Siliconix incorporated

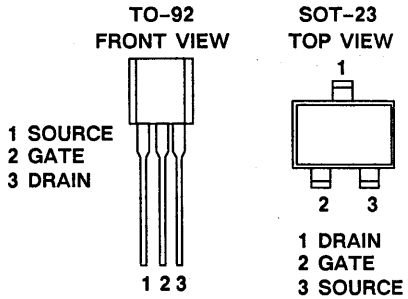
MOSPOWER

VP0610L, 2N7019

P-Channel Enhancement Mode Transistors[2]

PRODUCT SUMMARY

PART NUMBER	$V_{(BR)DSS}$ (VOLTS)	$r_{DS(on)}$ (OHMS)	I_D (AMPS)	PACKAGE OPTION
VP0610L	60	10	0.18	TO-92
2N7019	60	10	0.12	SOT-23



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	VP0610L	2N7019	Units
Drain-Source Voltage		V_{DS}	60	60	V
Gate-Source Voltage		V_{GS}	± 30	± 30	
Continuous Drain Current	T_A = 25°C	I_D	0.18	0.12	A
	T_A = 100°C		0.11	0.07	
Pulsed Drain Current[1]		I_{DM}	0.8	0.4	
Power Dissipation	T_A = 25°C	P_D	0.80	0.36	W
	T_A = 100°C		0.32	0.14	
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150		°C
Lead Temperature (1/16" from case for 10 secs.)		T_L	300		

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	Symbol	TO-92	SOT-23	Units
Junction-to-Ambient	R_{thJA}	156	350	°C/W

[1]Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, figure 11)
[2]Negative signs for current and voltage values have been omitted for the sake of clarity

ELECTRICAL CHARACTERISTICS (T_A= 25°C unless otherwise noted) P-Channel Device

Negative signs have been omitted for clarity

PARAMETERS/TEST CONDITIONS		Symbol	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage V_{GS} = 0, I_D = 10 µA		$V_{(BR)DSS}$	60	70	–	V
Gate Threshold Voltage V_{DS}= V_{GS}, I_D = 1 mA		$V_{GS(th)}$	1	2.7	4	
Gate-Body Leakage V_{DS}= 0, V_{GS} = ±20 V		I_{GSS}	–	±1	±10	nA
Zero Gate Voltage Drain Current V_{DS} = 48 V, V_{GS} = 0		I_{DSS}	–	0.02	1.0	µA
Zero Gate Voltage Drain Current V_{DS} = 48 V, V_{GS}= 0, T_J =125°C		I_{DSS}	–	1.0	200	
On-State Drain Current[2] V_{DS} = 10 V, V_{GS} = 10 V		$I_{D(on)}$	0.6	0.7	–	A
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 0.5 A		$r_{DS(on)}$	–	8	10	Ω
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 0.5 A, T_J = 125°C		$r_{DS(on)}$	–	16	20	
Forward Transconductance[2] V_{DS} =10 V, I_D = 0.5 A		g_{fs}	80	125	–	mS
Common Source Output Conductance V_{DS} =10 V, I_D =0.2 A		g_{os}	–	600	–	µS
Input Capacitance	V_{GS} = 0 V_{DS} = 25 V f = 1 MHz	C_{iss}	–	16	60	pF
Output Capacitance		C_{oss}	–	11	25	
Reverse Transfer Capacitance		C_{rss}	–	3	5	
Turn-On Delay Time	V_{DD} = 25 V, R_L= 47 Ω I_D ≅ 0.5 A, V_{GEN}= 10 V R_G = 25 Ω (Switching time is essentially independent of operating temperature)	$t_{d(on)}$	–	6	–	ns
Rise Time		t_r	–	15	–	
Turn-Off Delay Time		$t_{d(off)}$	–	5	–	
Fall Time		t_f	–	4.5	–	

TO-92 Only

SOURCE-DRAIN DIODE RATINGS & CHARACTERISTICS (T_A= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS	Symbol	Min.	Typ.	Max.	Units
Continuous Current	I_S	–	–	0.18	A
Pulsed Current[1]	I_{SM}	–	–	0.8	
Forward Voltage[2] I_F = I_S = 0.18 A, V_{GS}= 0	V_{SD}	–	0.9	1.5	V

[1] Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, figure 11)
[2] Pulse test: Pulse width ≤ 300 µsec, Duty Cycle ≤ 2%

PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 1: Typical Output Characteristics

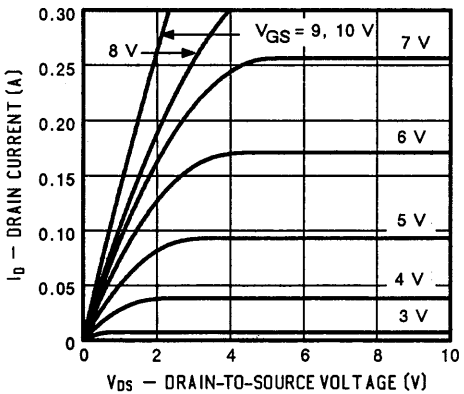


FIGURE 2: Typical Transfer Characteristics

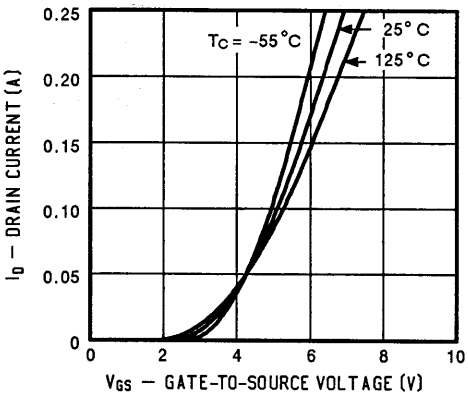


FIGURE 3: Typical Transconductance

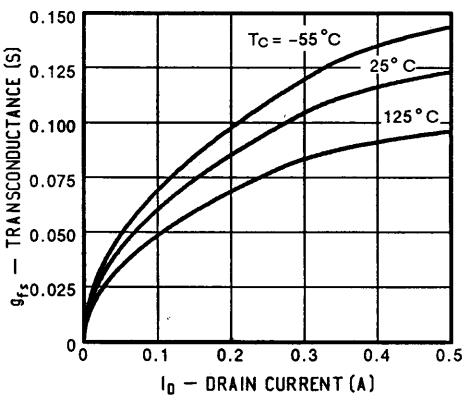


FIGURE 4: Typical On-Resistance

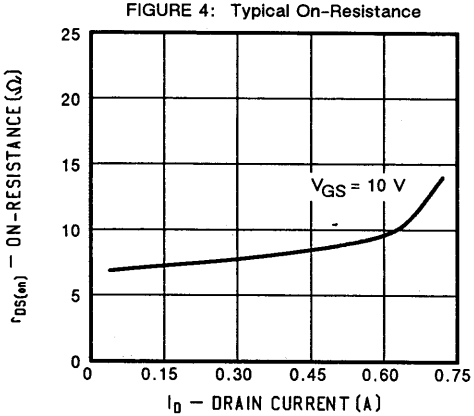


FIGURE 5: Typical Capacitance

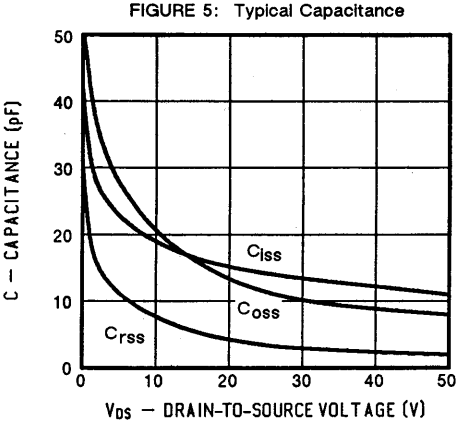
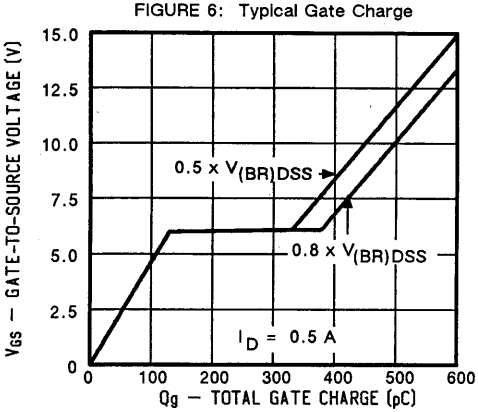


FIGURE 6: Typical Gate Charge



4

PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 7: On-Resistance vs. Junction Temperature

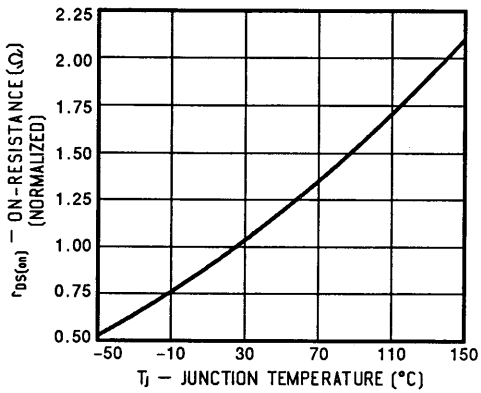


FIGURE 8: Typical Source-Drain Diode Forward Voltage

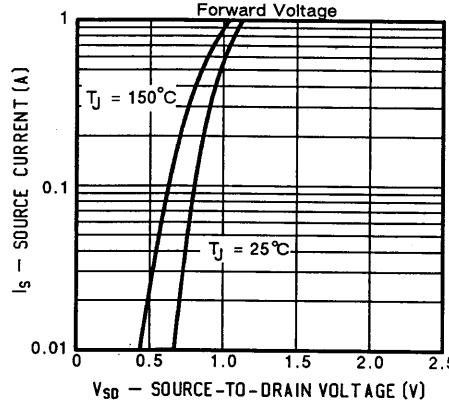


FIGURE 9: Maximum Avalanche and Drain Current vs. Ambient Temperature

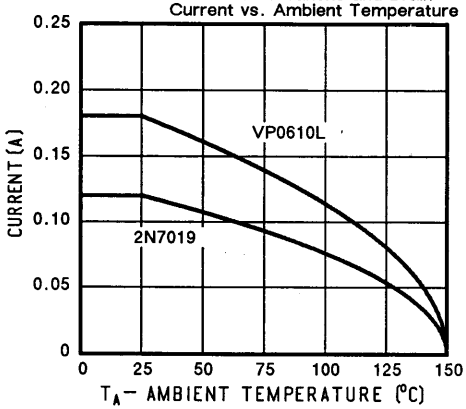
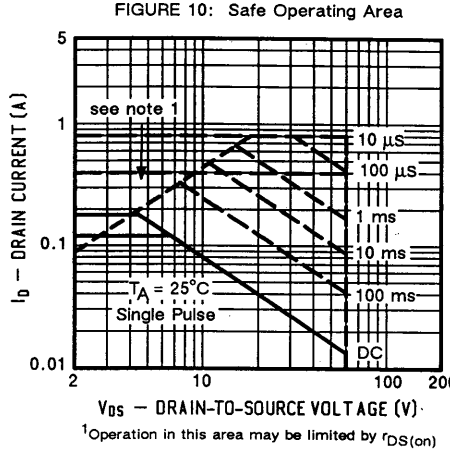
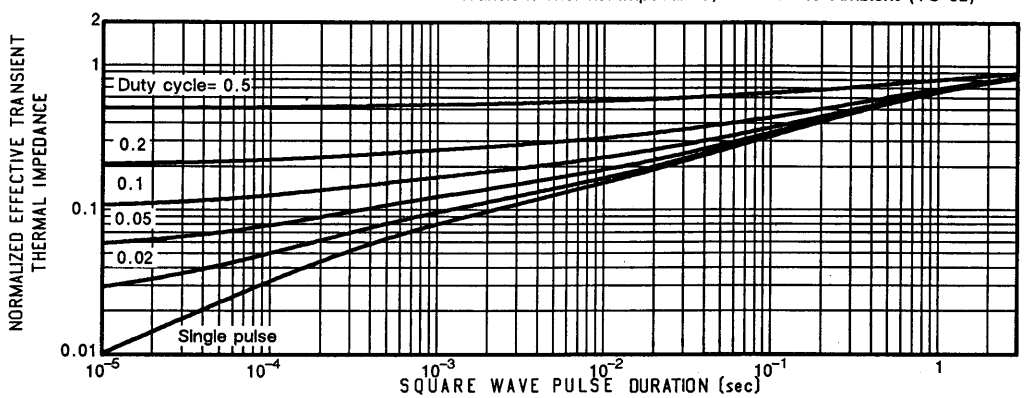


FIGURE 10: Safe Operating Area



[1]Operation in this area may be limited by $r_{DS(on)}$

FIGURE 11: Normalized Effective Transient Thermal Impedance, Junction-to-Ambient (TO-92)



PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 12: Low Voltage Output Characteristics

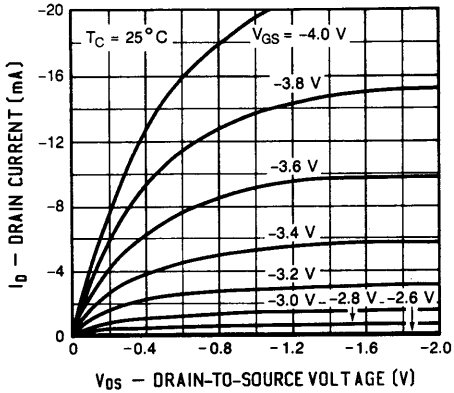


FIGURE 13: Ohmic Region Characteristics

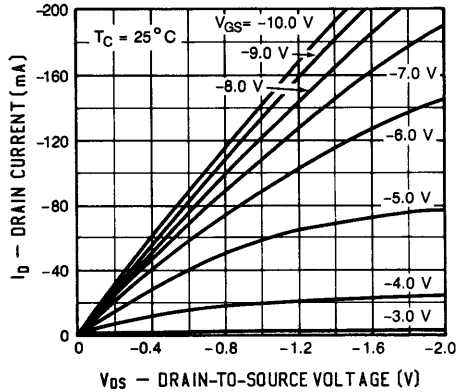


FIGURE 14: On-Resistance vs. Gate to Source Voltage

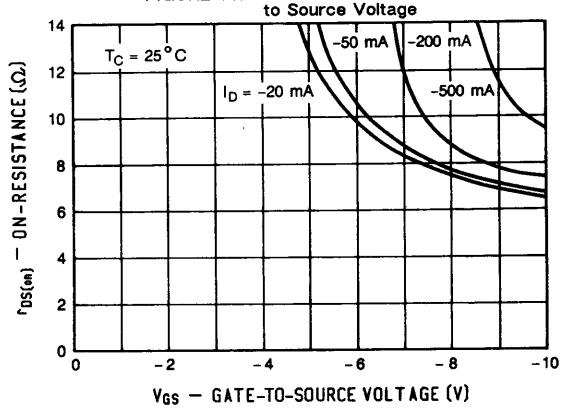


FIGURE 15: Off State Current

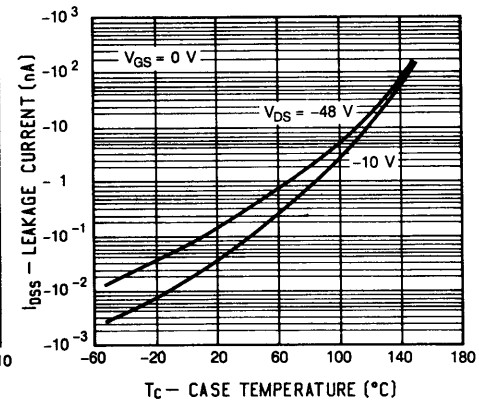


FIGURE 16: Switching Effects on Drive Resistance

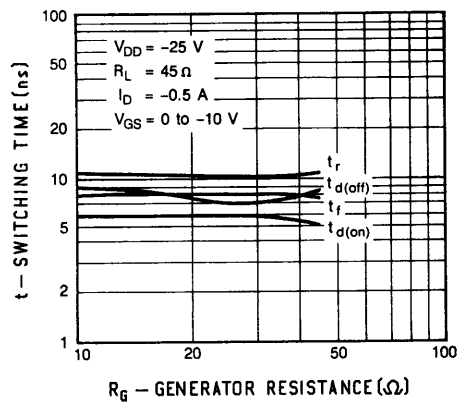
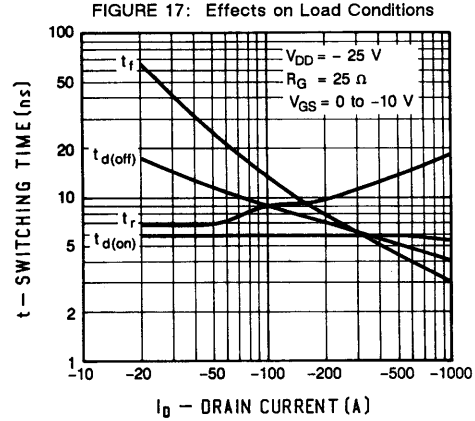


FIGURE 17: Effects on Load Conditions



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PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 18: Equivalent Input Noise Voltage vs. Frequency

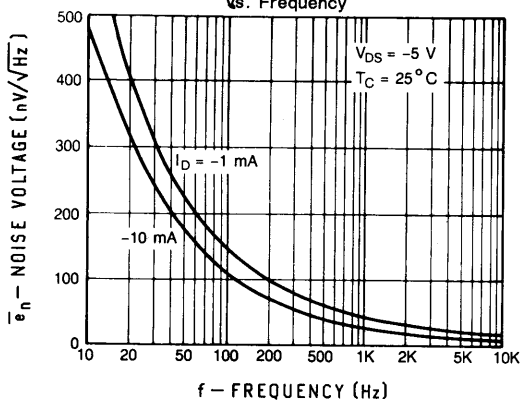


FIGURE 19: Threshold Region

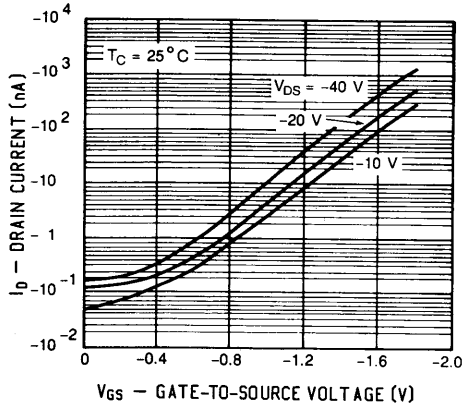


FIGURE 20: Output Conductance vs. Drain Current

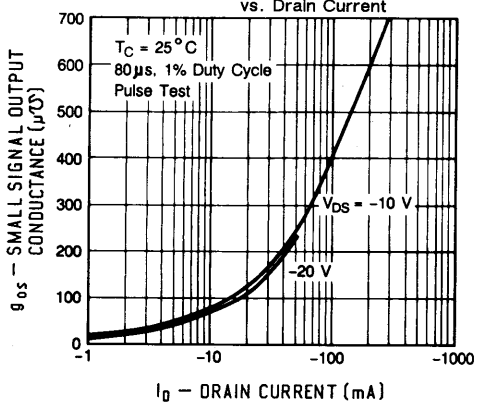
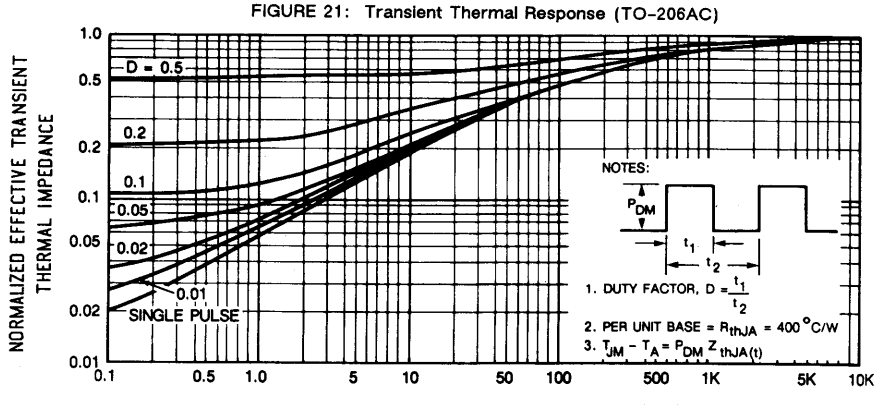


FIGURE 21: Transient Thermal Response (TO-206AC)



Siliconix incorporated

MOSPOWER

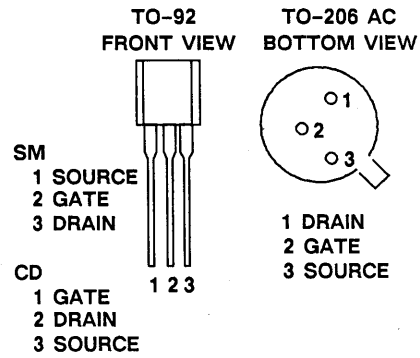
NOS2012L, BSS129 2N7020

N-Channel Depletion Mode Transistors

PRODUCT SUMMARY

PART NUMBER	$V_{(BR)DSS}$ (VOLTS)	$r_{DS(on)}$ (OHMS)	I_D (AMPS)	PACKAGE OPTION
NOS2012L	200	12	0.16	TO-92 SM
BSS129	200	12	0.18	TO-92 CD
2N7020	200	12	0.10	TO-206 AC (TO-52)

SM = Standard Mold, CD = Center Drain



ABSOLUTE MAXIMUM RATINGS (T_C= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	NOS2012L	BSS129	2N7020	Units
Drain-Source Voltage		V_{DS}	200	200	200	V
Gate-Source Voltage		V_{GS}	± 30	± 30	± 30	
Continuous Drain Current	T_A = 25°C	I_D	0.16	0.18	0.10	A
	T_A = 100°C		0.10	0.11	0.06	
Pulsed Drain Current[1]		I_{DM}	0.64	0.72	0.40	
Power Dissipation	T_A = 25°C	P_D	0.80	1.0	0.30	W
	T_A = 100°C		0.32	0.40	0.12	
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150			°C
Lead Temperature (1/16" from case for 10 secs.)		T_L	300			

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	Symbol	TO-92 NOS2012L	TO-92 BSS129	TO-52 2N7020	Units
Junction-to-Ambient	R_{thJA}	156	125	400	°C/W

[1]Pulse width limited by maximum junction temperature

4

ELECTRICAL CHARACTERISTICS (T_A= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage V_{GS} = -5 V, I_D = 1 µA		$V_{(BR)DSS}$	200	220	-	V
Gate Source Cutoff Voltage V_{DS}= 160 V, I_D = 10 µA		$V_{GS(off)}$	-2.5	-3.5	-4.5	V
Gate-Body Leakage V_{DS}= 0 V, V_{GS} = ±20 V		I_{GSS}	-	-	±100	nA
Zero Gate Voltage Drain Current V_{DS} = 160 V, V_{GS} = -10 V		$I_{D(off)}$	-	-	1	µA
Zero Gate Voltage Drain Current V_{DS} = 160 V, V_{GS} = -10 V, T_J =125°C		$I_{D(off)}$	-	-	200	µA
On-State Drain Current[2] V_{DS} = 10 V, V_{GS} = 0 V		$I_{D(on)}$	0.15	-	-	A
Drain-Source On-State Resistance[2] V_{GS} = 0 V, I_D = 100 mA		$r_{DS(on)}$	-	-	12	Ω
Drain-Source On-State Resistance[2] V_{GS} = 0 V, I_D = 100 mA, T_J = 125°C		$r_{DS(on)}$	-	-	24	Ω
Forward Transconductance[2] V_{DS} =10 V , I_D = 100 mA		g_{fs}	-	175	-	mS
Input Capacitance	V_{GS} = -10 V V_{DS} = 25 V f = 1 MHz	C_{iss}	-	50	-	pF
Output Capacitance		C_{oss}	-	25	-	pF
Reverse Transfer Capacitance		C_{rss}	-	12	-	pF

TO-92 Only

SOURCE-DRAIN DIODE RATINGS & CHARACTERISTICS (T_A= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS	Symbol	Min.	Typ.	Max.	Units
Continuous Current	I_S	-	-	0.16	A
Pulsed Current[1]	I_{SM}	-	-	0.64	A
Forward Voltage[2] I_F = I_S = 0.16 A, V_{GS}= 0	V_{SD}	-	-	1.5	V

[1] Pulse width limited by maximum junction temperature
[2] Pulse test: Pulse width ≤ 300 µsec, Duty Cycle ≤ 2%

Siliconix incorporated

MOSPOWER

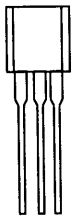
VP4030L, 2N7021

P-Channel Enhancement Mode Transistors[2]

PRODUCT SUMMARY

PART NUMBER	$V_{(BR)DSS}$ (VOLTS)	$r_{DS(on)}$ (OHMS)	I_D (AMPS)	PACKAGE OPTION
VP4030L	400	30	0.10	TO-92
2N7021	400	30	0.11	TO-205 AF

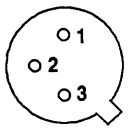
TO-92
FRONT VIEW



1 SOURCE
2 GATE
3 DRAIN

1 2 3

TO-205 AF
BOTTOM VIEW



1 DRAIN
2 GATE
3 SOURCE

ABSOLUTE MAXIMUM RATINGS (T_C= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	VP4030L	2N8021	Units
Drain-Source Voltage		V_{DS}	400	400	V
Gate-Source Voltage		V_{GS}	± 30	± 30	
Continuous Drain Current	T_A = 25°C	I_D	0.10	0.11	A
	T_A = 100°C		0.06	0.07	
Pulsed Drain Current[1]		I_{DM}	0.40	1.0	
Power Dissipation	T_A = 25°C	P_D	0.80	1.0	W
	T_A = 100°C		0.32	0.40	
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150		°C
Lead Temperature (1/16" from case for 10 secs.)		T_L	300		

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	Symbol	TO-92 SM	TO-205 AF	Units
Junction-to-Ambient	R_{thJA}	156	170	°C/W

[1]Pulse width limited by maximum junction temperature
[2]Negative signs for current and voltage values have been omitted for the sake of clarity

4

ELECTRICAL CHARACTERISTICS (T_A= 25°C unless otherwise noted) P-Channel Device

Negative signs have been omitted for clarity

PARAMETERS/TEST CONDITIONS	Symbol	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage V_{GS} = 0, I_D = 10 µA	$V_{(BR)DSS}$	400	420	–	V
Gate Threshold Voltage V_{DS}= V_{GS}, I_D = 2.5 mA	$V_{GS(th)}$	0.8	2.0	2.5	
Gate-Body Leakage V_{DS}= 0, V_{GS} = ±20 V	I_{GSS}	–	±1	±10	nA
Zero Gate Voltage Drain Current V_{DS} = 320 V, V_{GS} = 0	I_{DSS}	–	–	1.0	µA
Zero Gate Voltage Drain Current V_{DS} = 320 V, V_{GS}= 0, T_J =125°C	I_{DSS}	–	–	100	
On-State Drain Current[2] V_{DS} = 10 V, V_{GS} = 4.5 V	$I_{D(on)}$	0.10	–	–	A
Drain-Source On-State Resistance[2] V_{GS} = 4.5 V, I_D = 100 mA	$r_{DS(on)}$	–	27	30	Ω
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 100 mA, T_J = 125°C	$r_{DS(on)}$	–	–	60	
Forward Transconductance[2] V_{DS} =10 V, I_D = 100 mA	g_{fs}	50	–	–	mS
Input Capacitance V_{GS} = 0 V_{DS} = 25 V f = 1 MHz	C_{iss}	–	80	100	pF
Output Capacitance	C_{oss}	–	15	20	
Reverse Transfer Capacitance	C_{rss}	–	7	10	

TO-92 Only
SOURCE-DRAIN DIODE RATINGS & CHARACTERISTICS (T_A= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS	Symbol	Min.	Typ.	Max.	Units
Continuous Current	I_S	–	–	0.10	A
Pulsed Current[1]	I_{SM}	–	–	0.48	
Forward Voltage[2] I_F = I_S = 0.10 A, V_{GS}= 0	V_{SD}	–	–	1.4	V

[1] Pulse width limited by maximum junction temperature
[2] Pulse test: Pulse width ≤ 300 µsec, Duty Cycle ≤ 2%

Siliconix incorporated

MOSPOWER

VN4012L, VN3515L 2N7022

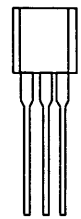
N-Channel Enhancement Mode Transistors

PRODUCT SUMMARY

PART NUMBER	$V_{(BR)DSS}$ (VOLTS)	$r_{DS(on)}$ (OHMS)	I_D (AMPS)	PACKAGE OPTION
VN4012L	400	12	0.16	TO-92
VN3515L	350	15	0.15	TO-92
2N7022	400	12	0.18	TO-205 AF

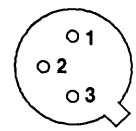
TO-92
FRONT VIEW

1 SOURCE
2 GATE
3 DRAIN



1 2 3

TO-205 AF
BOTTOM VIEW



1 DRAIN
2 GATE
3 SOURCE

ABSOLUTE MAXIMUM RATINGS (T_C= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	VN4012L	VN3515L	2N7022	Units
Drain-Source Voltage		V_{DS}	400	350	400	V
Gate-Source Voltage		V_{GS}	± 30	± 30	± 30	
Continuous Drain Current	T_A = 25°C	I_D	0.16	0.15	0.18	A
	T_A = 100°C		0.10	0.09	0.11	
Pulsed Drain Current[1]		I_{DM}	0.80	0.72	1.6	
Power Dissipation	T_A = 25°C	P_D	0.80	0.80	1.0	W
	T_A = 100°C		0.32	0.32	0.40	
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150			°C
Lead Temperature (1/16" from case for 10 secs.)		T_L	300			

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	Symbol	TO-92 SM	TO-205 AF	Units
Junction-to-Ambient	R_{thJA}	156	125	°C/W

[1]Pulse width limited by maximum junction temperature

4

ELECTRICAL CHARACTERISTICS (T_A= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage V_{GS} = 0, I_D = 100 µA		$V_{(BR)DSS}$	400	415	–	V
Gate Threshold Voltage V_{DS}= V_{GS}, I_D = 1 mA		$V_{GS(th)}$	0.6	1.4	1.8	
Gate-Body Leakage V_{DS}= 0, V_{GS} = ±20 V		I_{GSS}	–	±1	±10	nA
Zero Gate Voltage Drain Current V_{DS} = 360 V, V_{GS} = 0		I_{DSS}	–	–	1.0	µA
Zero Gate Voltage Drain Current V_{DS} = 0.8 x $V_{(BR)DSS}$, V_{GS}= 0, T_J =125°C		I_{DSS}	–	–	100	
On-State Drain Current[2] V_{DS} = 10 V, V_{GS} = 4.5 V		$I_{D(on)}$	0.15	0.3	–	A
Drain-Source On-State Resistance[2] V_{GS} = 4.5 V, I_D = 100 mA		$r_{DS(on)}$	–	–	12	Ω
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 100 mA, T_J = 125°C		$r_{DS(on)}$	–	–	20	
Forward Transconductance[2] V_{DS} =15 V, I_D =100 mA		g_{fs}	125	250	–	mS
Input Capacitance	V_{GS} = 0 V_{DS} = 25 V f = 1 MHz	C_{iss}	–	80	90	pF
Output Capacitance		C_{oss}	–	15	20	
Reverse Transfer Capacitance		C_{rss}	–	3	5	
Turn-On Delay Time	V_{DD} = 25 V, R_L= 250 Ω I_D ≅ 0.1 A, V_{GEN} = 10 V R_G = 25 Ω (Switching time is essentially independent of operating temperature)	$t_{d(on)}$	–	10	20	ns
Rise Time		t_r	–	10	20	
Turn-Off Delay Time		$t_{d(off)}$	–	45	65	
Fall Time		t_f	–	45	65	

TO-92 Only
SOURCE-DRAIN DIODE RATINGS & CHARACTERISTICS (T_A= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS	Symbol	Min.	Typ.	Max.	Units
Continuous Current	I_S	–	–	0.16	A
Pulsed Current[1]	I_{SM}	–	–	0.8	
Forward Voltage[2] I_F = I_S, V_{GS} = 0	V_{SD}	–	0.9	1.2	V

[1] Pulse width limited by maximum junction temperature
[2] Pulse test: Pulse width ≤ 300 µsec, Duty Cycle ≤ 2%

Siliconix incorporated

MOSPOWER

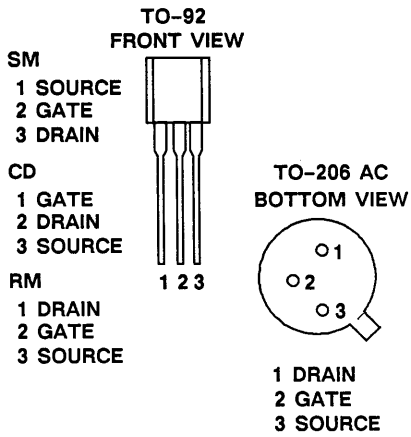
VP2020L, BSS92 BS208, 2N7023

P-Channel Enhancement Mode Transistors[2]

PRODUCT SUMMARY

PART NUMBER	$V_{(BR)DSS}$ (VOLTS)	$r_{DS(on)}$ (OHMS)	I_D (AMPS)	PACKAGE OPTION
VP2020L	200	20	0.12	TO-92 SM
BSS92	200	20	0.14	TO-92 CD
BS208	200	20	0.12	TO-92 RM
2N7023	200	20	0.07	TO-206 AC (TO-52)

SM = Standard Mold, RM = Reverse Mold, CD = Center Drain



ABSOLUTE MAXIMUM RATINGS (T_C = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	VP 2020L	BSS 92	BS 208	2N 7023	Units
Drain-Source Voltage		V_{DS}	200	200	200	200	V
Gate-Source Voltage		V_{GS}	± 30	± 30	± 30	± 30	
Continuous Drain Current	T_A = 25°C	I_D	0.12	0.14	0.12	0.07	A
	T_A = 100°C		0.08	0.08	0.08	0.04	
Pulsed Drain Current[1]		I_{DM}	0.48	0.56	0.48	0.90	
Power Dissipation	T_A = 25°C	P_D	0.80	1.0	0.80	0.30	W
	T_A = 100°C		0.32	0.40	0.32	0.12	
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150				°C
Lead Temperature (1/16" from case for 10 secs.)		T_L	300				

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	Symbol	TO-92 SM & RM	TO-92 CD	TO-206	Units
Junction-to-Ambient	R_{thJA}	156	125	400	°C/W

[1]Pulse width limited by maximum junction temperature
[2]Negative signs for current and voltage values have been omitted for the sake of clarity

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) P-Channel Device

Negative signs have been omitted for clarity

PARAMETERS/TEST CONDITIONS		Symbol	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage V_{GS} = 0, I_D = 10 µA		$V_{(BR)DSS}$	200	215	–	V
Gate Threshold Voltage V_{DS} = V_{GS}, I_D = 1 mA		$V_{GS(th)}$	0.8	2.0	2.5	
Gate-Body Leakage V_{DS} = 0, V_{GS} = ±20 V		I_{GSS}	–	±1	±10	nA
Zero Gate Voltage Drain Current V_{DS} = 160 V, V_{GS} = 0		I_{DSS}	–	–	1.0	µA
Zero Gate Voltage Drain Current V_{DS} = 160 V, V_{GS} = 0, T_J = 125°C		I_{DSS}	–	–	100	
On-State Drain Current[2] V_{DS} = 10 V, V_{GS} = 4.5 V		$I_{D(on)}$	0.1	–	–	A
Drain-Source On-State Resistance[2] V_{GS} = 4.5 V, I_D = 100 mA		$r_{DS(on)}$	–	16	20	Ω
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 100 mA, T_J = 125°C		$r_{DS(on)}$	–	–	40	
Forward Transconductance[2] V_{DS} = 10 V, I_D = 100 mA		g_{fs}	100	–	–	mS
Input Capacitance	V_{GS} = 0 V_{DS} = 25 V f = 1 MHz	C_{iss}	–	–	70	pF
Output Capacitance		C_{oss}	–		20	
Reverse Transfer Capacitance		C_{rss}	–	–	10	

TO-92 Only
SOURCE-DRAIN DIODE RATINGS & CHARACTERISTICS (T_A = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS	Symbol	Min.	Typ.	Max.	Units
Continuous Current	I_S	–	–	0.12	A
Pulsed Current[1]	I_{SM}	–	–	0.48	
Forward Voltage[2] I_F = I_S = 0.12 A, V_{GS} = 0	V_{SD}	–	–	1.2	V

[1] Pulse width limited by maximum junction temperature
[2] Pulse test: Pulse width ≤ 300 µsec, Duty Cycle ≤ 2%

Siliconix incorporated

MOSPOWER

NOS2406L, 2N7024

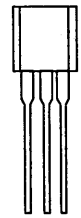
N-Channel Depletion Mode Transistors

PRODUCT SUMMARY

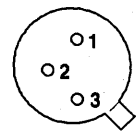
PART NUMBER	$V_{(BR)DSS}$ (VOLTS)	$r_{DS(on)}$ (OHMS)	I_D (AMPS)	PACKAGE OPTION
NOS2406L	240	6	0.23	TO-92
2N7024	240	6	0.14	TO-206 AC (TO-52)

TO-92
FRONT VIEW

1 SOURCE
2 GATE
3 DRAIN



TO-206 AC
BOTTOM VIEW



1 DRAIN
2 GATE
3 SOURCE

ABSOLUTE MAXIMUM RATINGS (T_C= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	NOS2406L	2N7024	Units
Drain-Source Voltage		V_{DS}	240	240	V
Gate-Source Voltage		V_{GS}	± 30	± 30	
Continuous Drain Current	T_A = 25°C	I_D	0.23	0.14	A
	T_A = 100°C		0.14	0.09	
Pulsed Drain Current[1]		I_{DM}	0.92	1.0	
Power Dissipation	T_A = 25°C	P_D	0.80	0.3	W
	T_A = 100°C		0.32	0.12	
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150		°C
Lead Temperature (1/16" from case for 10 secs.)		T_L	300		

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	Symbol	TO-92	TO-206	Units
Junction-to-Ambient	R_{thJA}	156	400	°C/W

[1]Pulse width limited by maximum junction temperature

4

ELECTRICAL CHARACTERISTICS (T_A= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage V_{GS} = -5 V, I_D = 1 µA		$V_{(BR)DSS}$	240	250	-	V
Gate Source Cutoff Voltage V_{DS}= 160 V, I_D = 10 µA		$V_{GS(off)}$	-2.5	-3.5	-4.5	
Gate-Body Leakage V_{DS}= 0, V_{GS} = ±20 V		I_{GSX}	-	-	±100	nA
Zero Gate Voltage Drain Current V_{DS} = 190 V, V_{GS} = -10 V		$I_{D(off)}$	-	-	1	µA
Zero Gate Voltage Drain Current V_{DS} = 190 V, V_{GS}= -10 V, T_J =125°C		$I_{D(off)}$	-	-	200	
On-State Drain Current[2] V_{DS} = 10 V, V_{GS} = 0 V		$I_{D(on)}$	0.6	-	-	A
Drain-Source On-State Resistance[2] V_{GS} = 0 V, I_D = 100 mA		$r_{DS(on)}$	-	-	6	Ω
Drain-Source On-State Resistance[2] V_{GS} = 0 V, I_D = 100 mA, T_J = 125°C		$r_{DS(on)}$	-	-	12	
Forward Transconductance[2] V_{DS} =10 V , I_D = 100 mA		g_{fs}	100	200	-	mS
Input Capacitance	V_{GS} = -10 V V_{DS} = 25 V f = 1 MHz	C_{iss}	-	65	-	pF
Output Capacitance		C_{oss}	-	18	-	
Reverse Transfer Capacitance		C_{rss}	-	6	-	

TO-92 Only
SOURCE-DRAIN DIODE RATINGS & CHARACTERISTICS (T_A= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS	Symbol	Min.	Typ.	Max.	Units
Continuous Current	I_S	-	-	0.23	A
Pulsed Current[1]	I_{SM}	-	-	0.92	
Forward Voltage[2] I_F = I_S = 0.23 A, V_{GS}= 10 V	V_{SD}	-	-	1.5	V

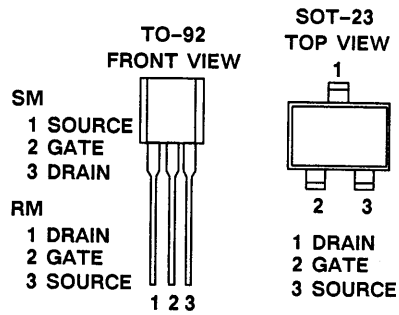
[1] Pulse width limited by maximum junction temperature
[2] Pulse test: Pulse width ≤ 300 µsec, Duty Cycle ≤ 2%

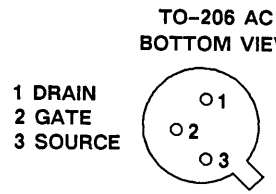
Siliconix incorporated

MOSPOWER

BS250, 2N7025 2N7026, 2N7027

P-Channel Enhancement Mode Transistors[2]





PRODUCT SUMMARY

PART NUMBER	$V_{(BR)DSS}$ (VOLTS)	$r_{DS(on)}$ (OHMS)	I_D (AMPS)	PACKAGE OPTION
BS250	45	14	0.15	TO-92 RM
2N7025	30	7	0.18	TO-92 SM
2N7026	30	7	0.12	SOT-23
2N7027	30	7	0.11	TO-206 AC (TO-52)

SM = Standard Mold, RM = Reverse Mold

ABSOLUTE MAXIMUM RATINGS (T_C= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	BS250	2N			Units
				7025	7026	7027	
Drain-Source Voltage		V_{DS}	45	30	30	30	V
Gate-Source Voltage		V_{GS}	± 30	± 30	± 30	± 30	V
Continuous Drain Current	T_A = 25°C	I_D	0.15	0.18	0.12	0.11	A
	T_A = 100°C		0.095	0.11	0.07	0.07	A
Pulsed Drain Current[1]		I_{DM}	0.69	0.69	0.48	0.60	A
Power Dissipation	T_A = 25°C	P_D	0.83	0.80	0.36	0.30	W
	T_A = 100°C		0.32	0.32	0.14	0.12	W
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150				°C
Lead Temperature (1/16" from case for 10 secs.)		T_L	300				°C

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	Symbol	TO-92	SOT-23	TO-206	Units
Junction-to-Ambient	R_{thJA}	156	350	400	°C/W

[1]Pulse width limited by maximum junction temperature
[2]Negative signs for current and voltage values have been omitted for the sake of clarity

4

ELECTRICAL CHARACTERISTICS (T_A= 25°C unless otherwise noted) P-Channel Device

Negative signs have been omitted for clarity

PARAMETERS/TEST CONDITIONS		Symbol	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage V_{GS} = 0, I_D = 100 µA		$V_{(BR)DSS}$	45	60	-	V
Gate Threshold Voltage V_{DS}= V_{GS}, I_D = 1 mA		$V_{GS(th)}$	1	2.7	3.5	
Gate-Body Leakage V_{DS}= 0, V_{GS} = ±15 V		I_{GSS}	-	±1	±20	nA
Zero Gate Voltage Drain Current V_{DS} = 36 V, V_{GS} = 0		I_{DSS}	-	-	0.5	µA
Zero Gate Voltage Drain Current V_{DS} = 36 V, V_{GS} = 0, T_J =125°C		I_{DSS}	-	-	2000	
On-State Drain Current[2] V_{DS} = 10 V, V_{GS} = 10 V		$I_{D(on)}$	0.2	-	-	A
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 0.2 A		$r_{DS(on)}$	-	-	14	Ω
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 0.2 A, T_J = 125°C		$r_{DS(on)}$	-	-	28	
Forward Transconductance[2] V_{DS} =10 V, I_D = 0.2 A		g_{fs}	100	-	-	mS
Common Source Output Conductance V_{DS} =10 V, I_D = 0.2 A		g_{os}	-	600	-	µS
Input Capacitance	V_{GS} = 0 V_{DS} = 15 V f = 1 MHz	C_{iss}	-	25	60	pF
Output Capacitance		C_{oss}	-	15	25	
Reverse Transfer Capacitance		C_{rss}	-	4	8	
Turn-On Time	V_{DD} = 25 V, R_L= 120 Ω I_D = 200 mA, V_{GEN}= 10 V R_G = 25 Ω (Switching time is essentially independent of operating temperature)	$t_{(on)}$	-	16	-	ns
Turn-Off Time		$t_{(off)}$	-	15	-	

TO-92 Only
SOURCE-DRAIN DIODE RATINGS & CHARACTERISTICS (T_A= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS	Symbol	Min.	Typ.	Max.	Units
Continuous Current	I_S	-	-	0.15	A
Pulsed Current[1]	I_{SM}	-	-	0.69	
Forward Voltage[2] I_F = I_S = 0.15 A, V_{GS} = 0	V_{SD}	-	0.9	1.5	V

[1] Pulse width limited by maximum junction temperature
[2] Pulse test: Pulse width ≤ 300 µsec, Duty Cycle ≤ 2%

Siliconix incorporated

MOSPOWER

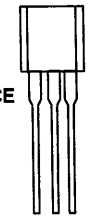
VP2410L, 2N7030

P-Channel Enhancement Mode Transistors[2]

PRODUCT SUMMARY

PART NUMBER	$V_{(BR)DSS}$ (VOLTS)	$r_{DS(on)}$ (OHMS)	I_D (AMPS)	PACKAGE OPTION
VP2410L	200	10	0.18	TO-92
2N7030	200	10	0.17	TO-205 AF

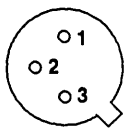
TO-92
FRONT VIEW



1 SOURCE
2 GATE
3 DRAIN

1 2 3

TO-205 AF
BOTTOM VIEW



1 DRAIN
2 GATE
3 SOURCE

ABSOLUTE MAXIMUM RATINGS (T_C= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	VP2410L	2N7030	Units
Drain-Source Voltage		V_{DS}	200	200	V
Gate-Source Voltage		V_{GS}	± 30	± 30	
Continuous Drain Current	T_A = 25°C	I_D	0.18	0.17	A
	T_A = 100°C		0.11	0.10	
Pulsed Drain Current[1]		I_{DM}	0.72	1.7	
Power Dissipation	T_A = 25°C	P_D	0.80	0.73	W
	T_A = 100°C		0.32	0.29	
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150		°C
Lead Temperature (1/16" from case for 10 secs.)		T_L	300		

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	Symbol	TO-92 SM	TO-205 AF	Units
Junction-to-Ambient	R_{thJA}	156	170	°C/W

[1]Pulse width limited by maximum junction temperature
[2]Negative signs for current and voltage values have been omitted for the sake of clarity

4

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) P-Channel Device

Negative signs have been omitted for clarity

PARAMETERS/TEST CONDITIONS	Symbol	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage V_{GS} = 0, I_D = 5 µA	$V_{(BR)DSS}$	240	260	–	V
Gate Threshold Voltage V_{DS} = V_{GS}, I_D = 2.5 mA	$V_{GS(th)}$	0.8	2.0	2.5	
Gate-Body Leakage V_{DS} = 0, V_{GS} = ±20 V	I_{GSS}	–	±1	±10	nA
Zero Gate Voltage Drain Current V_{DS} = 192 V, V_{GS} = 0	I_{DSS}	–	–	1.0	µA
Zero Gate Voltage Drain Current V_{DS} = 192 V, V_{GS} = 0, T_J = 125°C	I_{DSS}	–	–	100	
On-State Drain Current[2] V_{DS} = 10 V, V_{GS} = 4.5 V	$I_{D(on)}$	0.15	–	–	A
Drain-Source On-State Resistance[2] V_{GS} = 4.5 V, I_D = 100 mA	$r_{DS(on)}$	–	–	10	Ω
Drain-Source On-State Resistance[2] V_{GS} = 4.5 V, I_D = 100 mA, T_J = 125°C	$r_{DS(on)}$	–	–	20	
Forward Transconductance[2] V_{DS} = 10 V, I_D = 100 mA	g_{fs}	125	–	–	mS
Input Capacitance V_{GS} = 0 V_{DS} = 25 V f = 1 MHz	C_{iss}	–	95	–	pF
Output Capacitance	C_{oss}	–	20	–	
Reverse Transfer Capacitance	C_{rss}	–	10	–	

TO-92 Only

SOURCE-DRAIN DIODE RATINGS & CHARACTERISTICS (T_A = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS	Symbol	Min.	Typ.	Max.	Units
Continuous Current	I_S	–	–	0.18	A
Pulsed Current[1]	I_{SM}	–	–	0.72	
Forward Voltage[2] I_F = I_S, V_{GS} = 0	V_{SD}	–	–	1.4	V

[1] Pulse width limited by maximum junction temperature
[2] Pulse test: Pulse width ≤ 300 µsec, Duty Cycle ≤ 2%

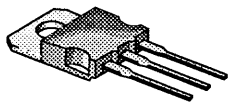
Siliconix incorporated

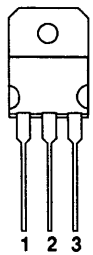
MOSPOWER

2N7054

N-Channel Enhancement Mode Transistor

TOP VIEW





TO-218

1 GATE
2 DRAIN
3 SOURCE

PRODUCT SUMMARY

PART NUMBER	$V_{(BR)DSS}$ (VOLTS)	$r_{DS(on)}$ (OHMS)	I_D (AMPS)
2N7054	100	0.060	38

ABSOLUTE MAXIMUM RATINGS (T_C= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	2N7054	Units
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 40	
Continuous Drain Current	T_C = 25°C	I_D	38	A
	T_C = 100°C		24	
Pulsed Drain Current[1]		I_{DM}	160	
Power Dissipation	T_C = 25°C	P_D	150	W
	T_C = 100°C		60	
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C
Lead Temperature (1/16" from case for 10 secs.)		T_L	300	

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	Symbol	Typ.	Max.	Units
Junction-to-Case	R_{thJC}	-	0.83	K/W
Junction-to-Ambient	R_{thJA}	-	30	
Case-to-Sink	R_{thCS}	0.4	-	

[1]Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, figure 11)

4

Siliconix incorporated

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage V_{GS} = 0, I_D = 250 µA		$V_{(BR)DSS}$	100	–	–	V
Gate Threshold Voltage V_{DS} = V_{GS}, I_D = 1000 µA		$V_{GS(th)}$	2.0	–	4.0	
Gate-Body Leakage V_{DS} = 0, V_{GS} = ±20 V		I_{GSS}	–	–	100	nA
Zero Gate Voltage Drain Current V_{DS} = $V_{(BR)DSS}$, V_{GS} = 0		I_{DSS}	–	–	250	µA
Zero Gate Voltage Drain Current V_{DS} = 0.8 x $V_{(BR)DSS}$, V_{GS} = 0, T_J =125°C		I_{DSS}	–	–	1000	
On-State Drain Current[2] V_{DS} = 5.0 V, V_{GS} = 10 V		$I_{D(on)}$	38	–	–	A
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 20 A		$r_{DS(on)}$	–	0.045	0.060	Ω
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 20 A, T_J = 125°C		$r_{DS(on)}$	–	0.08	0.096	
Forward Transconductance[2] V_{DS} =15 V, I_D = 20 A		g_{fs}	8.0	11.0	–	S(℧)
Input Capacitance	V_{GS} = 0 V_{DS} = 25 V f = 1 MHz	C_{iss}	–	2800	3300	pF
Output Capacitance		C_{oss}	–	1100	1500	
Reverse Transfer Capacitance		C_{rss}	–	400	700	
Total Gate Charge	V_{DS} = 0.5 x $V_{(BR)DSS}$, V_{GS} = 10 V, I_D = 38 A (Gate charge is essentially independent of operating temperature)	Q_g	–	62	120	nC
Gate-Source Charge		Q_{gs}	–	15	–	
Gate-Drain Charge		Q_{gd}	–	29	–	
Turn-On Delay Time	V_{DD} = 30 V, R_L = 1.5 Ω I_D = 20 A, V_{GEN} = 10 V R_G = 2.5 Ω (Switching time is essentially independent of operating temperature)	$t_{d(on)}$	–	15	35	ns
Rise Time		t_r	–	30	100	
Turn-Off Delay Time		$t_{d(off)}$	–	50	120	
Fall Time		t_f	–	20	100	

SOURCE-DRAIN DIODE RATINGS & CHARACTERISTICS (T_J = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS	Symbol	Min.	Typ.	Max.	Units
Continuous Current	I_S	–	–	38	A
Pulsed Current[1]	I_{SM}	–	–	160	
Forward Voltage[2] I_F = I_S, V_{GS} = 0	V_{SD}	–	–	2.3	V
Reverse Recovery Time I_F = I_S, dI_F/dt = 100 A/µs	t_{rr}	–	150	400	ns
Reverse Recovered Charge I_F = I_S, dI_F/dt = 100 A/µs	Q_{rr}	–	0.5	–	µC

[1] Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, figure 11)
[2] Pulse test: Pulse width ≤ 300 µsec, Duty Cycle ≤ 2%

PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 1: Typical Output Characteristics

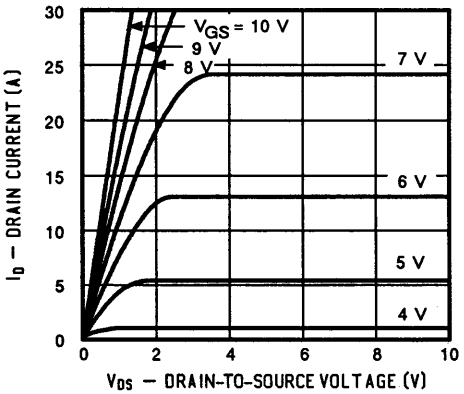


FIGURE 2: Typical Transfer Characteristics

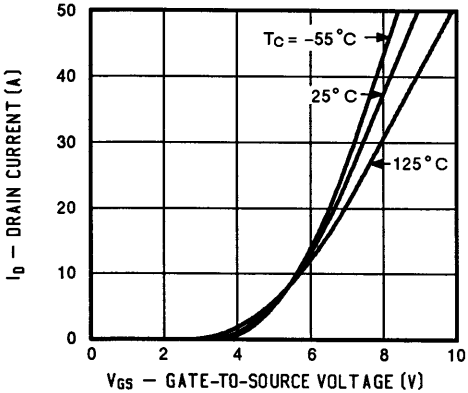


FIGURE 3: Typical Transconductance

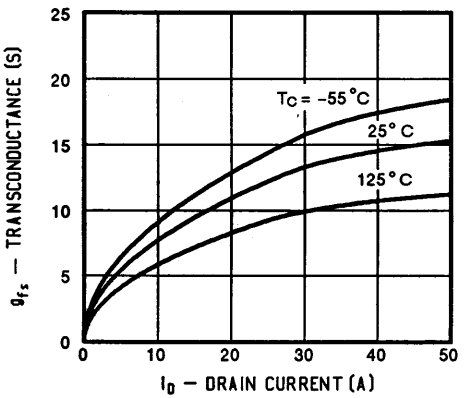


FIGURE 4: Typical On-Resistance

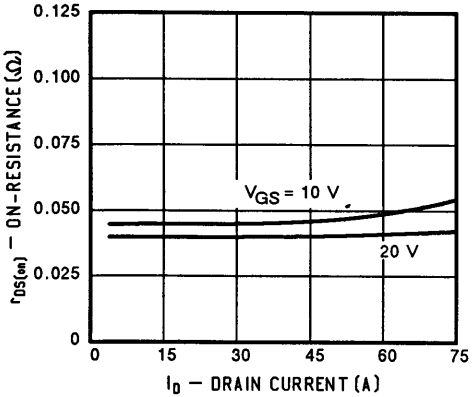


FIGURE 5: Typical Capacitance

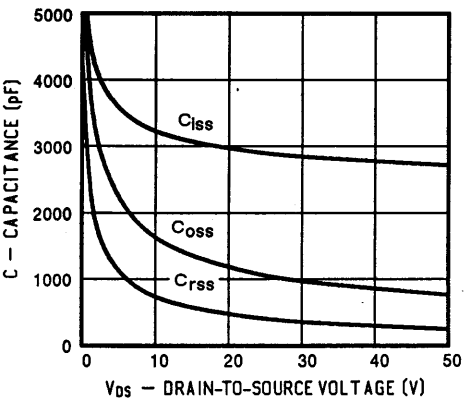
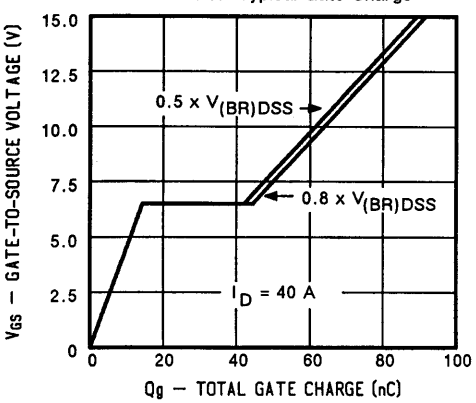


FIGURE 6: Typical Gate Charge



4

Siliconix incorporated

PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 7: On-Resistance vs. Junction Temperature

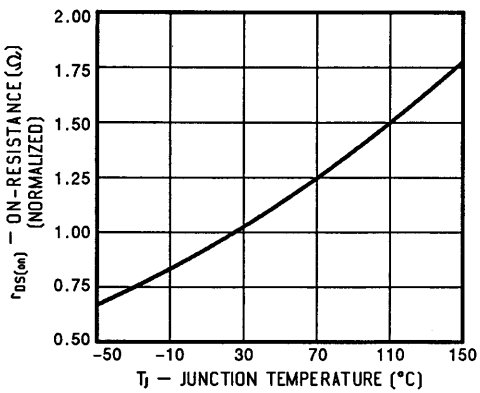


FIGURE 8: Typical Source-Drain Diode Forward Voltage

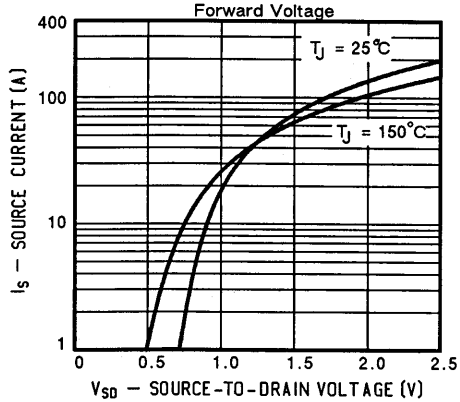


FIGURE 9: Maximum Drain Current vs. Case Temperature

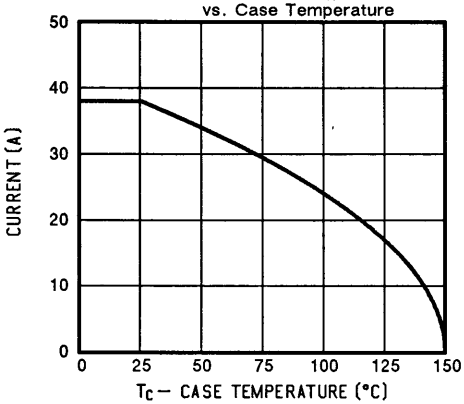
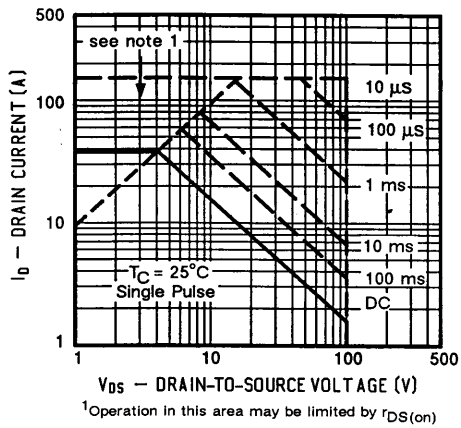
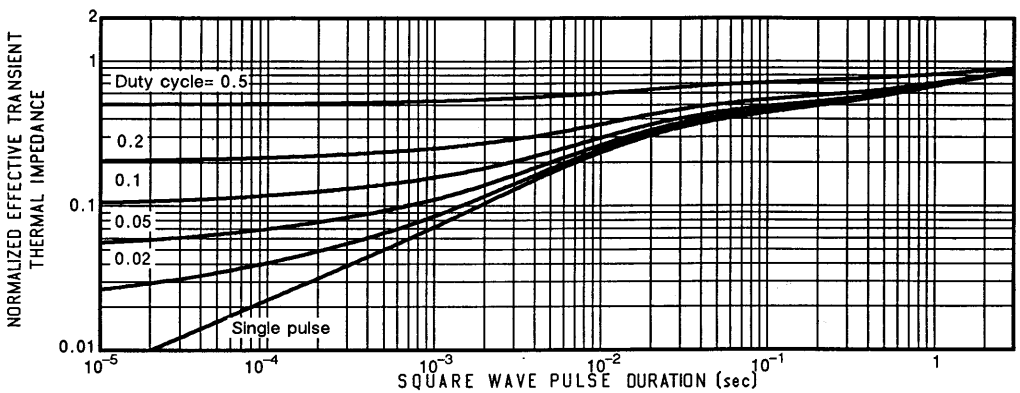


FIGURE 10: Safe Operating Area



[1]Operation in this area may be limited by $r_{DS(on)}$

FIGURE 11: Normalized Effective Transient Thermal Impedance, Junction-to-Case



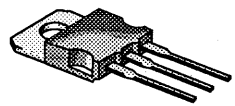
Siliconix incorporated

MOSPOWER

2N7055

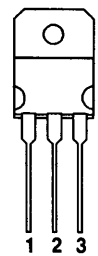
N-Channel Enhancement Mode Transistor

TOP VIEW



TO-218

1 GATE
2 DRAIN
3 SOURCE



PRODUCT SUMMARY

PART NUMBER	$V_{(BR)DSS}$ (VOLTS)	$r_{DS(on)}$ (OHMS)	I_D (AMPS)
2N7055	200	0.10	28

ABSOLUTE MAXIMUM RATINGS (T_C= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	2N7055	Units
Drain-Source Voltage		V_{DS}	200	V
Gate-Source Voltage		V_{GS}	± 40	
Continuous Drain Current	T_C = 25°C	I_D	28	A
	T_C = 100°C		17	
Pulsed Drain Current[1]		I_{DM}	120	
Avalanche Current (see figure 9)		I_A	28	
Power Dissipation	T_C = 25°C	P_D	150	W
	T_C = 100°C		60	
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C
Lead Temperature (1/16" from case for 10 secs.)		T_L	300	

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	Symbol	Typ.	Max.	Units
Junction-to-Case	R_{thJC}	-	0.83	K/W
Junction-to-Ambient	R_{thJA}	-	30	
Case-to-Sink	R_{thCS}	0.4	-	

[1]Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, figure 11)

4

Siliconix incorporated

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage V_{GS} = 0, I_D = 250 µA		$V_{(BR)DSS}$	200	-	-	V
Gate Threshold Voltage V_{DS} = V_{GS}, I_D = 1000 µA		$V_{GS(th)}$	2.0	-	4.0	
Gate-Body Leakage V_{DS} = 0, V_{GS} = ±20 V		I_{GSS}	-	-	100	nA
Zero Gate Voltage Drain Current V_{DS} = $V_{(BR)DSS}$, V_{GS} = 0		I_{DSS}	-	-	250	µA
Zero Gate Voltage Drain Current V_{DS} = 0.8 x $V_{(BR)DSS}$, V_{GS} = 0, T_J =125°C		I_{DSS}	-	-	1000	
On-State Drain Current[2] V_{DS} = 10 V, V_{GS} = 10 V		$I_{D(on)}$	28	-	-	A
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 16 A		$r_{DS(on)}$	-	0.07	0.100	Ω
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 9.0 A, T_J = 125°C		$r_{DS(on)}$	-	0.12	0.175	
Forward Transconductance[2] V_{DS} =15 V, I_D = 16 A		g_{fs}	8.0	13	-	S(℧)
Input Capacitance	V_{GS} = 0 V_{DS} = 25 V f = 1 MHz	C_{iss}	-	2700	3300	pF
Output Capacitance		C_{oss}	-	850	1200	
Reverse Transfer Capacitance		C_{rss}	-	300	600	
Total Gate Charge	V_{DS} =.0.5 x $V_{(BR)DSS}$, V_{GS} = 10 V, I_D = 28 A (Gate charge is essentially independent of operating temperature)	Q_g	-	63	120	nC
Gate-Source Charge		Q_{gs}	-	14	-	
Gate-Drain Charge		Q_{gd}	-	32	-	
Turn-On Delay Time	V_{DD} = 100 V, R_L = 6.25Ω I_D = 16 A, V_{GEN} = 10 V R_G = 4.7 Ω (Switching time is essentially independent of operating temperature)	$t_{d(on)}$	-	15	35	ns
Rise Time		t_r	-	30	100	
Turn-Off Delay Time		$t_{d(off)}$	-	50	125	
Fall Time		t_f	-	20	100	

SOURCE-DRAIN DIODE RATINGS & CHARACTERISTICS (T_J = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS	Symbol	Min.	Typ.	Max.	Units
Continuous Current	I_S	-	-	28	A
Pulsed Current[1]	I_{SM}	-	-	120	
Forward Voltage[2] I_F = I_S, V_{GS} = 0	V_{SD}	-	-	2.0	V
Reverse Recovery Time I_F = I_S, dI_F/dt = 100 A/µs	t_{rr}	-	150	400	ns
Reverse Recovered Charge I_F = I_S, dI_F/dt = 100 A/µs	Q_{rr}	-	0.5	-	µC

[1] Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, figure 11)
[2] Pulse test: Pulse width ≤ 300 µsec, Duty Cycle ≤ 2%

PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 1: Typical Output Characteristics

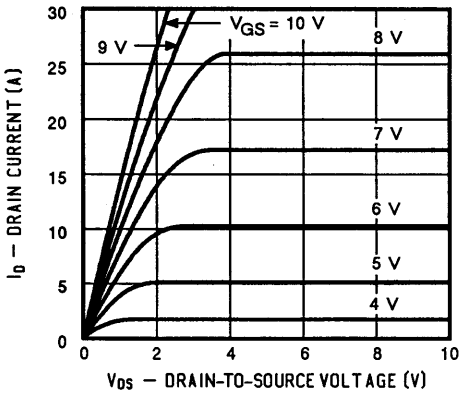


FIGURE 2: Typical Transfer Characteristics

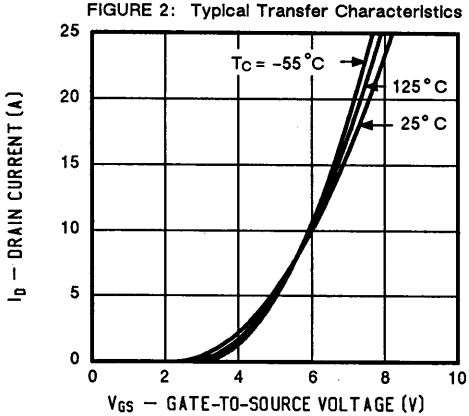


FIGURE 3: Typical Transconductance

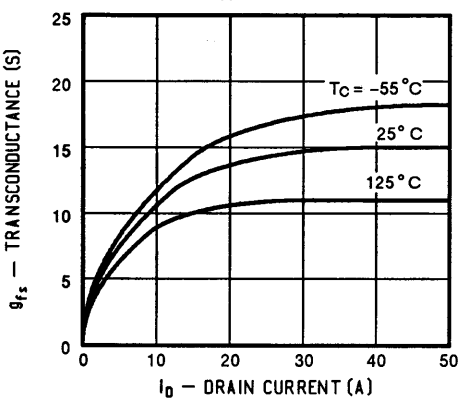


FIGURE 4: Typical On-Resistance

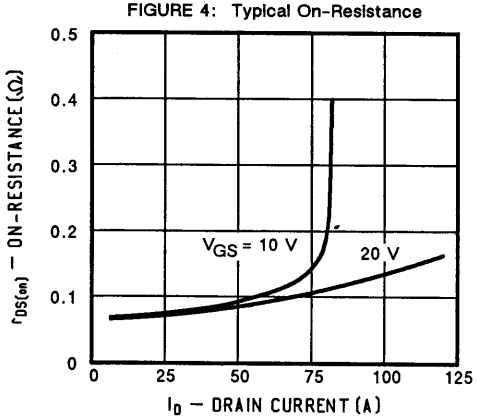


FIGURE 5: Typical Capacitance

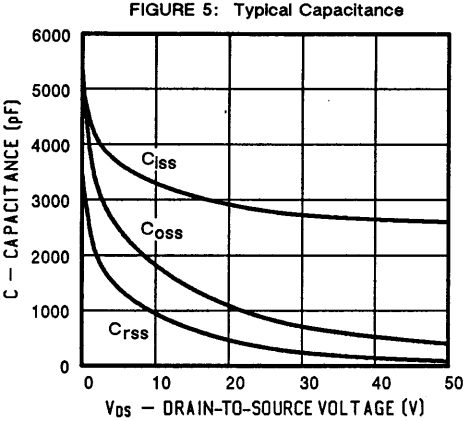
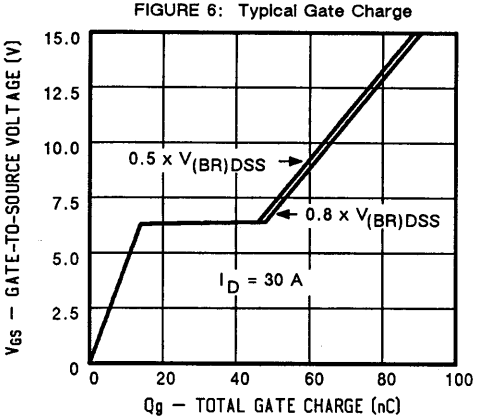


FIGURE 6: Typical Gate Charge



4

PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 7: On-Resistance vs. Junction Temperature

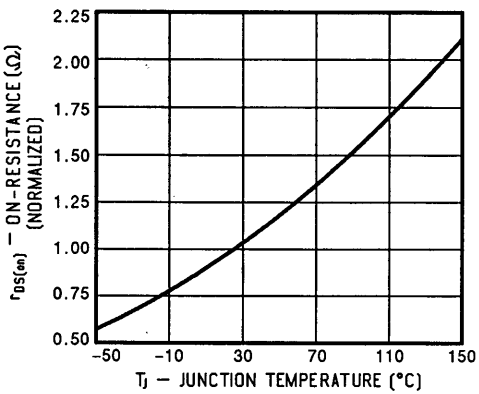


FIGURE 8: Typical Source-Drain Diode Forward Voltage

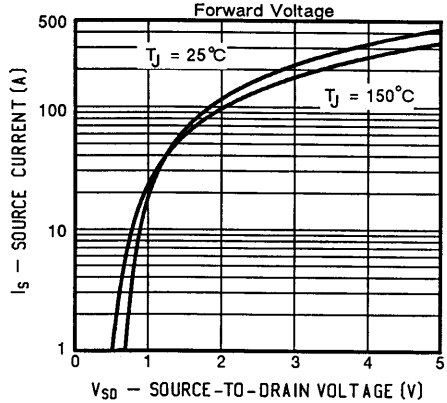


FIGURE 9: Maximum Avalanche and Drain Current vs. Case Temperature

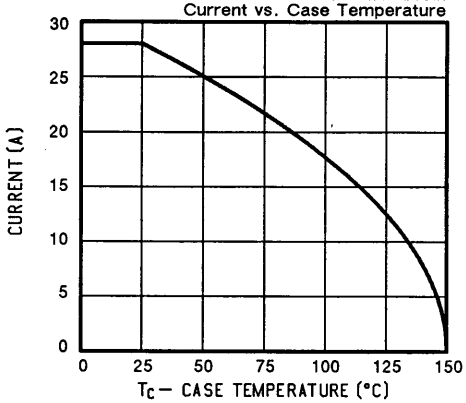
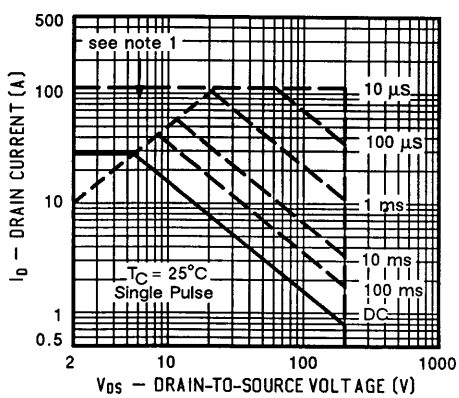
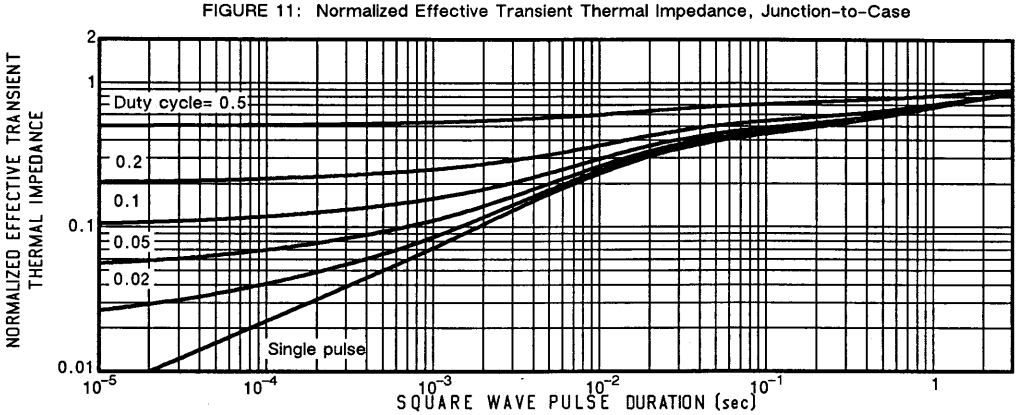


FIGURE 10: Safe Operating Area



[1]Operation in this area may be limited by $r_{DS(on)}$

FIGURE 11: Normalized Effective Transient Thermal Impedance, Junction-to-Case



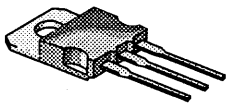
Siliconix incorporated

MOSPOWER

2N7057

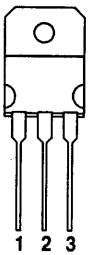
N-Channel Enhancement Mode Transistor

TOP VIEW



TO-218

1 GATE
2 DRAIN
3 SOURCE



PRODUCT SUMMARY

PART NUMBER	$V_{(BR)DSS}$ (VOLTS)	$r_{DS(on)}$ (OHMS)	I_D (AMPS)
2N7057	400	0.40	13

ABSOLUTE MAXIMUM RATINGS (T_C= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	2N7057	Units
Drain-Source Voltage		V_{DS}	400	V
Gate-Source Voltage		V_{GS}	± 40	
Continuous Drain Current	T_C = 25°C	I_D	13	A
	T_C = 100°C		8	
Pulsed Drain Current[1]		I_{DM}	60	
Avalanche Current (see figure 9)		I_A	13	
Power Dissipation	T_C = 25°C	P_D	150	W
	T_C = 100°C		60	
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C
Lead Temperature (1/16" from case for 10 secs.)		T_L	300	

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	Symbol	Typ.	Max.	Units
Junction-to-Case	R_{thJC}	-	0.83	K/W
Junction-to-Ambient	R_{thJA}	-	30	
Case-to-Sink	R_{thCS}	0.4	-	

[1]Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, figure 11)

4

Siliconix incorporated

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage V_{GS} = 0, I_D = 250 µA		$V_{(BR)DSS}$	400	–	–	V
Gate Threshold Voltage V_{DS} = V_{GS}, I_D = 1000 µA		$V_{GS(th)}$	2.0	–	4.0	
Gate-Body Leakage V_{DS} = 0, V_{GS} = ±20 V		I_{GSS}	–	–	100	nA
Zero Gate Voltage Drain Current V_{DS} = $V_{(BR)DSS}$, V_{GS} = 0		I_{DSS}	–	–	250	µA
Zero Gate Voltage Drain Current V_{DS} = 0.8 x $V_{(BR)DSS}$, V_{GS} = 0, T_J = 125°C		I_{DSS}	–	–	1000	
On-State Drain Current[2] V_{DS} = 10 V, V_{GS} = 10 V		$I_{D(on)}$	13	–	–	A
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 8.0 A		$r_{DS(on)}$	–	0.22	0.40	Ω
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 8.0 A, T_J = 125°C		$r_{DS(on)}$	–	0.40	0.74	
Forward Transconductance[2] V_{DS} = 15 V, I_D = 9.0 A		g_{fs}	7.0	8.0	–	S(℧)
Input Capacitance	V_{GS} = 0 V_{DS} = 25 V f = 1 MHz	C_{iss}	–	2700	3300	pF
Output Capacitance		C_{oss}	–	450	700	
Reverse Transfer Capacitance		C_{rss}	–	160	300	
Total Gate Charge	V_{DS} = 0.5 x $V_{(BR)DSS}$, V_{GS} = 10 V, I_D = 13 A (Gate charge is essentially independent of operating temperature)	Q_g	–	77	120	nC
Gate-Source Charge		Q_{gs}	–	14	–	
Gate-Drain Charge		Q_{gd}	–	39	–	
Turn-On Delay Time	V_{DD} = 200 V, R_L = 25Ω I_D = 8.0 A, V_{GEN} = 10 V R_G = 4.7Ω (Switching time is essentially independent of operating temperature)	$t_{d(on)}$	–	14	40	ns
Rise Time		t_r	–	30	65	
Turn-Off Delay Time		$t_{d(off)}$	–	54	150	
Fall Time		t_f	–	15	75	

SOURCE-DRAIN DIODE RATINGS & CHARACTERISTICS (T_J = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS	Symbol	Min.	Typ.	Max.	Units
Continuous Current	I_S	–	–	13	A
Pulsed Current[1]	I_{SM}	–	–	60	
Forward Voltage[2] I_F = I_S, V_{GS} = 0	V_{SD}	–	1.5	2.0	V
Reverse Recovery Time I_F = I_S, dI_F/dt = 100 A/µs	t_{rr}	–	300	500	ns
Reverse Recovered Charge I_F = I_S, dI_F/dt = 100 A/µs	Q_{rr}	–	2.0	–	µC

[1] Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, figure 11)
[2] Pulse test: Pulse width ≤ 300 µsec, Duty Cycle ≤ 2%

PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 1: Typical Output Characteristics

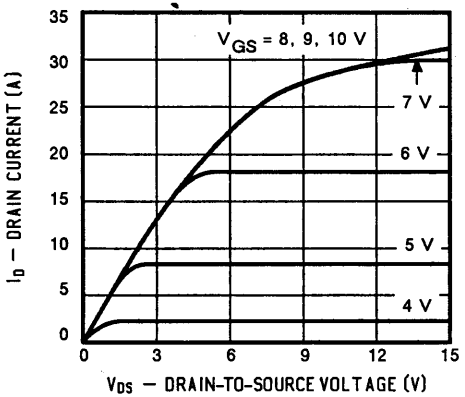


FIGURE 2: Typical Transfer Characteristics

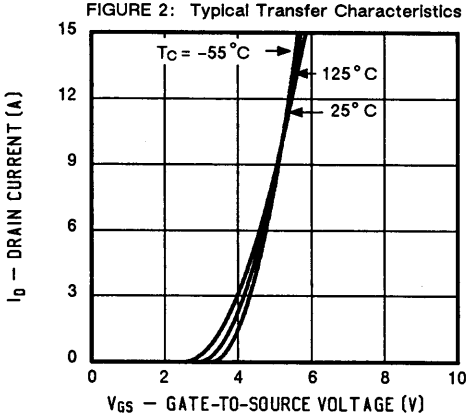


FIGURE 3: Typical Transconductance

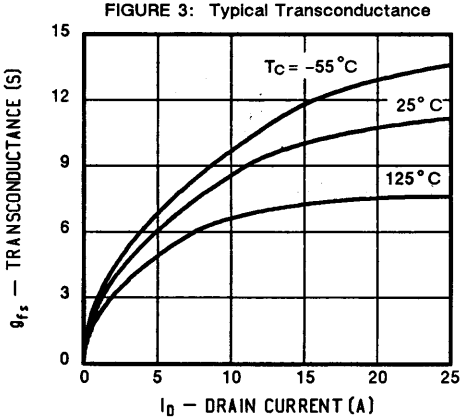


FIGURE 4: Typical On-Resistance

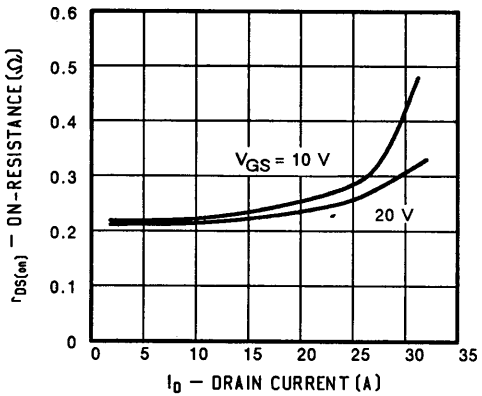


FIGURE 5: Typical Capacitance

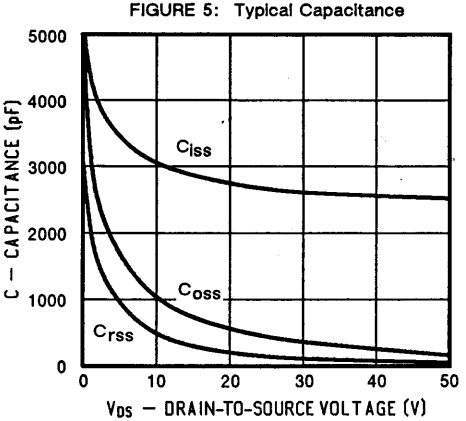
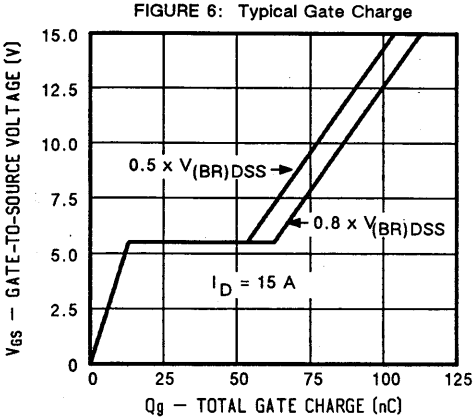


FIGURE 6: Typical Gate Charge



4

PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 7: On-Resistance vs. Junction Temperature

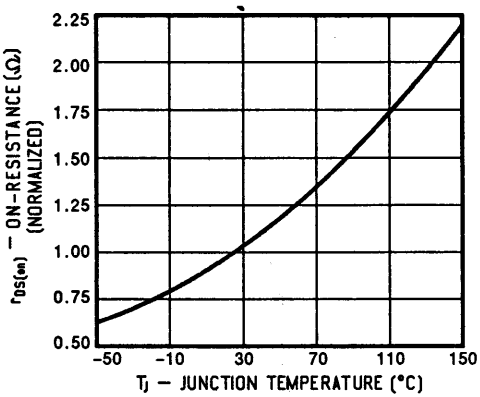


FIGURE 8: Typical Source-Drain Diode Forward Voltage

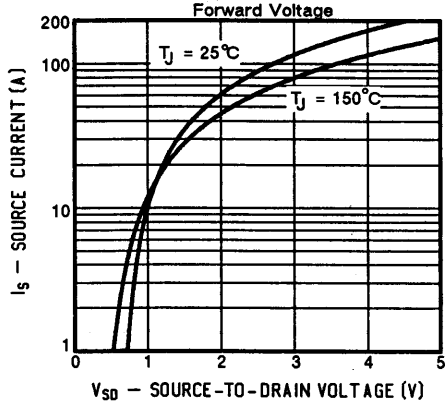


FIGURE 9: Maximum Avalanche and Drain Current vs. Case Temperature

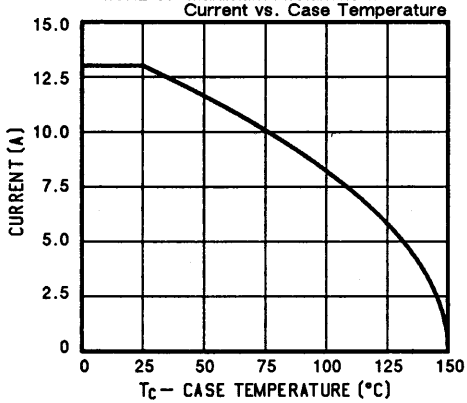
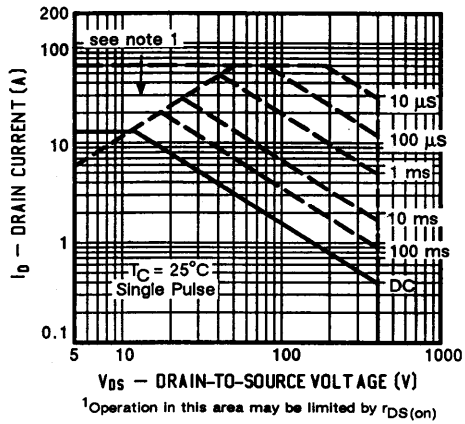
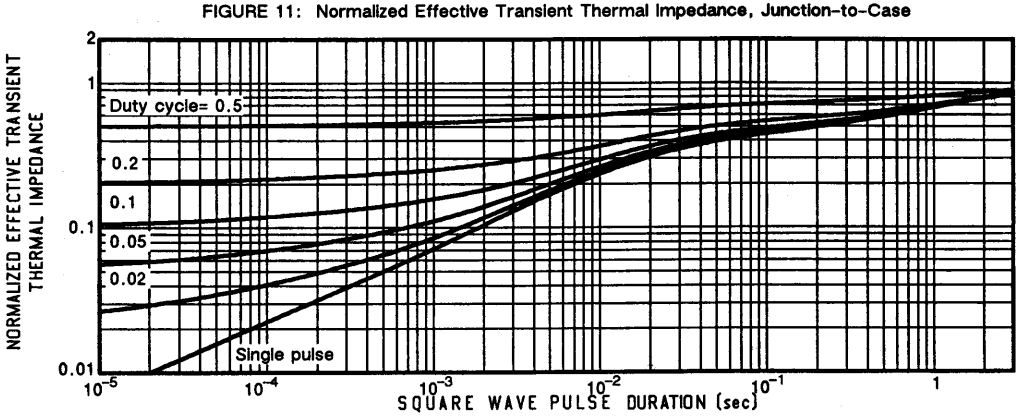


FIGURE 10: Safe Operating Area



[1]Operation in this area may be limited by $r_{DS(on)}$

FIGURE 11: Normalized Effective Transient Thermal Impedance, Junction-to-Case



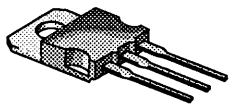
Siliconix incorporated

MOSPOWER

2N7058

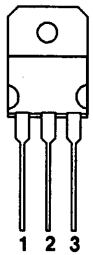
N-Channel Enhancement Mode Transistor

TOP VIEW



TO-218

1 GATE
2 DRAIN
3 SOURCE



PRODUCT SUMMARY

PART NUMBER	$V_{(BR)DSS}$ (VOLTS)	$r_{DS(on)}$ (OHMS)	I_D (AMPS)
2N7058	500	0.45	12

ABSOLUTE MAXIMUM RATINGS (T_C= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	2N7058	Units
Drain-Source Voltage		V_{DS}	500	V
Gate-Source Voltage		V_{GS}	± 40	
Continuous Drain Current	T_C = 25°C	I_D	12	A
	T_C = 100°C		8	
Pulsed Drain Current[1]		I_{DM}	52	
Avalanche Current (see figure 9)		I_A	12	
Power Dissipation	T_C = 25°C	P_D	150	W
	T_C = 100°C		60	
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C
Lead Temperature (1/16" from case for 10 secs.)		T_L	300	

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	Symbol	Typ.	Max.	Units
Junction-to-Case	R_{thJC}	-	0.83	K/W
Junction-to-Ambient	R_{thJA}	-	30	
Case-to-Sink	R_{thCS}	0.4	-	

[1]Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, figure 11)

Siliconix incorporated

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage V_{GS} = 0, I_D = 250 µA		$V_{(BR)DSS}$	500	-	-	V
Gate Threshold Voltage V_{DS} = V_{GS}, I_D = 1000 µA		$V_{GS(th)}$	2.0	3.0	4.0	
Gate-Body Leakage V_{DS} = 0, V_{GS} = ±20 V		I_{GSS}	-	-	100	nA
Zero Gate Voltage Drain Current V_{DS} = $V_{(BR)DSS}$, V_{GS} = 0		I_{DSS}	-	-	250	µA
Zero Gate Voltage Drain Current V_{DS} = 0.8 x $V_{(BR)DSS}$, V_{GS} = 0, T_J =125°C		I_{DSS}	-	-	1000	
On-State Drain Current[2] V_{DS} = 10 V, V_{GS} = 10 V		$I_{D(on)}$	12	-	-	A
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 7.0 A		$r_{DS(on)}$	-	0.35	0.45	Ω
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 7.0 A, T_J = 125°C		$r_{DS(on)}$	-	0.72	0.86	
Forward Transconductance[2] V_{DS} =15 V, I_D = 7.0 A		g_{fs}	6.0	9.0	-	S(℧)
Input Capacitance	V_{GS} = 0 V_{DS} = 25 V f = 1 MHz	C_{iss}	-	2700	3300	pF
Output Capacitance		C_{oss}	-	410	700	
Reverse Transfer Capacitance		C_{rss}	-	140	300	
Total Gate Charge	V_{DS} = 0.5 x $V_{(BR)DSS}$, V_{GS} = 10 V, I_D = 12.0 A (Gate charge is essentially independent of operating temperature)	Q_g	-	75	120	nC
Gate-Source Charge		Q_{gs}	-	12	-	
Gate-Drain Charge		Q_{gd}	-	35	-	
Turn-On Delay Time	V_{DD} = 210 V, R_L = 30Ω I_D = 7.0 A, V_{GEN} = 10 V R_G = 4.7 Ω (Switching time is essentially independent of operating temperature)	$t_{d(on)}$	-	13	40	ns
Rise Time		t_r	-	26	50	
Turn-Off Delay Time		$t_{d(off)}$	-	55	150	
Fall Time		t_f	-	17	70	

SOURCE-DRAIN DIODE RATINGS & CHARACTERISTICS (T_J = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS	Symbol	Min.	Typ.	Max.	Units
Continuous Current	I_S	-	-	12	A
Pulsed Current[1]	I_{SM}	-	-	52	
Forward Voltage[2] I_F = I_S, V_{GS} = 0	V_{SD}	-	1.2	1.5	V
Reverse Recovery Time I_F = I_S, dI_F/dt = 100 A/µs	t_{rr}	-	300	600	ns
Reverse Recovered Charge I_F = I_S, dI_F/dt = 100 A/µs	Q_{rr}	-	2.0	-	µC

[1] Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, figure 11)
[2] Pulse test: Pulse width ≤ 300 µsec, Duty Cycle ≤ 2%

PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 1: Typical Output Characteristics

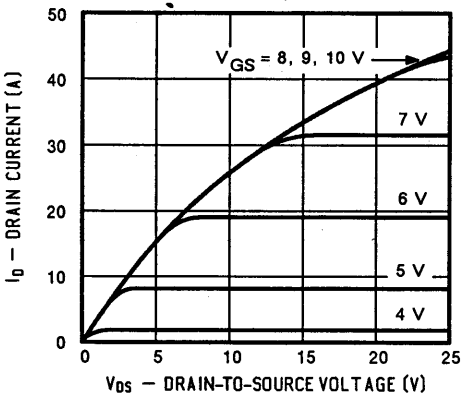


FIGURE 2: Typical Transfer Characteristics

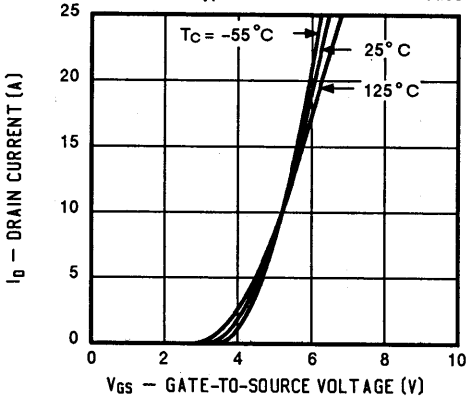


FIGURE 3: Typical Transconductance

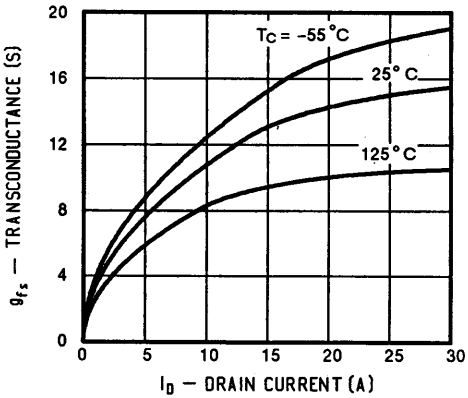


FIGURE 4: Typical On-Resistance

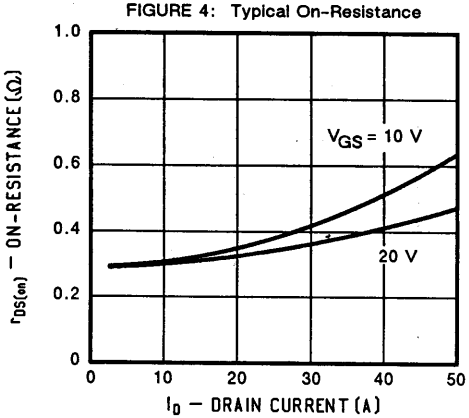


FIGURE 5: Typical Capacitance

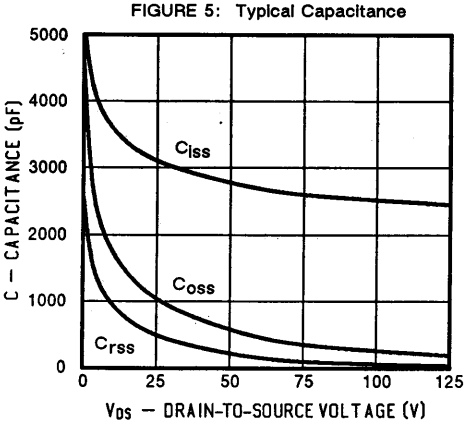
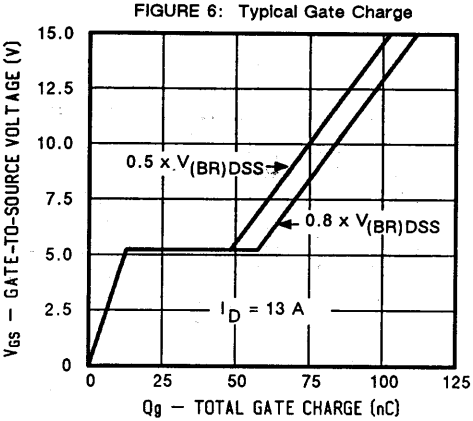


FIGURE 6: Typical Gate Charge



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PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 7: On-Resistance vs. Junction Temperature

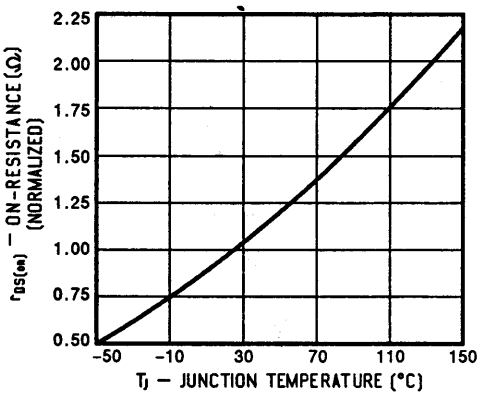


FIGURE 8: Typical Source-Drain Diode Forward Voltage

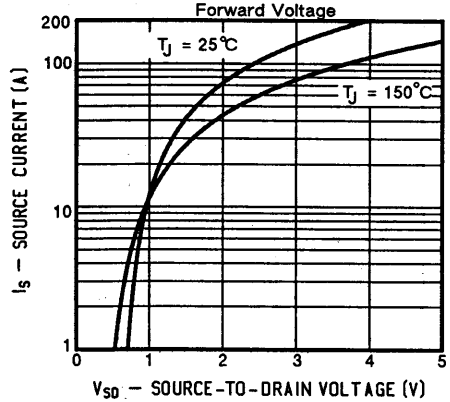


FIGURE 9: Maximum Avalanche and Drain Current vs. Case Temperature

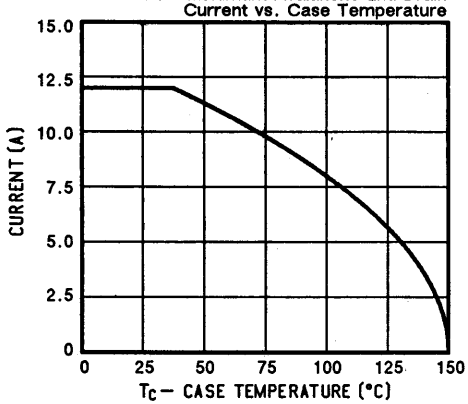
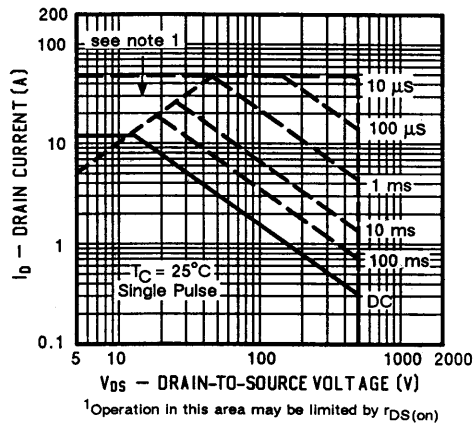
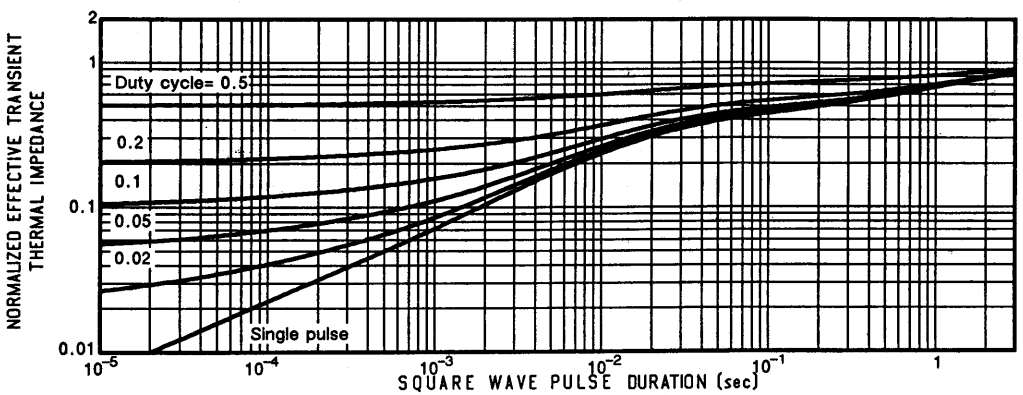


FIGURE 10: Safe Operating Area



[1]Operation in this area may be limited by $r_{DS(on)}$

FIGURE 11: Normalized Effective Transient Thermal Impedance, Junction-to-Case



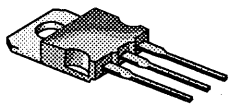
Siliconix incorporated

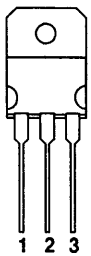
2N7060

N-Channel Enhancement Mode Transistor

MOSPOWER

TOP VIEW





TO-218

1 GATE
2 DRAIN
3 SOURCE

PRODUCT SUMMARY

PART NUMBER	$V_{(BR)DSS}$ (VOLTS)	$r_{DS(on)}$ (OHMS)	I_D (AMPS)
2N7060	100	0.10	25

ABSOLUTE MAXIMUM RATINGS (T_C= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	2N7060	Units
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 40	
Continuous Drain Current	T_C = 25°C	I_D	25	A
	T_C = 100°C		16	
Pulsed Drain Current[1]		I_{DM}	100	
Power Dissipation	T_C = 25°C	P_D	125	W
	T_C = 100°C		50	
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C
Lead Temperature (1/16" from case for 10 secs.)		T_L	300	

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	Symbol	Typ.	Max.	Units
Junction-to-Case	R_{thJC}	-	1.0	K/W
Junction-to-Ambient	R_{thJA}	-	30	
Case-to-Sink	R_{thCS}	0.4	-	

[1]Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, figure 11)

4

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage V_{GS} = 0, I_D = 250 µA		$V_{(BR)DSS}$	100	–	–	V
Gate Threshold Voltage V_{DS} = V_{GS}, I_D = 1000 µA		$V_{GS(th)}$	2.0	–	4.0	
Gate-Body Leakage V_{DS} = 0, V_{GS} = ±20 V		I_{GSS}	–	–	100	nA
Zero Gate Voltage Drain Current V_{DS} = $V_{(BR)DSS}$, V_{GS} = 0		I_{DSS}	–	–	250	µA
Zero Gate Voltage Drain Current V_{DS} = 0.8 x $V_{(BR)DSS}$, V_{GS} = 0, T_J =125°C		I_{DSS}	–	–	1000	
On-State Drain Current[2] V_{DS} = 5.0 V, V_{GS} = 10 V		$I_{D(on)}$	25	–	–	A
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 15 A		$r_{DS(on)}$	–	0.07	0.100	Ω
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 8 A, T_J = 125°C		$r_{DS(on)}$	–	0.12	0.155	
Forward Transconductance[2] V_{DS} =15 V, I_D = 15 A		g_{fs}	6.0	8.0	–	S(℧)
Input Capacitance	V_{GS} = 0 V_{DS} = 25 V f = 1 MHz	C_{iss}	–	1550	2000	pF
Output Capacitance		C_{oss}	–	550	1000	
Reverse Transfer Capacitance		C_{rss}	–	150	400	
Total Gate Charge	V_{DS} = 0.5 x $V_{(BR)DSS}$, V_{GS} = 10 V, I_D = 25 A (Gate charge is essentially independent of operating temperature)	Q_g	–	50	60	nC
Gate-Source Charge		Q_{gs}	–	10	–	
Gate-Drain Charge		Q_{gd}	–	23	–	
Turn-On Delay Time	V_{DD} = 30 V, R_L = 2.0 Ω I_D = 15 A, V_{GEN} = 10 V R_G = 4.7 Ω (Switching time is essentially independent of operating temperature)	$t_{d(on)}$	–	10	30	ns
Rise Time		t_r	–	40	60	
Turn-Off Delay Time		$t_{d(off)}$	–	30	80	
Fall Time		t_f	–	15	30	

SOURCE-DRAIN DIODE RATINGS & CHARACTERISTICS (T_J = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS	Symbol	Min.	Typ.	Max.	Units
Continuous Current	I_S	–	–	25	A
Pulsed Current[1]	I_{SM}	–	–	100	
Forward Voltage[2] I_F = I_S, V_{GS} = 0	V_{SD}	0.6	–	2.0	V
Reverse Recovery Time I_F = I_S, dI_F/dt = 100 A/µs	t_{rr}	–	150	600	ns
Reverse Recovered Charge I_F = I_S, dI_F/dt = 100 A/µs	Q_{rr}	–	0.5	–	µC

[1] Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, figure 11)
[2] Pulse test: Pulse width ≤ 300 µsec, Duty Cycle ≤ 2%

PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 1: Typical Output Characteristics

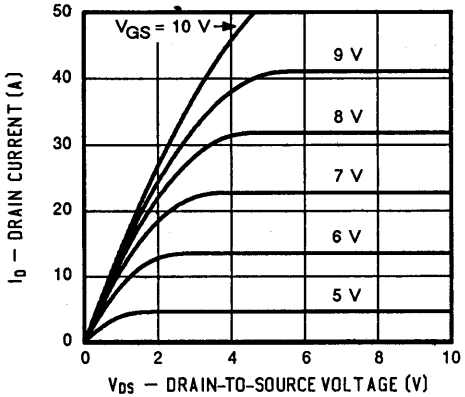


FIGURE 2: Typical Transfer Characteristics

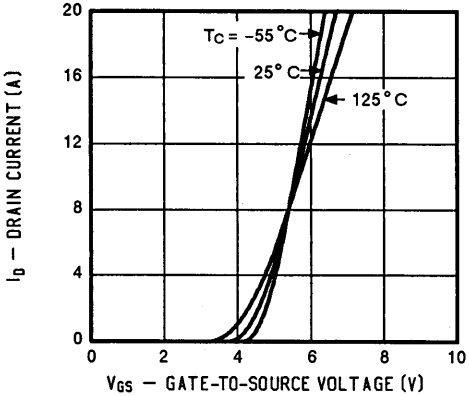


FIGURE 3: Typical Transconductance

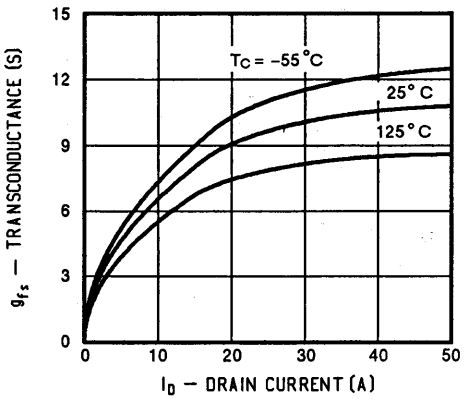


FIGURE 4: Typical On-Resistance

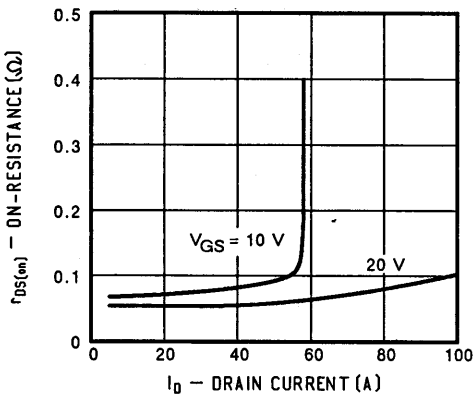


FIGURE 5: Typical Capacitance

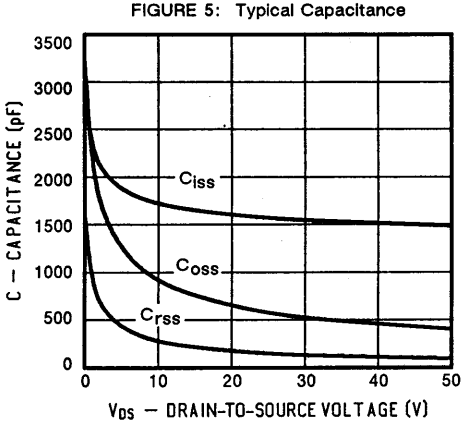
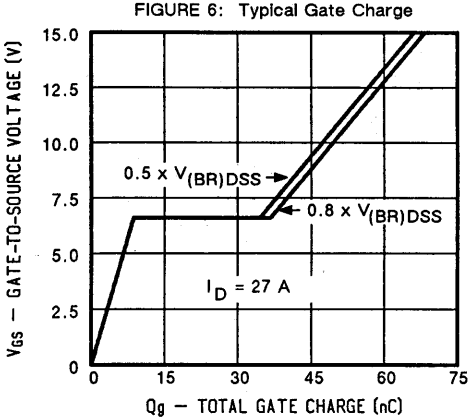


FIGURE 6: Typical Gate Charge



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PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 7: On-Resistance vs. Junction Temperature

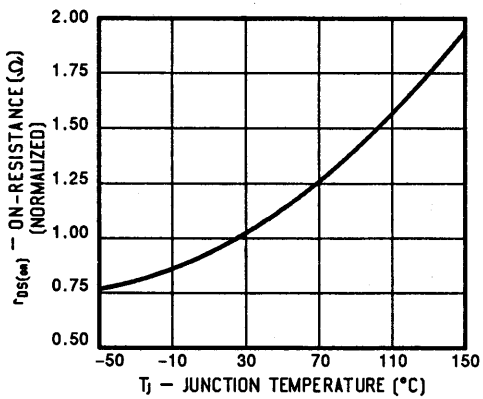


FIGURE 8: Typical Source-Drain Diode Forward Voltage

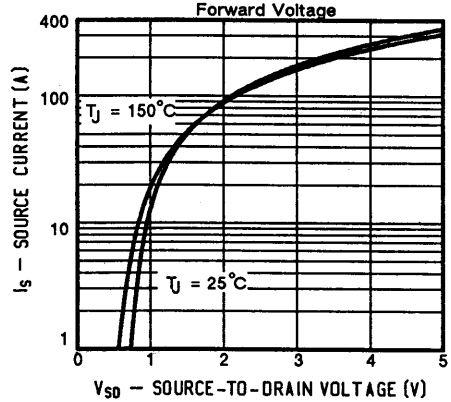


FIGURE 9: Maximum Drain Current vs. Case Temperature

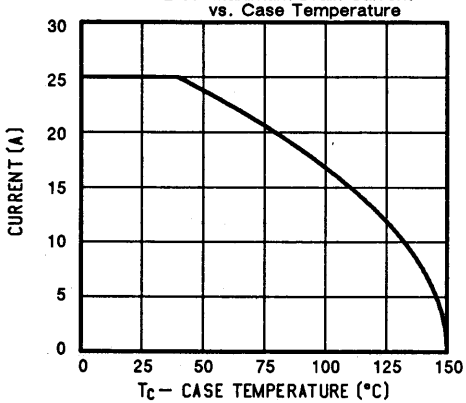
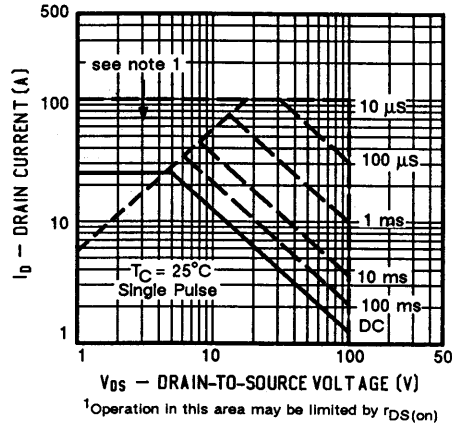
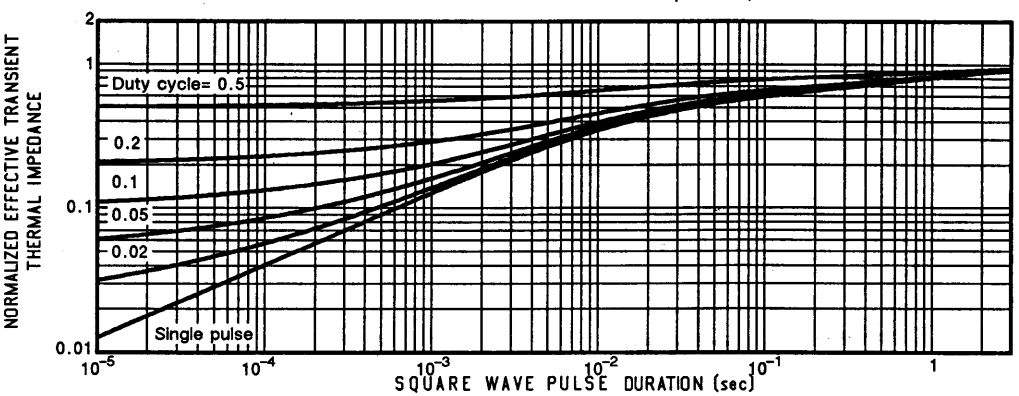


FIGURE 10: Safe Operating Area



[1]Operation in this area may be limited by $r_{DS(on)}$

FIGURE 11: Normalized Effective Transient Thermal Impedance, Junction-to-Case



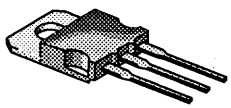
Siliconix incorporated

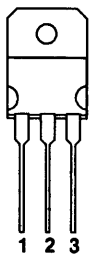
2N7061

N-Channel Enhancement Mode Transistor

MOSPOWER

TOP VIEW





TO-218

1 GATE
2 DRAIN
3 SOURCE

PRODUCT SUMMARY

PART NUMBER	$V_{(BR)DSS}$ (VOLTS)	$r_{DS(on)}$ (OHMS)	I_D (AMPS)
2N7061	200	0.20	16.5

ABSOLUTE MAXIMUM RATINGS (T_C= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	2N7061	Units
Drain-Source Voltage		V_{DS}	200	V
Gate-Source Voltage		V_{GS}	± 40	
Continuous Drain Current	T_C = 25°C	I_D	16.5	A
	T_C = 100°C		10.5	
Pulsed Drain Current[1]		I_{DM}	67	
Avalanche Current (see figure 9)		I_A	16.5	
Power Dissipation	T_C = 25°C	P_D	125	W
	T_C = 100°C		50	
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C
Lead Temperature (1/16" from case for 10 secs.)		T_L	300	

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	Symbol	Typ.	Max.	Units
Junction-to-Case	R_{thJC}	-	1.0	K/W
Junction-to-Ambient	R_{thJA}	-	30	
Case-to-Sink	R_{thCS}	0.4	-	

[1]Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, figure 11)

4

Siliconix incorporated

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage V_{GS} = 0, I_D = 250 µA		$V_{(BR)DSS}$	200	–	–	V
Gate Threshold Voltage V_{DS} = V_{GS}, I_D = 1000 µA		$V_{GS(th)}$	2.0	–	4.0	
Gate-Body Leakage V_{DS} = 0, V_{GS} = ±20 V		I_{GSS}	–	–	100	nA
Zero Gate Voltage Drain Current V_{DS} = $V_{(BR)DSS}$, V_{GS} = 0		I_{DSS}	–	–	250	µA
Zero Gate Voltage Drain Current V_{DS} = 0.8 x $V_{(BR)DSS}$, V_{GS} = 0, T_J = 125°C		I_{DSS}	–	–	1000	
On-State Drain Current[2] V_{DS} = 10 V, V_{GS} = 10 V		$I_{D(on)}$	16.5	–	–	A
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 10 A		$r_{DS(on)}$	–	0.14	0.20	Ω
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 5 A, T_J = 125°C		$r_{DS(on)}$	–	0.27	0.39	
Forward Transconductance[2] V_{DS} = 15 V, I_D = 10 A		g_{fs}	6.0	7.2	–	S(℧)
Input Capacitance	V_{GS} = 0 V_{DS} = 25 V f = 1 MHz	C_{iss}	–	1550	2000	pF
Output Capacitance		C_{oss}	–	500	750	
Reverse Transfer Capacitance		C_{rss}	–	220	300	
Total Gate Charge	V_{DS} = 0.5 x $V_{(BR)DSS}$, V_{GS} = 10 V, I_D = 16.5 A (Gate charge is essentially independent of operating temperature)	Q_g	–	43	60	nC
Gate-Source Charge		Q_{gs}	–	10	–	
Gate-Drain Charge		Q_{gd}	–	19	–	
Turn-On Delay Time	V_{DD} = 75 V, R_L = 7.5Ω I_D ≅ 10 A, V_{GEN} = 10 V R_G = 4.7Ω (Switching time is essentially independent of operating temperature)	$t_{d(on)}$	–	10	30	ns
Rise Time		t_r	–	40	60	
Turn-Off Delay Time		$t_{d(off)}$	–	30	80	
Fall Time		t_f	–	15	60	

SOURCE-DRAIN DIODE RATINGS & CHARACTERISTICS (T_J = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS	Symbol	Min.	Typ.	Max.	Units
Continuous Current	I_S	–	–	16.5	A
Pulsed Current[1]	I_{SM}	–	–	67	
Forward Voltage[2] I_F = I_S, V_{GS} = 0	V_{SD}	–	–	1.9	V
Reverse Recovery Time I_F = I_S, dI_F/dt = 100 A/µs	t_{rr}	–	150	550	ns
Reverse Recovered Charge I_F = I_S, dI_F/dt = 100 A/µs	Q_{rr}	–	0.5	–	µC

[1] Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, figure 11)
[2] Pulse test: Pulse width ≤ 300 µsec, Duty Cycle ≤ 2%

PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 1: Typical Output Characteristics

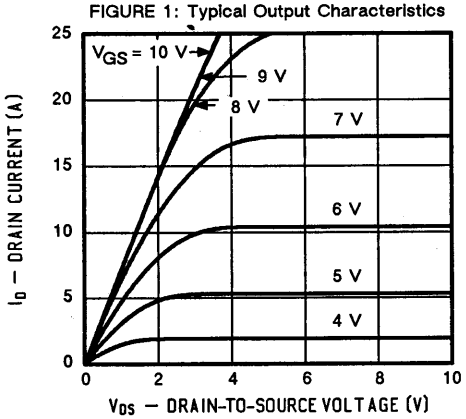


FIGURE 2: Typical Transfer Characteristics

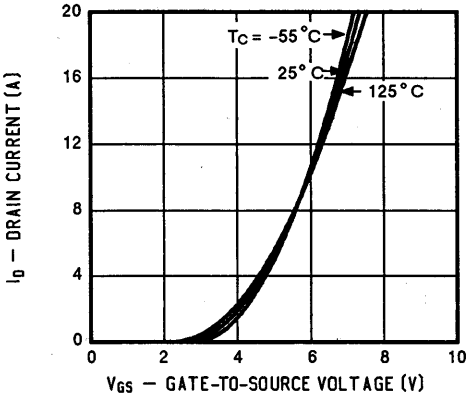


FIGURE 3: Typical Transconductance

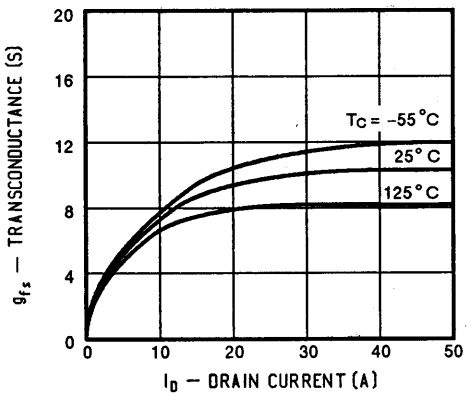


FIGURE 4: Typical On-Resistance

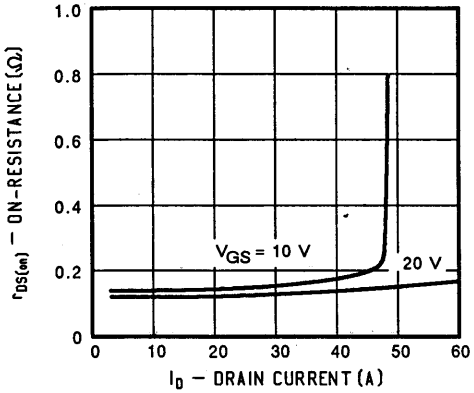


FIGURE 5: Typical Capacitance

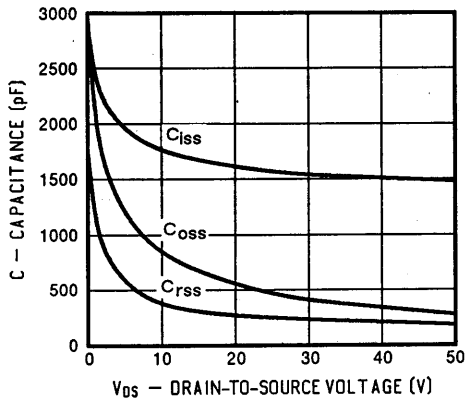
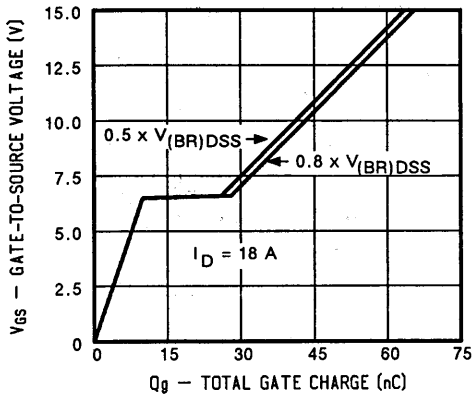


FIGURE 6: Typical Gate Charge



4

PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 7: On-Resistance vs. Junction Temperature

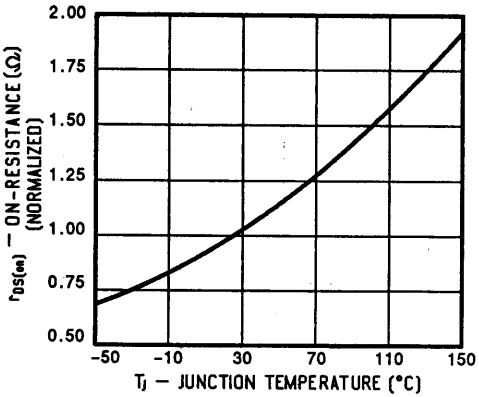


FIGURE 8: Typical Source-Drain Diode Forward Voltage

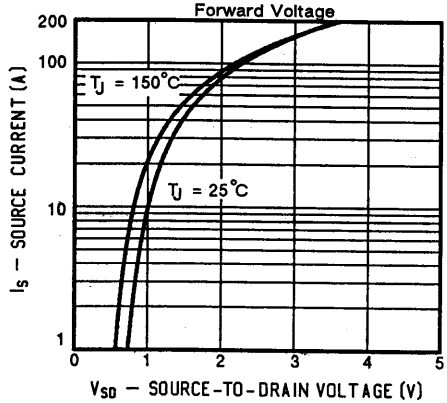


FIGURE 9: Maximum Avalanche and Drain Current vs. Case Temperature

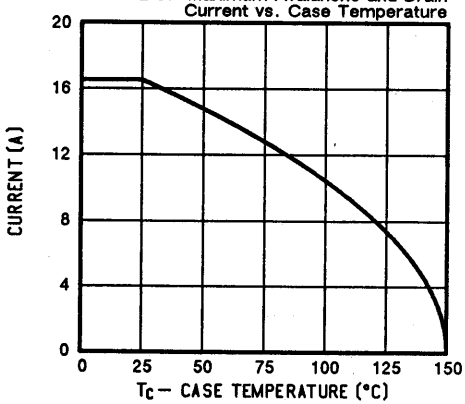
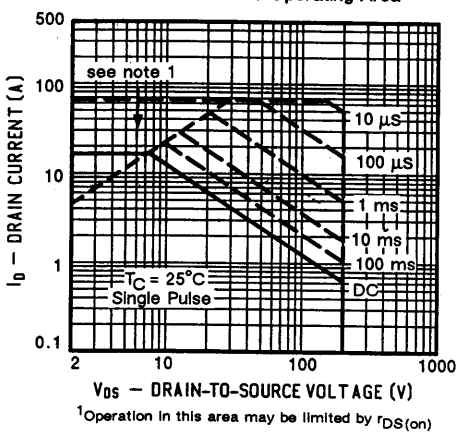
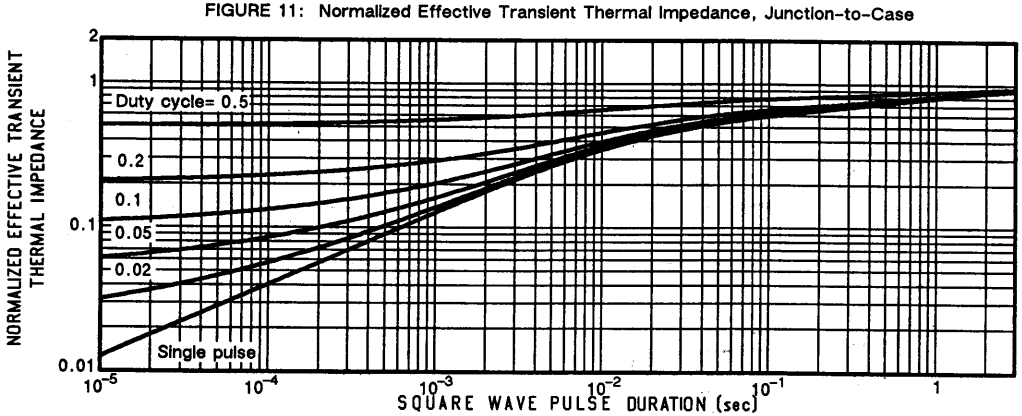


FIGURE 10: Safe Operating Area



[1]Operation in this area may be limited by $r_{DS(on)}$

FIGURE 11: Normalized Effective Transient Thermal Impedance, Junction-to-Case



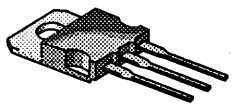
Siliconix incorporated

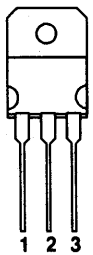
2N7063

N-Channel Enhancement Mode Transistor

MOSPOWER

TOP VIEW





TO-218

1 GATE
2 DRAIN
3 SOURCE

PRODUCT SUMMARY

PART NUMBER	$V_{(BR)DSS}$ (VOLTS)	$r_{DS(on)}$ (OHMS)	I_D (AMPS)
2N7063	400	0.60	9.5

ABSOLUTE MAXIMUM RATINGS (T_C= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	2N7063	Units
Drain-Source Voltage		V_{DS}	400	V
Gate-Source Voltage		V_{GS}	± 40	
Continuous Drain Current	T_C = 25°C	I_D	9.5	A
	T_C = 100°C		6.0	
Pulsed Drain Current[1]		I_{DM}	40	
Avalanche Current (see figure 9)		I_A	9.5	
Power Dissipation	T_C = 25°C	P_D	125	W
	T_C = 100°C		50	
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C
Lead Temperature (1/16" from case for 10 secs.)		T_L	300	

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	Symbol	Typ.	Max.	Units
Junction-to-Case	R_{thJC}	-	1.0	K/W
Junction-to-Ambient	R_{thJA}	-	30	
Case-to-Sink	R_{thCS}	0.4	-	

[1]Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, figure 11)

Siliconix incorporated

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage V_{GS} = 0, I_D = 250 µA		$V_{(BR)DSS}$	400	–	–	V
Gate Threshold Voltage V_{DS} = V_{GS}, I_D = 1000 µA		$V_{GS(th)}$	2.0	–	4.0	
Gate-Body Leakage V_{DS} = 0, V_{GS} = ±20 V		I_{GSS}	–	–	100	nA
Zero Gate Voltage Drain Current V_{DS} = $V_{(BR)DSS}$, V_{GS} = 0		I_{DSS}	–	–	250	µA
Zero Gate Voltage Drain Current V_{DS} = 0.8 x $V_{(BR)DSS}$, V_{GS} = 0, T_J =125°C		I_{DSS}	–	–	1000	
On-State Drain Current[2] V_{DS} = 10 V, V_{GS} = 10 V		$I_{D(on)}$	9.5	–	–	A
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 5.0 A		$r_{DS(on)}$	–	0.45	0.60	Ω
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 3.0 A, T_J = 125°C		$r_{DS(on)}$	–	0.90	1.17	
Forward Transconductance[2] V_{DS} =15 V, I_D = 5.0 A		g_{fs}	3.0	4.4	–	S(℧)
Input Capacitance	V_{GS} = 0 V_{DS} = 25 V f = 1 MHz	C_{iss}	–	1500	1800	pF
Output Capacitance		C_{oss}	–	300	450	
Reverse Transfer Capacitance		C_{rss}	–	120	150	
Total Gate Charge	V_{DS} = 0.5 x $V_{(BR)DSS}$, V_{GS} = 10 V, I_D = 9.0 A (Gate charge is essentially independent of operating temperature)	Q_g	–	53	60	nC
Gate-Source Charge		Q_{gs}	–	12	–	
Gate-Drain Charge		Q_{gd}	–	35	–	
Turn-On Delay Time	V_{DD} = 175 V, R_L = 35 Ω I_D ≅ 5.0 A, V_{GEN} = 10 V R_G = 4.7 Ω (Switching time is essentially independent of operating temperature)	$t_{d(on)}$	–	14	35	ns
Rise Time		t_r	–	14	20	
Turn-Off Delay Time		$t_{d(off)}$	–	52	90	
Fall Time		t_f	–	18	35	

SOURCE-DRAIN DIODE RATINGS & CHARACTERISTICS (T_J = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS	Symbol	Min.	Typ.	Max.	Units
Continuous Current	I_S	–	–	9.5	A
Pulsed Current[1]	I_{SM}	–	–	40	
Forward Voltage[2] I_F = I_S, V_{GS} = 0	V_{SD}	–	–	1.9	V
Reverse Recovery Time I_F = I_S, dI_F/dt = 100 A/µs	t_{rr}	–	250	600	ns
Reverse Recovered Charge I_F = I_S, dI_F/dt = 100 A/µs	Q_{rr}	–	1.0	–	µC

[1] Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, figure 11)
[2] Pulse test: Pulse width ≤ 300 µsec, Duty Cycle ≤ 2%

PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 1: Typical Output Characteristics

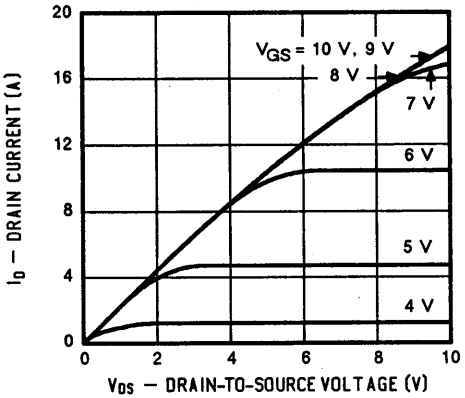


FIGURE 2: Typical Transfer Characteristics

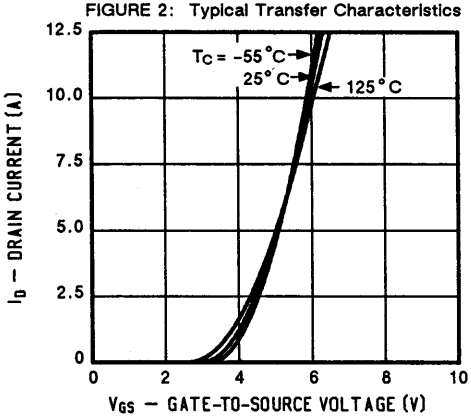


FIGURE 3: Typical Transconductance

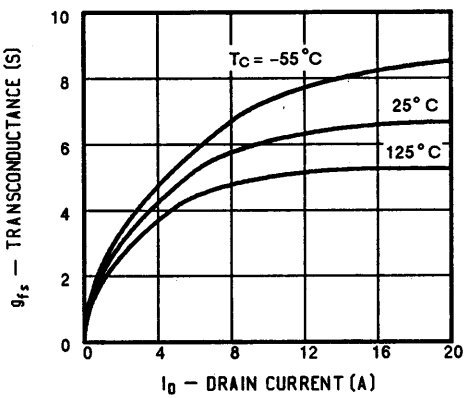


FIGURE 4: Typical On-Resistance

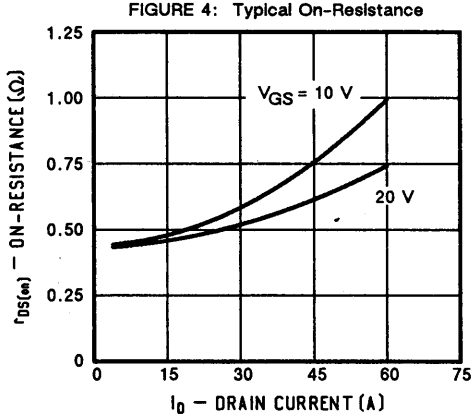


FIGURE 5: Typical Capacitance

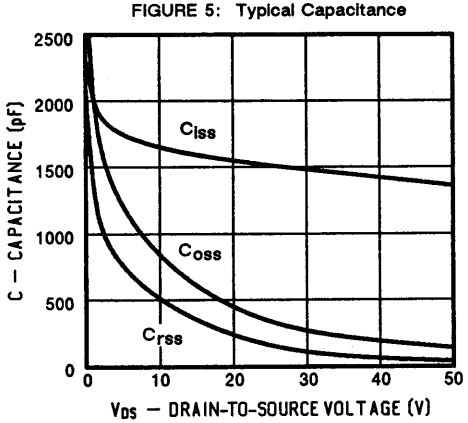
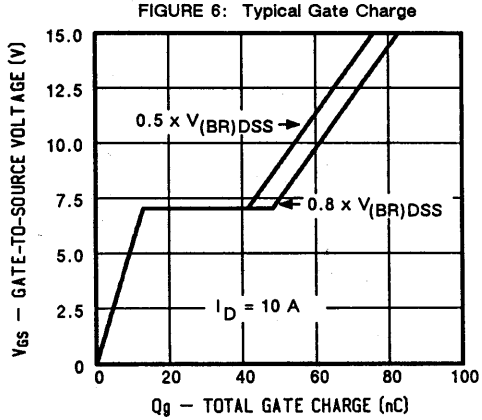


FIGURE 6: Typical Gate Charge



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Siliconix incorporated

PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 7: On-Resistance vs. Junction Temperature

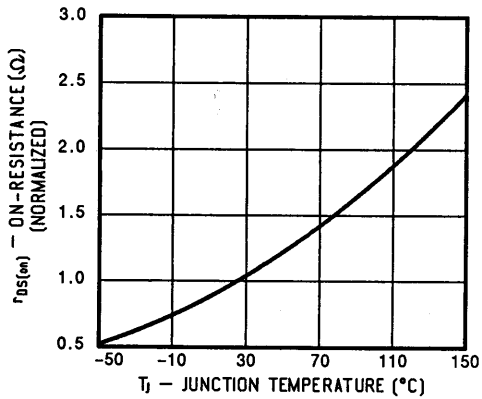


FIGURE 8: Typical Source-Drain Diode Forward Voltage

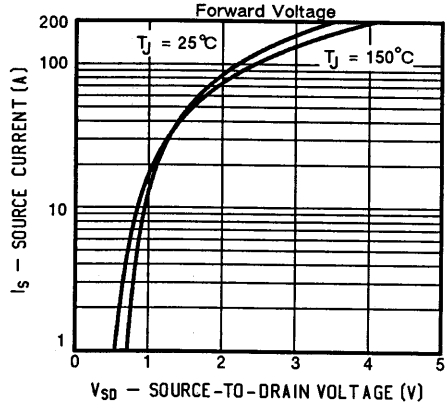


FIGURE 9: Maximum Avalanche and Drain Current vs. Case Temperature

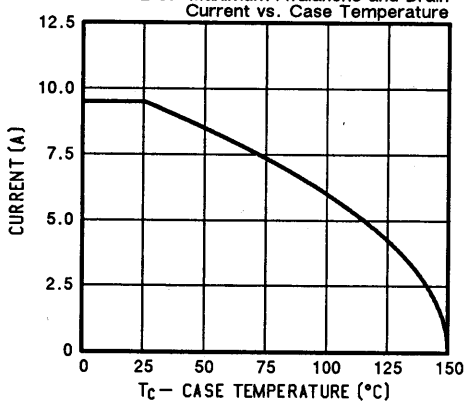
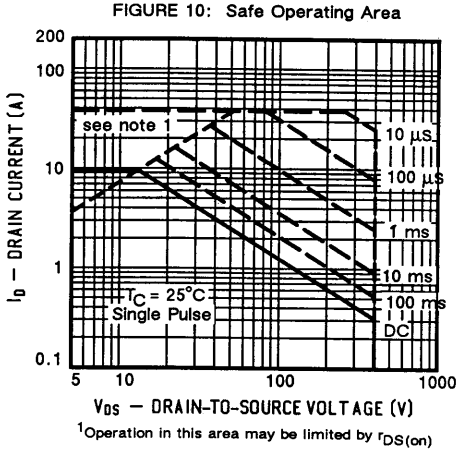
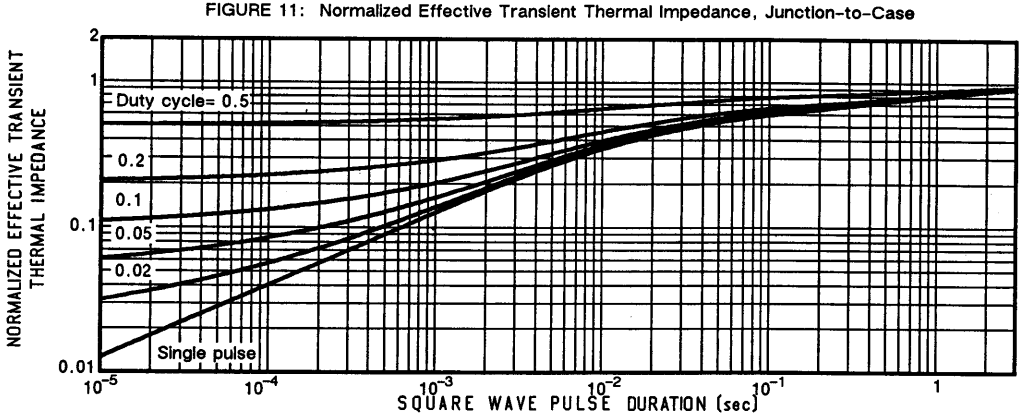


FIGURE 10: Safe Operating Area



[1]Operation in this area may be limited by $r_{DS(on)}$

FIGURE 11: Normalized Effective Transient Thermal Impedance, Junction-to-Case



Siliconix incorporated

2N7064

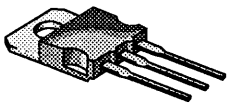
N-Channel Enhancement Mode Transistor

MOSPOWER

PRODUCT SUMMARY

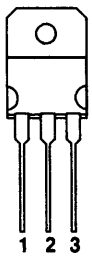
PART NUMBER	$V_{(BR)DSS}$ (VOLTS)	$r_{DS(on)}$ (OHMS)	I_D (AMPS)
2N7064	500	0.90	8.0

TOP VIEW



TO-218

1 GATE
2 DRAIN
3 SOURCE



ABSOLUTE MAXIMUM RATINGS (T_C= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	2N7064	Units
Drain-Source Voltage		V_{DS}	500	V
Gate-Source Voltage		V_{GS}	± 40	
Continuous Drain Current	T_C = 25°C	I_D	8.0	A
	T_C = 100°C		5.0	
Pulsed Drain Current[1]		I_{DM}	32	
Avalanche Current (see figure 9)		I_A	8.0	
Power Dissipation	T_C = 25°C	P_D	125	W
	T_C = 100°C		50	
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C
Lead Temperature (1/16" from case for 10 secs.)		T_L	300	

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	Symbol	Typ.	Max.	Units
Junction-to-Case	R_{thJC}	-	1.0	K/W
Junction-to-Ambient	R_{thJA}	-	30	
Case-to-Sink	R_{thCS}	0.4	-	

[1]Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, figure 11)

4

Siliconix incorporated

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage V_{GS} = 0, I_D = 250 µA		$V_{(BR)DSS}$	500	–	–	V
Gate Threshold Voltage V_{DS} = V_{GS}, I_D = 1000 µA		$V_{GS(th)}$	2.0	–	4.0	
Gate-Body Leakage V_{DS} = 0, V_{GS} = ±20 V		I_{GSS}	–	–	100	nA
Zero Gate Voltage Drain Current V_{DS} = $V_{(BR)DSS}$, V_{GS} = 0		I_{DSS}	–	–	250	µA
Zero Gate Voltage Drain Current V_{DS} = 0.8 x $V_{(BR)DSS}$, V_{GS} = 0, T_J = 125°C		I_{DSS}	–	–	1000	
On-State Drain Current[2] V_{DS} = 10 V, V_{GS} = 10 V		$I_{D(on)}$	8.0	–	–	A
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 4.0 A		$r_{DS(on)}$	–	0.80	0.90	Ω
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 4.0 A, T_J = 125°C		$r_{DS(on)}$	–	1.5	1.71	
Forward Transconductance[2] V_{DS} = 15 V, I_D = 4.0 A		g_{fs}	3.0	4.3	–	S(℧)
Input Capacitance	V_{GS} = 0 V_{DS} = 25 V f = 1 MHz	C_{iss}	–	1500	1800	pF
Output Capacitance		C_{oss}	–	250	350	
Reverse Transfer Capacitance		C_{rss}	–	75	150	
Total Gate Charge	V_{DS} = 0.5 x $V_{(BR)DSS}$, V_{GS} = 10 V, I_D = 8.0 A (Gate charge is essentially independent of operating temperature)	Q_g	–	47	60	nC
Gate-Source Charge		Q_{gs}	–	10	–	
Gate-Drain Charge		Q_{gd}	–	26	–	
Turn-On Delay Time	V_{DD} = 200 V, R_L = 50 Ω I_D ≅ 4.0 A, V_{GEN} = 10 V R_G = 4.7 Ω (Switching time is essentially independent of operating temperature)	$t_{d(on)}$	–	12	35	ns
Rise Time		t_r	–	12	15	
Turn-Off Delay Time		$t_{d(off)}$	–	50	70	
Fall Time		t_f	–	17	30	

SOURCE-DRAIN DIODE RATINGS & CHARACTERISTICS (T_J = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS	Symbol	Min.	Typ.	Max.	Units
Continuous Current	I_S	–	–	8.0	A
Pulsed Current[1]	I_{SM}	–	–	32	
Forward Voltage[2] I_F = I_S, V_{GS} = 0	V_{SD}	–	–	1.9	V
Reverse Recovery Time I_F = I_S, dI_F/dt = 100 A/µs	t_{rr}	–	250	600	ns
Reverse Recovered Charge I_F = I_S, dI_F/dt = 100 A/µs	Q_{rr}	–	1.0	–	µC

[1] Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, figure 11)
[2] Pulse test: Pulse width ≤ 300 µsec, Duty Cycle ≤ 2%

PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 1: Typical Output Characteristics

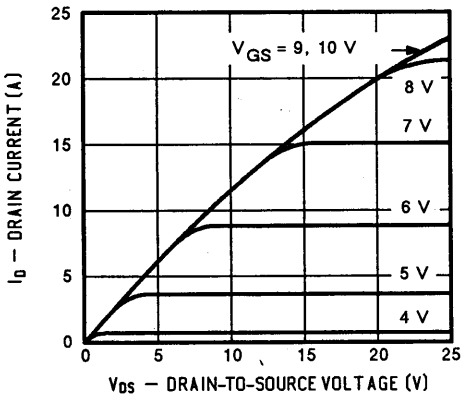


FIGURE 2: Typical Transfer Characteristics

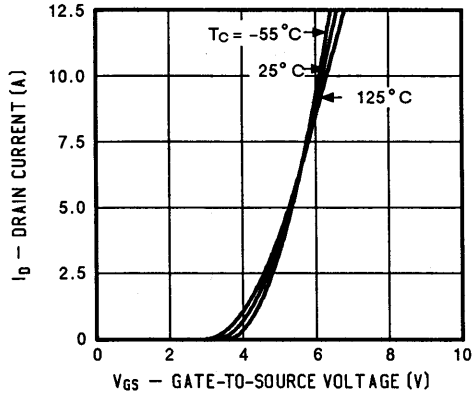


FIGURE 3: Typical Transconductance

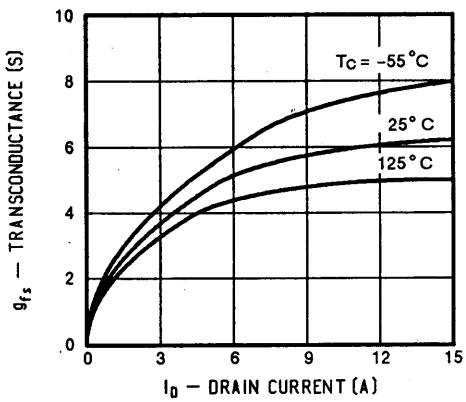


FIGURE 4: Typical On-Resistance

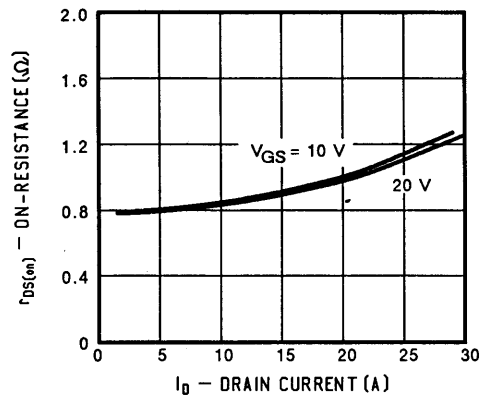


FIGURE 5: Typical Capacitance

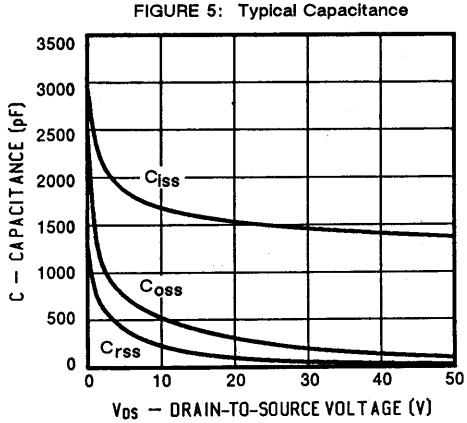
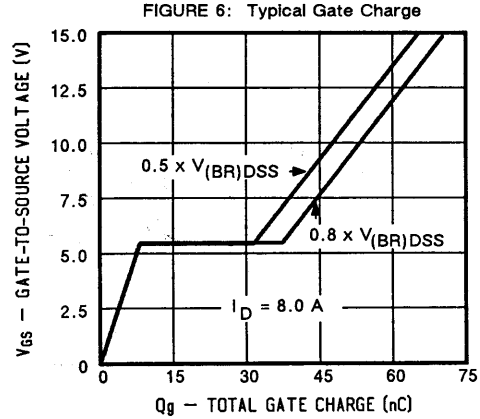


FIGURE 6: Typical Gate Charge



4

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PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 7: On-Resistance vs. Junction Temperature

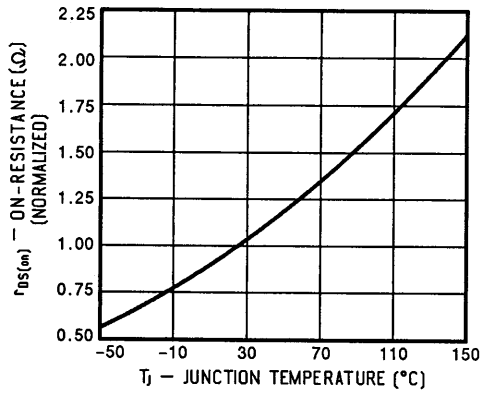


FIGURE 8: Typical Source-Drain Diode Forward Voltage

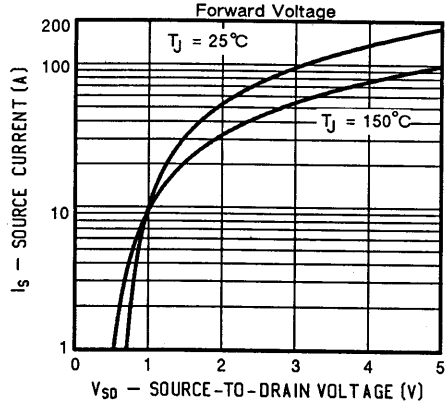


FIGURE 9: Maximum Avalanche and Drain Current vs. Case Temperature

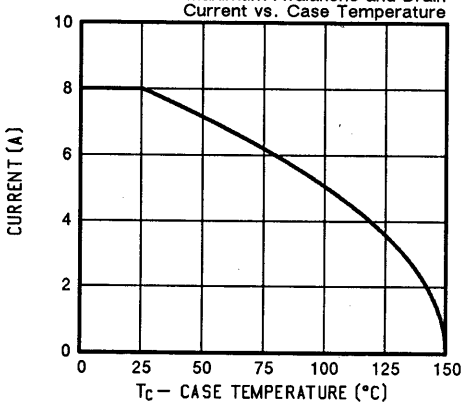
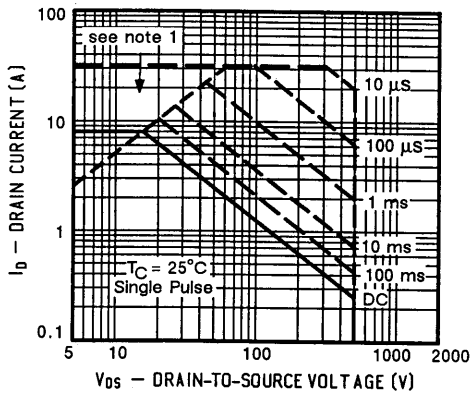
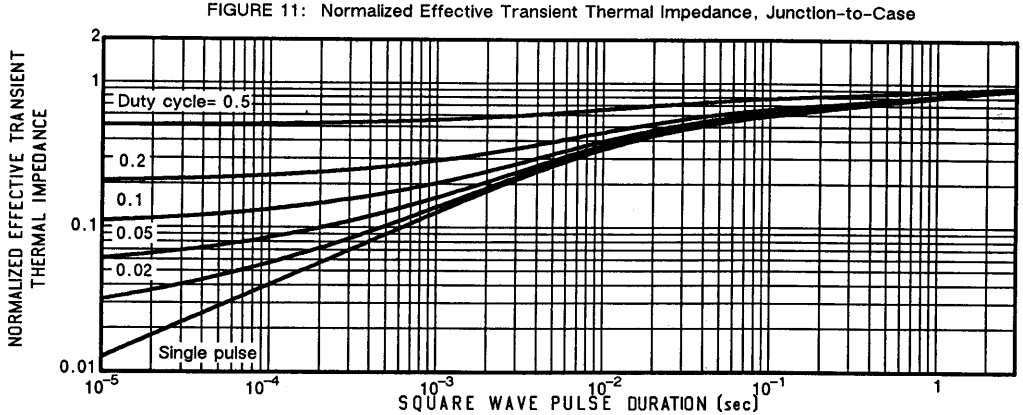


FIGURE 10: Safe Operating Area



[1]Operation in this area may be limited by $r_{DS(on)}$

FIGURE 11: Normalized Effective Transient Thermal Impedance, Junction-to-Case



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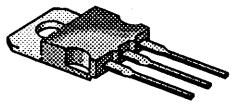
MOSPOWER

2N7066

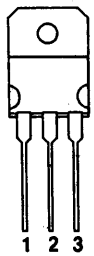
N-Channel Enhancement Mode Transistor

TOP VIEW



TO-218

1 GATE
2 DRAIN
3 SOURCE



PRODUCT SUMMARY

PART NUMBER	$V_{(BR)DSS}$ (VOLTS)	$r_{DS(on)}$ (OHMS)	I_D (AMPS)
2N7066	650	1.60	5.5

ABSOLUTE MAXIMUM RATINGS (T_C= 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	2N7066	Units
Drain-Source Voltage		V_{DS}	650	V
Gate-Source Voltage		V_{GS}	± 40	
Continuous Drain Current	T_C = 25°C	I_D	5.5	A
	T_C = 100°C		3.5	
Pulsed Drain Current[1]		I_{DM}	15	
Avalanche Current (see figure 9)		I_A	5.5	
Power Dissipation	T_C = 25°C	P_D	125	W
	T_C = 100°C		50	
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C
Lead Temperature (1/16" from case for 10 secs.)		T_L	300	

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	Symbol	Typ.	Max.	Units
Junction-to-Case	R_{thJC}	-	1.0	K/W
Junction-to-Ambient	R_{thJA}	-	30	
Case-to-Sink	R_{thCS}	0.4	-	

[1]Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, figure 11)

4

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ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage V_{GS} = 0, I_D = 250 µA		$V_{(BR)DSS}$	650	–	–	V
Gate Threshold Voltage V_{DS} = V_{GS}, I_D = 1000 µA		$V_{GS(th)}$	2.0	–	4.0	
Gate-Body Leakage V_{DS} = 0, V_{GS} = ±20 V		I_{GSS}	–	–	100	nA
Zero Gate Voltage Drain Current V_{DS} = $V_{(BR)DSS}$, V_{GS} = 0		I_{DSS}	–	–	250	µA
Zero Gate Voltage Drain Current V_{DS} = 0.8 x $V_{(BR)DSS}$, V_{GS} = 0, T_J =125°C		I_{DSS}	–	–	1000	
On-State Drain Current[2] V_{DS} = 10 V, V_{GS} = 10 V		$I_{D(on)}$	5.5	–	–	A
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 3.0 A		$r_{DS(on)}$	–	1.25	1.60	Ω
Drain-Source On-State Resistance[2] V_{GS} = 10 V, I_D = 3.0 A, T_J = 125°C		$r_{DS(on)}$	–	2.3	3.36	
Forward Transconductance[2] V_{DS} =15 V, I_D = 3.0 A		g_{fs}	2.0	3.2	–	S(℧)
Input Capacitance	V_{GS} = 0 V_{DS} = 25 V f = 1 MHz	C_{iss}	–	1200	1800	pF
Output Capacitance		C_{oss}	–	200	350	
Reverse Transfer Capacitance		C_{rss}	–	80	150	
Total Gate Charge	V_{DS} = 0.5 x $V_{(BR)DSS}$, V_{GS} = 10 V, I_D = 5.5 A (Gate charge is essentially independent of operating temperature)	Q_g	–	52	75	nC
Gate-Source Charge		Q_{gs}	–	13	–	
Gate-Drain Charge		Q_{gd}	–	26	–	
Turn-On Delay Time	V_{DD} = 325 V, R_L = 130Ω I_D ≅ 2.5 A, V_{GEN} = 10 V R_G = 5.0 Ω (Switching time is essentially independent of operating temperature)	$t_{d(on)}$	–	15	40	ns
Rise Time		t_r	–	20	50	
Turn-Off Delay Time		$t_{d(off)}$	–	80	90	
Fall Time		t_f	–	45	70	

SOURCE-DRAIN DIODE RATINGS & CHARACTERISTICS (T_J = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS	Symbol	Min.	Typ.	Max.	Units
Continuous Current	I_S	–	–	5.5	A
Pulsed Current[1]	I_{SM}	–	–	15	
Forward Voltage[2] I_F = I_S, V_{GS} = 0	V_{SD}	–	–	2.0	V
Reverse Recovery Time I_F = I_S, dI_F/dt = 100 A/µs	t_{rr}	–	250	850	ns
Reverse Recovered Charge I_F = I_S, dI_F/dt = 100 A/µs	Q_{rr}	–	1.0	–	µC

[1] Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, figure 11)
[2] Pulse test: Pulse width ≤ 300 µsec, Duty Cycle ≤ 2%

PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 1: Typical Output Characteristics

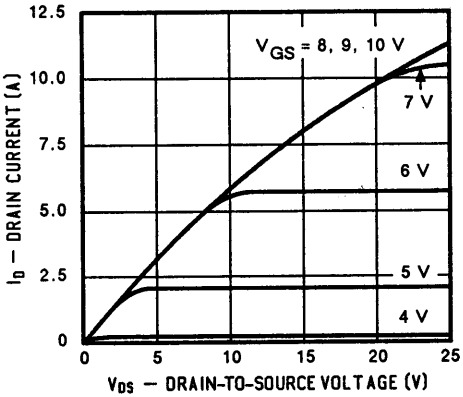


FIGURE 2: Typical Transfer Characteristics

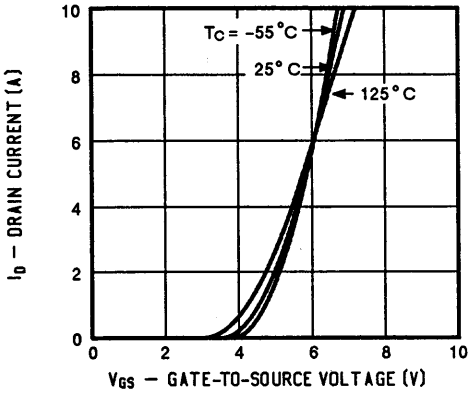


FIGURE 3: Typical Transconductance

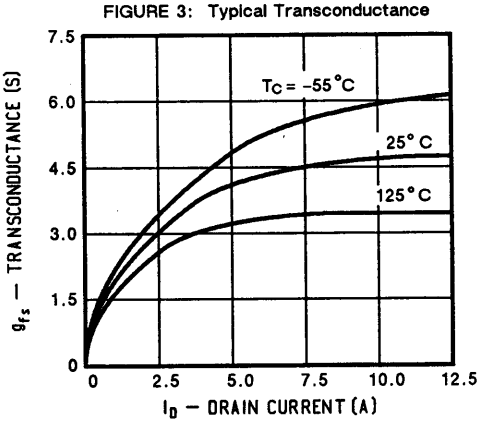


FIGURE 4: Typical On-Resistance

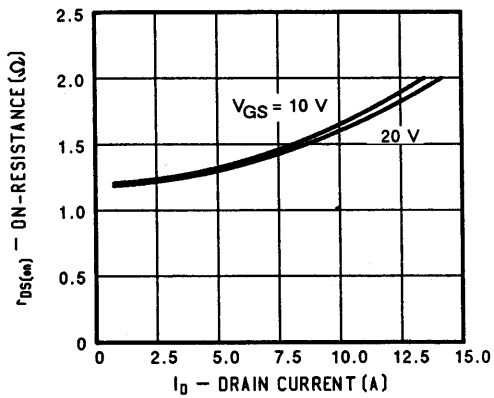


FIGURE 5: Typical Capacitance

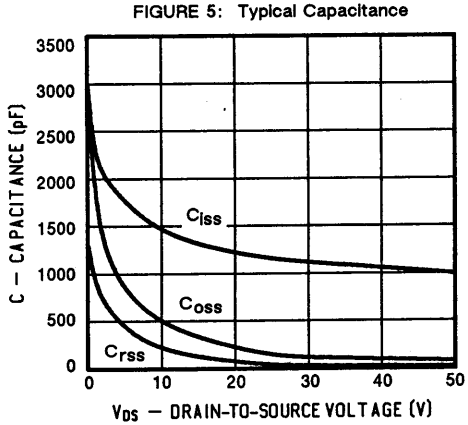
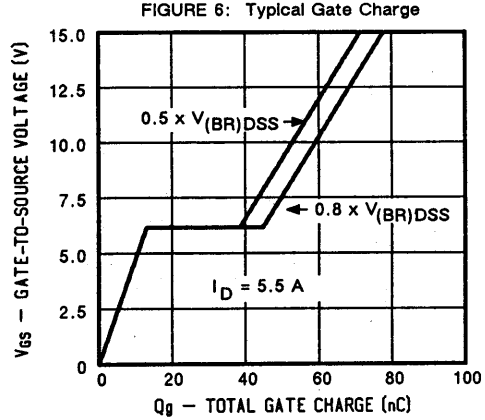


FIGURE 6: Typical Gate Charge



4

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PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 7: On-Resistance vs. Junction Temperature

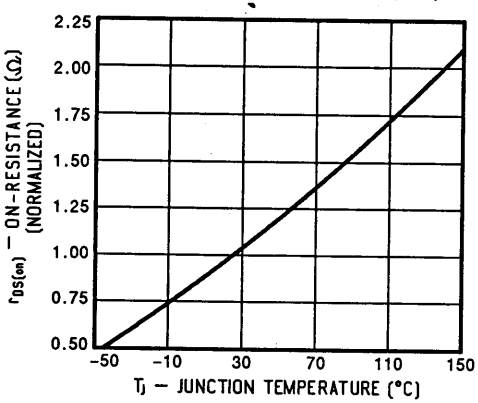


FIGURE 8: Typical Source-Drain Diode Forward Voltage

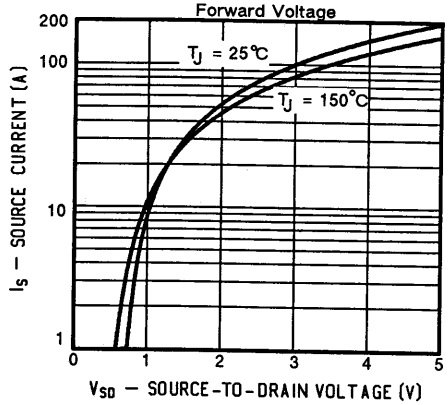


FIGURE 9: Maximum Avalanche and Drain Current vs. Case Temperature

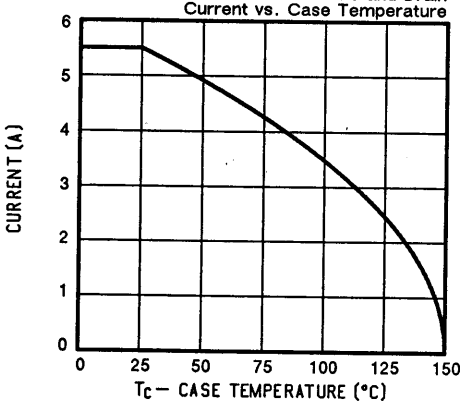
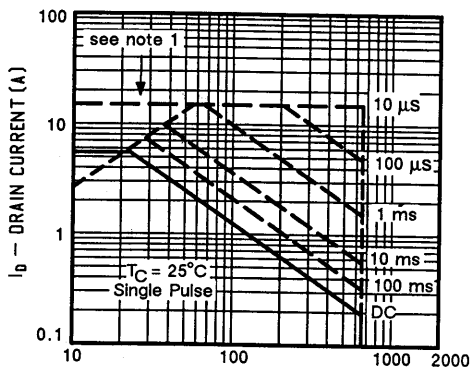


FIGURE 10: Safe Operating Area



[1]Operation in this area may be limited by $r_{DS(on)}$

FIGURE 11: Normalized Effective Transient Thermal Impedance, Junction-to-Case