

**N-Channel Enhancement Mode
MOSPOWER**

APPLICATIONS

- Switching Regulatōrs
- Converters
- Motor Drivers

PRODUCT SUMMARY

Part Number	BV _{DSS} Volts	r _{DS(ON)} (ohms)	Package
BSR65	60	5	T0-237
BSR64	60	7.5	T0-237

PIN 1 – Source
PIN 2 – Gate
PIN 3 & TAB – Drain



T0-237

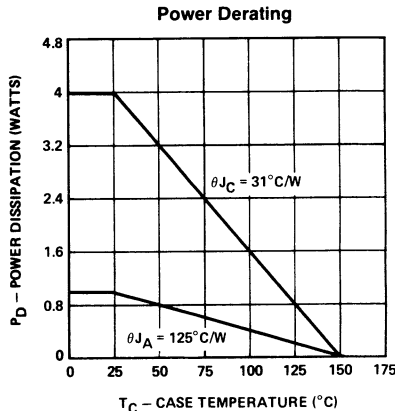
For Additional Curves
See Section 5: VNDF06

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

Parameter		BSR65	BSR64	Units
V _{DS}	Drain-Source Voltage	60	60	V
V _{DGR}	Drain-Gate Voltage (R _{GS} = 1 MΩ)	60	60	V
I _D @ T _C = 25° C	Continuous Drain Current	±0.3	±0.25	A
I _D @ T _C = 100° C	Continuous Drain Current	±0.23	±0.16	A
I _{DM}	Pulsed Drain Current ¹	±1	±1	A
V _{GS}	Gate-Source Voltage	±40	±40	V
P _D	Max Continuous Power Dissipation	1	1	W
P _D	Max Pulse ² Power Dissipation	4	4	W
Junction to Case	Linear Derating Factor	0.032	0.032	W/° C
Junction to Ambient	Linear Derating Factor	0.008	0.008	W/° C
T _J	Operating and	-55 To +150	-55 To +150	° C
T _{stg}	Storage Temperature Range	-55 To +150	-55 To +150	° C
Lead Temperature	(1/16" from case for 10 secs.)	300	300	° C

¹ Pulse Test: Pulsewidth ≤ 300μsec, Duty Cycle ≤ 2%

² 1 Sec Continuous Power Single Pulse



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ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

STATIC

Parameter		Type	Min.	Typ.	Max.	Units	Test Conditions
BV _{DSS}	Drain-Source Breakdown Voltage	All	60	80		V	$V_{GS} = 0$ $I_D = 100\ \mu\text{A}$
V _{GS(th)}	Gate-Threshold Voltage	BSR65 BSR64	0.8 0.6	1.8 1.8	2.5 2.5	V	$V_{DS} = V_{GS}, I_D = 1\ \text{mA}$
I _{GSSF}	Gate-Body Leakage Forward	All		5	100	nA	$V_{GS} = +15\text{V}$
I _{GSSR}	Gate-Body Leakage Reverse	All		-5	-100	nA	$V_{GS} = -15\text{V}$
I _{DSS}	Zero Gate Voltage Drain Current	All		0.1	10	μA	$V_{DS} = 45\text{V}, V_{GS} = 0$
		All		5	500	μA	$V_{DS} = 45\text{V}, V_{GS} = 0$ $T_C = 125^\circ\text{C}$
I _{D(on)}	On-State Drain Current ¹	All	0.75	1.5		A	$V_{DS} \geq 2V_{DS(ON)}, V_{GS} = 10\text{V}$
V _{DS(on)}	Static Drain-Source On-State Voltage ¹	All		1	1.5	V	$V_{GS} = 5\text{V}, I_D = 0.2\text{A}$
		BSR65 BSR64		1.5 2.25	2.5 3.75	V	$V_{GS} = 10\text{V}, I_D = 0.5\text{A}$
R _{DS(on)}	Static Drain-Source On-State Resistance ¹	All		5	7.5	Ω	$V_{GS} = 5\text{V}, I_D = 0.2\text{A}$
		BSR65 BSR64		3 4.5	5 7.5	Ω	$V_{GS} = 10\text{V}, I_D = 0.5\text{A}$
R _{DS(on)}	Static Drain-Source On-State Resistance ¹	BSR65		5.4	9	Ω	$V_{GS} = 10\text{V}, I_D = 0.5\text{A}, T_C = 125^\circ\text{C}$
		BSR64		8.1	13.5	Ω	$V_{GS} = 10\text{V}, I_D = 0.5\text{A}, T_C = 125^\circ\text{C}$


DYNAMIC

g_{fs}	Forward Transconductance ¹	All	100	200		mS (m Ω)	$V_{DS} \geq 2V_{DS(ON)}, I_D = 0.5\text{A}$
C _{iss}	Input Capacitance	All		30	60	pF	$V_{GS} = 0, V_{DS} = 25\text{V}$ $f = 1\ \text{MHz}$
C _{oss}	Output Capacitance	All		14	25	pF	
C _{rss}	Reverse Transfer Capacitance	All		2	5	pF	
t _{ON}	Turn-On Time	All		6	10	ns	$V_{DD} = 15\text{V}, I_D \cong 0.6\text{A}$ $R_g = 25\ \Omega, R_L = 23\ \Omega$ (MOSFET switching times are essentially independent of operating temperature.)
t _{OFF}	Turn-Off Time	All		6	10	ns	

THERMAL RESISTANCE

R _{thJC}	Junction-to-Case	All			31	$^\circ\text{C/W}$	
R _{thJA}	Junction-to-Ambient	All			125	$^\circ\text{C/W}$	Free Air Operation

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I _S	Continuous Source Current (Body Diode)	BSR65			-0.3	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier 
		BSR64			-0.25	A	
I _{SM}	Source Current ¹ (Body Diode)	All			-1	A	
V _{SD}	Diode Forward Voltage ¹	BSR65		-0.85		V	$T_C = 25^\circ\text{C}, I_S = -0.3\text{A}, V_{GS} = 0$
		BSR64		-0.85		V	$T_C = 25^\circ\text{C}, I_S = -0.25\text{A}, V_{GS} = 0$

¹ Pulse Test: Pulse Width $\leq 300\ \mu\text{sec}$, Duty Cycle $\leq 2\%$

Data Sheet Curves: VDNF06

**N-Channel Enhancement Mode
MOSPOWER**

APPLICATIONS

- Switching Regulators
- Converters
- Motor Drivers

PIN 1 – Source
PIN 2 – Gate
PIN 3 & TAB – Drain



T0-237

PRODUCT SUMMARY

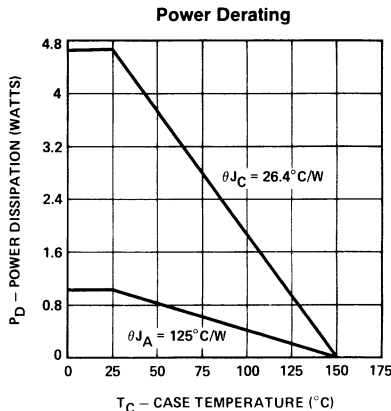
Part Number	BV _{DSS} Volts	r _{DS(ON)} (ohms)	Package
BSR66	60	3	T0-237

For Additional Curves
See Section 5: VNMA06

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

Parameter	BSR66	Units
V _{DS} Drain-Source Voltage	60	V
V _{DGR} Drain-Gate Voltage (R _{GS} = 1 MΩ)	60	V
I _D @ T _C = 25° C Continuous Drain Current	±0.47	A
I _D @ T _C = 100° C Continuous Drain Current	±0.30	A
I _{DM} Pulsed Drain Current ¹	±2	A
V _{GS} Gate-Source Voltage	±40	V
P _D Max Continuous Power Dissipation	1	W
P _D Max Pulse ² Power Dissipation	4.7	W
Junction to Case Linear Derating Factor	0.038	W/° C
Junction to Ambient Linear Derating Factor	0.008	W/° C
T _J Operating and	-55 To +150	° C
T _{stg} Storage Temperature Range		
Lead Temperature (1/16" from case for 10 secs.)	300	° C

1 Pulse Test: Pulswidth < 300μsec, Duty Cycle < 2%
2 1 Sec Continuous Power Single Pulse



ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

STATIC

Parameter		Type	Min.	Typ.	Max.	Units	Test Conditions
BV _{DSS}	Drain-Source Breakdown Voltage	BSR66	60	100		V	$V_{GS} = 0$ $I_D = 10\ \mu\text{A}$
V _{GS(th)}	Gate-Threshold Voltage	BSR66	0.8	1.5	2	V	$V_{DS} = V_{GS}$, $I_D = 1\ \text{mA}$
I _{GSSF}	Gate-Body Leakage Forward	BSR66		1	100	nA	$V_{GS} = +15\text{V}$
I _{GSSR}	Gate-Body Leakage Reverse	BSR66		-1	-100	nA	$V_{GS} = -15\text{V}$
I _{DSS}	Zero Gate Voltage Drain Current	BSR66		0.1	10	μA	$V_{DS} = \text{Max. Rating}$, $V_{GS} = 0$
I _{D(on)}	On-State Drain Current ¹	BSR66	1.5	1.7		A	$V_{DS} \geq 2V_{DS(ON)}$, $V_{GS} = 10\text{V}$
V _{DS(on)}	Static Drain-Source On-State Voltage ¹	BSR66		2.7	3	V	$V_{GS} = 10\text{V}$, $I_D = 1\text{A}$
R _{DS(on)}	Static Drain-Source On-State Resistance ¹	BSR66		2.7	3	Ω	$V_{GS} = 10\text{V}$, $I_D = 1\text{A}$
R _{DS(on)}	Static Drain-Source On-State Resistance ¹	BSR66		3.7	4.1	Ω	$V_{GS} = 10\text{V}$, $I_D = 1\text{A}$, $T_C = 125^\circ\text{C}$


DYNAMIC

g _{fs}	Forward Transconductance ¹	BSR66	170	195		mS	$V_{DS} \geq 2V_{DS(ON)}$, $I_D = 0.5\text{A}$
C _{iss}	Input Capacitance	BSR66		35	50	pF	
C _{oss}	Output Capacitance	BSR66		33	40	pF	$V_{GS} = 0$, $V_{DS} = 25\text{V}$ $f = 1\ \text{MHz}$
C _{rss}	Reverse Transfer Capacitance	BSR66		2	10	pF	
t _{ON}	Turn-On Time	BSR66		8	10	ns	$V_{DD} = 25\text{V}$, $I_D \cong 1\text{A}$ $R_g = 25\ \Omega$, $R_L = 23\ \Omega$ (MOSFET switching times are essentially independent of operating temperature.)
t _{OFF}	Turn-Off Time	BSR66		8	10	ns	

THERMAL RESISTANCE

R _{thJC}	Junction-to-Case	BSR66		22	26.4	$^\circ\text{C}/\text{W}$	
R _{thJA}	Junction-to-Ambient	BSR66			125	$^\circ\text{C}/\text{W}$	Free Air Operation

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I _S	Continuous Source Current (Body Diode)	BSR66			-0.4	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier 
I _{SM}	Source Current ¹ (Body Diode)	BSR66			-2	A	$T_C = 25^\circ\text{C}$, $I_S = -0.4$, $V_{GS} = 0$
V _{SD}	Diode Forward Voltage ¹	BSR66		-1.2		V	$T_C = 25^\circ\text{C}$, $I_S = -0.4$, $V_{GS} = 0$

¹ Pulse Test: Pulse Width $\leq 300\ \mu\text{sec}$, Duty Cycle $\leq 2\%$

Data Sheet Curves: VNMA06

BSR67



N-Channel Enhancement Mode MOSPOWER

APPLICATIONS

- Switching Regulators
- Converters
- Motor Drivers

PIN 1 – Source
PIN 2 – Gate
PIN 3 & TAB – Drain



T0-237

PRODUCT SUMMARY

Part Number	BV _{DSS} Volts	r _{DS(ON)} (ohms)	Package
BSR67	80	4	T0-237

VN 0808 M

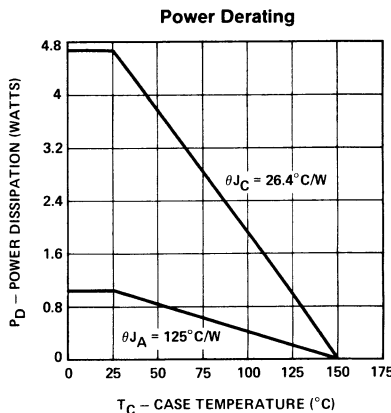
For Additional Curves
See Section 5: VNMA09

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

Parameter	BSR67	Units
V _{DS} Drain-Source Voltage	80	V
V _{DGR} Drain-Gate Voltage (R _{GS} = 1 MΩ)	80	V
I _D @ T _C = 25° C Continuous Drain Current	±0.4	A
I _D @ T _C = 100° C Continuous Drain Current	±0.26	A
I _{DM} Pulsed Drain Current ¹	±2	A
V _{GS} Gate-Source Voltage	±40	V
P _D Max Continuous Power Dissipation	1	W
P _D Max Pulse ² Power Dissipation	4.7	W
Junction to Case Linear Derating Factor	0.038	W/° C
Junction to Ambient Linear Derating Factor	0.008	W/° C
T _J Operating and Storage Temperature Range	-55 To +150	° C
Lead Temperature (1/16" from case for 10 secs.)	300	° C

¹ Pulse Test: Pulsewidth ≤ 300μsec, Duty Cycle ≤ 2%

² 1 Sec Continuous Power Single Pulse



ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

STATIC

Parameter	Type	Min.	Typ.	Max.	Units	Test Conditions	
BV _{DSS}	Drain-Source Breakdown Voltage	BSR67	80	110		V	$V_{GS} = 0$ $I_D = 10\ \mu\text{A}$
V _{GS(th)}	Gate-Threshold Voltage	BSR67	0.8	1.5	2	V	$V_{DS} = V_{GS}$, $I_D = 1\ \text{mA}$
I _{GSSF}	Gate-Body Leakage Forward	BSR67		1	100	nA	$V_{GS} = +15\text{V}$
I _{GSSR}	Gate-Body Leakage Reverse	BSR67		-1	-100	nA	$V_{GS} = -15\text{V}$
I _{DSS}	Zero Gate Voltage Drain Current	BSR67		1	10	μA	$V_{DS} = \text{Max. Rating}$, $V_{GS} = 0$
		BSR67		50	500	μA	$V_{DS} = \text{Max. Rating}$, $V_{GS} = 0$ $T_C = 125^\circ\text{C}$
I _{D(on)}	On-State Drain Current ¹	BSR67	1.5	1.7		A	$V_{DS} \geq 2V_{DS(ON)}$, $V_{GS} = 10\text{V}$
V _{DS(on)}	Static Drain-Source On-State Voltage ¹	BSR67		3	4	V	$V_{GS} = 10\text{V}$, $I_D = 1\text{A}$
R _{DS(on)}	Static Drain-Source On-State Resistance ¹	BSR67		3	4	Ω	$V_{GS} = 10\text{V}$, $I_D = 1\text{A}$
R _{DS(on)}	Static Drain-Source On-State Resistance ¹	BSR67		4.2	5.5	Ω	$V_{GS} = 10\text{V}$, $I_D = 1\text{A}$, $T_C = 125^\circ\text{C}$


DYNAMIC

g_{fs}	Forward Transconductance ¹	BSR67	170	195		mS	$V_{DS} \geq 2V_{DS(ON)}$, $I_D = 0.5\text{A}$
C _{iss}	Input Capacitance	BSR67		35	50	pF	$V_{GS} = 0$ $V_{DS} = 25\text{V}$ $f = 1\ \text{MHz}$
C _{oss}	Output Capacitance	BSR67		33	40	pF	
C _{rss}	Reverse Transfer Capacitance	BSR67		2	10	pF	
t _{ON}	Turn-On Time	BSR67		8	10	ns	
t _{OFF}	Turn-Off Time	BSR67		8	10	ns	$V_{DD} = 25\text{V}$, $I_D \cong 1\text{A}$ $R_g = 25\ \Omega$, $R_L = 23\ \Omega$
							(MOSFET switching times are essentially independent of operating temperature.)

THERMAL RESISTANCE

R _{thJC}	Junction-to-Case	BSR67		22	26.4	$^\circ\text{C/W}$	
R _{thJA}	Junction-to-Ambient	BSR67			125	$^\circ\text{C/W}$	Free Air Operation

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I _S	Continuous Source Current (Body Diode)	BSR67			-0.4	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier 
I _{SM}	Source Current ¹ (Body Diode)	BSR67			-2	A	
V _{SD}	Diode Forward Voltage ¹	BSR67		-1.2		V	$T_C = 25^\circ\text{C}$, $I_S = -0.4\text{A}$, $V_{GS} = 0$

¹ Pulse Test: Pulse Width $\leq 300\ \mu\text{sec}$, Duty Cycle $\leq 2\%$

Data Sheet Curves: VNMA09

**N-Channel Enhancement Mode
MOSPOWER**

APPLICATIONS

- Switching Regulators
- Converters
- Motor Drivers

PIN 1 – Source
PIN 2 – Gate
PIN 3 & TAB – Drain



T0-237

PRODUCT SUMMARY

Part Number	V _{DSS} Volts	r _{DS(ON)} (ohms)	Package
BSR76	240	10	T0-237
BSR72	170	10	T0-237
BSR70	120	10	T0-237

For Additional Curves
See Section 5: VNDB24

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

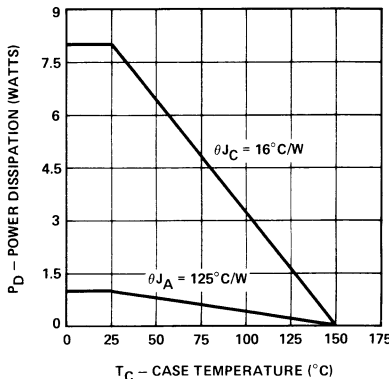
Parameter	BSR76	BSR72	BSR70	Units
V _{DS}	240	170	120	V
V _{DGR}	240	170	120	V
I _D @ T _C = 25° C	±0.19	±0.19	±0.19	A
I _D @ T _C = 100° C	±0.12	±0.12	±0.12	A
I _{DM}	±1	±1	±1	A
V _{GS}	±40	±40	±40	V
P _D	1	1	1	W
P _D	7.9	7.9	7.9	W
Junction to Case ¹	0.063	0.063	0.063	W/° C
Junction to Ambient	0.008	0.008	0.008	W/° C
T _J	Operating and	Operating and	Operating and	° C
T _{stg}	Storage Temperature Range	Storage Temperature Range	Storage Temperature Range	° C
Lead Temperature	(1/16" from case for 10 secs.)	300	300	° C

1 Pulse Test: Pulsewidth ≤ 300μsec, Duty Cycle ≤ 2%

2 1 Sec Continuous Power Single Pulse

3

Power Derating



ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

STATIC

Parameter	Type	Min.	Typ.	Max.	Units	Test Conditions
BV _{DSS} Drain-Source Breakdown Voltage	BSR76	240	260		V	$V_{GS} = 0$ $I_D = 100\ \mu\text{A}$
	BSR72	170	200			
	BSR70	120	160		V	
V _{GS(th)} Gate-Threshold Voltage	All	0.8	1.5	2	V	$V_{DS} = V_{GS}$, $I_D = 1\ \text{mA}$
I _{GSSF} Gate-Body Leakage Forward	All		1	100	nA	$V_{GS} = +15\text{V}$
I _{GSSR} Gate-Body Leakage Reverse	All		-1	-100	nA	$V_{GS} = -15\text{V}$
I _{DSS} Zero Gate Voltage Drain Current	All		0.5	10	μA	$V_{DS} = 120\text{V}$, $V_{GS} = 0$
	All		25	500	μA	$V_{DS} = 120\text{V}$, $V_{GS} = 0$ $T_C = 125^\circ\text{C}$
I _{D(on)} On-State Drain Current ¹	All	1	1.5		A	$V_{DS} \geq 2V_{DS(ON)}$, $V_{GS} = 10\text{V}$
V _{DS(on)} Static Drain-Source On-State Voltage ¹	All		0.8	1	V	$V_{GS} = 2.5\text{V}$, $I_D = 0.1\text{A}$
	All		4	5	V	$V_{GS} = 10\text{V}$, $I_D = 0.5\text{A}$
R _{DS(on)} Static Drain-Source On-State Resistance ¹	All		8	10	Ω	$V_{GS} = 2.5\text{V}$, $I_D = 0.1\text{A}$
	All		8	10	Ω	$V_{GS} = 10\text{V}$, $I_D = 0.5\text{A}$
R _{DS(on)} Static Drain-Source On-State Resistance ¹	All		19.8	24.7	Ω	$V_{GS} = 10\text{V}$, $I_D = 0.5\text{A}$, $T_C = 125^\circ\text{C}$


DYNAMIC

g _{fs} Forward Transconductance ¹	All	300	375		mS	$V_{DS} \geq 2V_{DS(ON)}$, $I_D = 0.5\text{A}$
C _{iss} Input Capacitance	All		80	125	pF	$V_{GS} = 0$, $V_{DS} = 25\text{V}$ $f = 1\ \text{MHz}$
C _{oss} Output Capacitance	All		25	50	pF	
C _{rss} Reverse Transfer Capacitance	All		5	20	pF	
t _{d(on)} Turn-On Delay Time	All		5	8	ns	
t _r Rise Time	All		5	8	ns	$V_{DD} = 60\text{V}$, $I_D \cong 0.1\text{A}$ $R_g = 25\ \Omega$, $R_L = 600\ \Omega$ (MOSFET switching times are essentially independent of operating temperature.)
t _{d(off)} Turn-Off Delay Time	All		15	23	ns	
t _f Fall Time	All		30	34	ns	

THERMAL RESISTANCE

R _{thJC} Junction-to-Case	All			16	$^\circ\text{C/W}$	
R _{thJA} Junction-to-Ambient	All			125	$^\circ\text{C/W}$	Free Air Operation

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I _S Continuous Source Current (Body Diode)	All			-0.19	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier 
I _{SM} Source Current ¹ (Body Diode)	All			-1	A	
V _{SD} Diode Forward Voltage ¹	All		-1.2		V	
						$T_C = 25^\circ\text{C}$, $I_S = -0.19\text{A}$, $V_{GS} = 0$

¹ Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2\%$

Data Sheet Curves: VNDB24

BSR78



P-Channel Enhancement Mode MOSPOWER

APPLICATIONS

- Switching Regulators
- Converters
- Motor Drivers

PIN 1 – Source
PIN 2 – Gate
PIN 3 & TAB – Drain



T0-237

PRODUCT SUMMARY

Part Number	BV_{DSS} Volts	$r_{DS(ON)}$ (ohms)	Package
BSR78	-30	2.5	T0-237

=VP0300

For Additional Curves
See Section 5: VPMH03

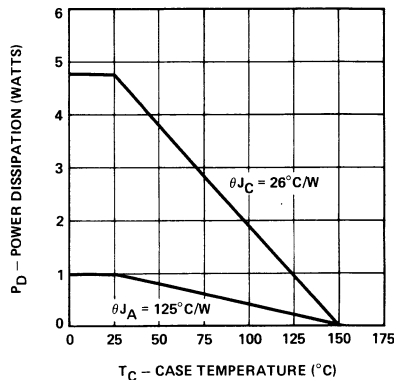
ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ C$ unless otherwise noted)

Parameter	BSR78	Units
V_{DS} Drain-Source Voltage	-30	V
V_{DGR} Drain-Gate Voltage ($R_{GS} = 1 M\Omega$)	-30	V
$I_D @ T_C = 25^\circ C$ Continuous Drain Current	± 0.5	A
$I_D @ T_C = 100^\circ C$ Continuous Drain Current	± 0.32	A
I_{DM} Pulsed Drain Current ¹	± 3	A
V_{GS} Gate-Source Voltage	± 40	V
P_D Max Continuous Power Dissipation	1	W
P_D Max Pulse ² Power Dissipation	4.3	W
Junction to Case Linear Derating Factor	0.034	$W/^\circ C$
Junction to Ambient Linear Derating Factor	0.008	$W/^\circ C$
T_J Operating and Storage Temperature Range	-55 To +150	$^\circ C$
Lead Temperature (1/16" from case for 10 secs.)	300	$^\circ C$

1 Pulse Test: Pulsewidth $\leq 300\mu sec$, Duty Cycle $\leq 2\%$

2 1 Sec Continuous Power Single Pulse

Power Derating



ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

STATIC

Parameter		Type	Min.	Typ.	Max.	Units	Test Conditions
V_{DSS}	Drain-Source Breakdown Voltage	BSR78	-30	-45		V	$V_{GS} = 0$ $I_D = -10\ \mu\text{A}$
$V_{GS(th)}$	Gate-Threshold Voltage	BSR78	-2	-3.4	-4.5	V	$V_{DS} = V_{GS}$, $I_D = -1\ \text{mA}$
I_{GSSF}	Gate-Body Leakage Forward	BSR78		-1	-100	nA	$V_{GS} = -30\text{V}$, $V_{DS} = 0$
I_{GSSR}	Gate-Body Leakage Reverse	BSR78		1	100	nA	$V_{GS} = 30\text{V}$, $V_{DS} = 0$
I_{DSS}	Zero Gate Voltage Drain Current	BSR78		-1	-10	μA	$V_{DS} = -25\text{V}$, $V_{GS} = 0$
$I_{D(on)}$	On-State Drain Current ¹	BSR78	-1.5	-1.7		A	$V_{DS} \geq 2V_{DS(ON)}$, $V_{GS} = -12\text{V}$
$V_{DS(on)}$	Static Drain-Source On-State Voltage ¹	BSR78		-2.2	-2.5	V	$V_{GS} = -12\text{V}$, $I_D = -1\text{A}$
$R_{DS(on)}$	Static Drain-Source On-State Resistance ¹	BSR78		2.2	2.5	Ω	$V_{GS} = -12\text{V}$, $I_D = -1\text{A}$
$R_{DS(on)}$	Static Drain-Source On-State Resistance ¹	BSR78		3.2	3.63	Ω	$V_{GS} = -12\text{V}$, $I_D = -1\text{A}$, $T_C = 125^\circ\text{C}$

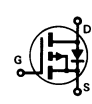
DYNAMIC

g_{fs}	Forward Transconductance ¹	BSR78	200	300		mS (\bar{v})	$V_{DS} \geq 2V_{DS(ON)}$, $I_D = -0.5\text{A}$
C_{iss}	Input Capacitance	BSR78		125	150	pF	
C_{oss}	Output Capacitance	BSR78		92	100	pF	$V_{GS} = 0$, $V_{DS} = -15\text{V}$ $f = 1\ \text{MHz}$
C_{rss}	Reverse Transfer Capacitance	BSR78		25	60	pF	
t_{ON}	Turn-On Time	BSR78		20	30	ns	$V_{DD} = -25\text{V}$, $I_D \cong -1\text{A}$ $R_g = 25\ \Omega$, $R_L = 24\ \Omega$ (MOSFET switching times are essentially independent of operating temperature.)
t_{OFF}	Turn-Off Time	BSR78		20	30	ns	

THERMAL RESISTANCE

R_{thJC}	Junction-to-Case	BSR78		24	29	$^\circ\text{C/W}$	
R_{thJA}	Junction-to-Ambient	BSR78			125	$^\circ\text{C/W}$	Free Air Operation

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S	Continuous Source Current (Body Diode)	BSR78			0.5A	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier 
I_{SM}	Source Current ¹ (Body Diode)	BSR78			3	A	
V_{SD}	Diode Forward Voltage ¹	BSR78		1.2		V	$T_C = 25^\circ\text{C}$, $I_S = 0.5\text{A}$, $V_{GS} = 0$

¹ Pulse Test: Pulse Width $\leq 300\ \mu\text{sec}$, Duty Cycle $\leq 2\%$

Data Sheet Curves: VPMH03

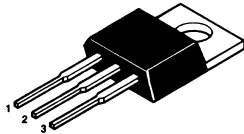
N-Channel Enhancement Mode MOSPOWER

APPLICATIONS

- Switching Regulators
- Converters
- Motor Drivers

PRODUCT SUMMARY

Part Number	V_{DSS} Volts	$r_{DS(ON)}$ (ohms)	Package
BSR80	40	3	T0-220AB



PIN 1 — Gate
PIN 2 & TAB — Drain
PIN 3 — Source

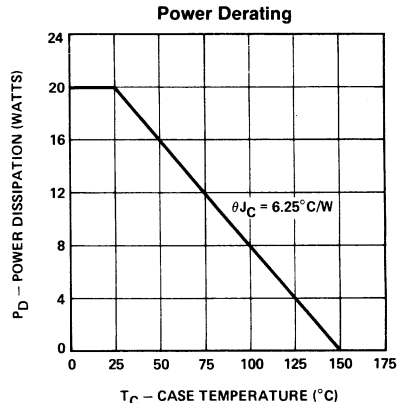
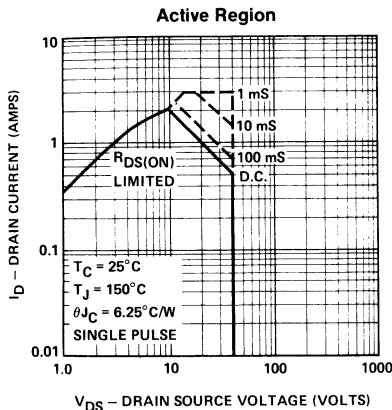
T0-220AB

For Additional Curves
See Section 5: VNMA06

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Parameter	BSR80	Units
V_{DS} Drain-Source Voltage	40	V
V_{DGR} Drain-Gate Voltage ($R_{GS} = 1\text{ M}\Omega$)	40	V
$I_D @ T_C = 25^\circ\text{C}$ Continuous Drain Current	± 2.1	A
$I_D @ T_C = 100^\circ\text{C}$ Continuous Drain Current	± 1.34	A
I_{DM} Pulsed Drain Current ¹	± 3	A
V_{GS} Gate-Source Voltage	± 40	V
$P_D @ T_C = 25^\circ\text{C}$ Max. Power Dissipation	20	W
$P_D @ T_C = 100^\circ\text{C}$ Max. Power Dissipation	8	W
Junction to Case Linear Derating Factor	0.16	W/ $^\circ\text{C}$
Junction to Ambient Linear Derating Factor	0.034	W/ $^\circ\text{C}$
T_J Operating and Storage Temperature Range	-55 To +150	$^\circ\text{C}$
Lead Temperature (1/16" from case for 10 secs.)	300	$^\circ\text{C}$

¹ Pulse Test: Pulsewidth $\leq 300\mu\text{sec}$, Duty Cycle $\leq 2\%$



ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

STATIC

Parameter	Type	Min.	Typ.	Max.	Units	Test Conditions
BV _{DSS}	Drain-Source Breakdown Voltage	BSR80	40	70		$V_{GS} = 0$ $I_D = 10\ \mu\text{A}$
V _{GS(th)}	Gate-Threshold Voltage	BSR80	0.8	1.5	2.5	V $V_{DS} = V_{GS}, I_D = 1\ \text{mA}$
I _{GSSF}	Gate-Body Leakage Forward	BSR80	1	10	10	nA $V_{GS} = +15\text{V}, V_{DS} = 0, T_A = 125^\circ\text{C}$
I _{GSSR}	Gate-Body Leakage Reverse	BSR80		-1	-10	nA $V_{GS} = -15\text{V}, V_{DS} = 0$
I _{DSS}	Zero Gate Voltage Drain Current	BSR80		1	10	μA $V_{DS} = \text{Max. Rating}, V_{GS} = 0$
		BSR80		50	500	μA $V_{DS} = \text{Max. Rating}, V_{GS} = 0$ $T_C = 125^\circ\text{C}$
I _{D(on)}	On-State Drain Current ¹	BSR80	1	1.7		A $V_{DS} \geq 2V_{DS(ON)}, V_{GS} = 10\text{V}$
V _{DSON}	Static Drain-Source On-State Voltage ¹	BSR80		1.2	1.5	V $V_{GS} = 5\text{V}, I_D = 0.3\text{A}$
		BSR80		2.5	3	V $V_{GS} = 10\text{V}, I_D = 1\text{A}$
R _{DSON}	Static Drain-Source On-State Resistance ¹	BSR80		4	5	Ω $V_{GS} = 5\text{V}, I_D = 0.3\text{A}$
		BSR80		2.5	3	Ω $V_{GS} = 10\text{V}, I_D = 1\text{A}$
R _{DSON}	Static Drain-Source On-State Resistance ¹	BSR80		3	4.2	Ω $V_{GS} = 10\text{V}, I_D = 1\text{A}, T_C = 125^\circ\text{C}$


DYNAMIC

g_{fs}	Forward Transconductance ¹	BSR80	170	195		mS $V_{DS} \geq 2V_{DS(ON)}, I_D = 0.5\text{A}$
C _{iss}	Input Capacitance	BSR80		35	50	pF $V_{GS} = 0, V_{DS} = 25\text{V}$ $f = 1\ \text{MHz}$
C _{oss}	Output Capacitance	BSR80		33	40	pF
C _{rss}	Reverse Transfer Capacitance	BSR80		2	10	pF
t _{ON}	Turn-On Time	BSR80		8	10	ns $V_{DD} = 25\text{V}, I_D \approx 1\text{A}$ $R_g = 25\ \Omega, R_L = 23\ \Omega$ (MOSFET switching times are essentially independent of operating temperature.)
t _{OFF}	Turn-Off Time	BSR80		8	10	ns

THERMAL RESISTANCE

R _{thJC}	Junction-to-Case	BSR80			6.25	$^\circ\text{C/W}$
R _{thJA}	Junction-to-Ambient	BSR80			30	$^\circ\text{C/W}$ Free Air Operation

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I _S	Continuous Source Current (Body Diode)	BSR80			-2.1	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier 
I _{SM}	Source Current ¹ (Body Diode)	BSR80			-3	A	
V _{SD}	Diode Forward Voltage ¹	BSR80		-1.2		V $T_C = 25^\circ\text{C}, I_S = -2.1\text{A}, V_{GS} = 0$	

¹ Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2\%$

Data Sheet Curves: VNMA06

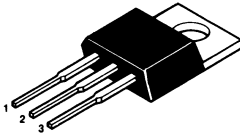
**N-Channel Enhancement Mode
MOSPOWER**

APPLICATIONS

- Switching Regulators
- Converters
- Motor Drivers

PRODUCT SUMMARY

Part Number	V_{DSS} Volts	$r_{DS(ON)}$ (ohms)	Package
BSR81	60	3	T0-220AB



PIN 1 — Gate
PIN 2 & TAB — Drain
PIN 3 — Source

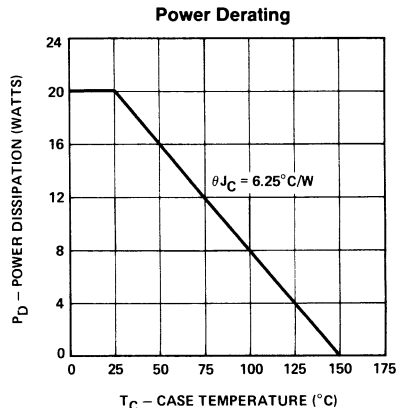
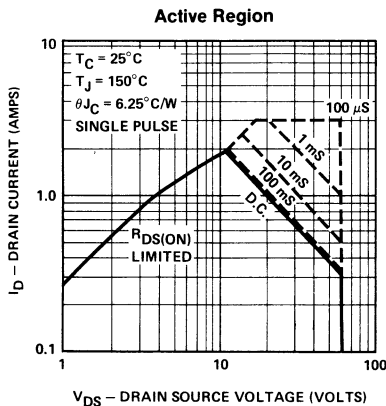
T0-220AB

For Additional Curves
See Section 5: VNMA06

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Parameter	BSR81	Units
V_{DS} Drain-Source Voltage	60	V
V_{DGR} Drain-Gate Voltage ($R_{GS} = 1\text{ M}\Omega$)	60	V
$I_D @ T_C = 25^\circ\text{C}$ Continuous Drain Current	± 2.1	A
$I_D @ T_C = 100^\circ\text{C}$ Continuous Drain Current	± 1.34	A
I_{DM} Pulsed Drain Current ¹	± 3	A
V_{GS} Gate-Source Voltage	± 40	V
$P_D @ T_C = 25^\circ\text{C}$ Max. Power Dissipation	20	W
$P_D @ T_C = 100^\circ\text{C}$ Max. Power Dissipation	8	W
Junction to Case Linear Derating Factor	0.16	$W/^\circ\text{C}$
Junction to Ambient Linear Derating Factor	0.0125	$W/^\circ\text{C}$
T_J Operating and Storage Temperature Range	-55 To +150	$^\circ\text{C}$
Lead Temperature (1/16" from case for 10 secs.)	300	$^\circ\text{C}$

¹ Pulse Test: Pulsewidth $\leq 300\mu\text{sec}$, Duty Cycle $\leq 2\%$



3

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

STATIC

Parameter		Type	Min.	Typ.	Max.	Units	Test Conditions
V_{DSS}	Drain-Source Breakdown Voltage	BSR81	60	100		V	$V_{GS} = 0$ $I_D = 10\ \mu\text{A}$
$V_{GS(th)}$	Gate-Threshold Voltage	BSR81	0.8	1.5	2.5	V	$V_{DS} = V_{GS}$, $I_D = 1\ \text{mA}$
I_{GSSF}	Gate-Body Leakage Forward	BSR81		1	100	nA	$V_{GS} = +30\text{V}$
I_{GSSR}	Gate-Body Leakage Reverse	BSR81		-1	-100	nA	$V_{GS} = -30\text{V}$
I_{DSS}	Zero Gate Voltage Drain Current	BSR81		0.1	1	μA	$V_{DS} = \text{Max. Rating}$, $V_{GS} = 0$
		BSR81		1	10	μA	$V_{DS} = \text{Max. Rating}$, $V_{GS} = 0$ $T_C = 125^\circ\text{C}$
$I_{D(on)}$	On-State Drain Current ¹	BSR81	1.5	1.7		A	$V_{DS} \geq 2V_{DS(ON)}$, $V_{GS} = 10\text{V}$
$V_{DS(on)}$	Static Drain-Source On-State Voltage ¹	BSR81		1.4	1.5	V	$V_{GS} = 5\text{V}$, $I_D = 0.3\text{A}$
		BSR81		2.7	3	V	$V_{GS} = 10\text{V}$, $I_D = 1\text{A}$
$R_{DS(on)}$	Static Drain-Source On-State Resistance ¹	BSR81		4.7	5	Ω	$V_{GS} = 5\text{V}$, $I_D = 0.3\text{A}$
		BSR81		2.7	3	Ω	$V_{GS} = 10\text{V}$, $I_D = 1\text{A}$
$R_{DS(on)}$	Static Drain-Source On-State Resistance ¹	BSR81		3.8	4.2	Ω	$V_{GS} = 10\text{V}$, $I_D = 1\text{A}$, $T_C = 125^\circ\text{C}$

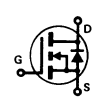
DYNAMIC

g_{fs}	Forward Transconductance ¹	BSR81	170	195		mS	$V_{DS} \geq 2V_{DS(ON)}$, $I_D = 0.5\text{A}$
C_{iss}	Input Capacitance	BSR81		35	50	pF	
C_{oss}	Output Capacitance	BSR81		33	40	pF	$V_{GS} = 0$, $V_{DS} = 25\text{V}$ $f = 1\ \text{MHz}$
C_{rss}	Reverse Transfer Capacitance	BSR81		2	10	pF	
t_{ON}	Turn-On Time	BSR81		8	10	ns	$V_{DD} = 25\text{V}$, $I_D \cong 1\text{A}$ $R_g = 25\ \Omega$, $R_L = 23\ \Omega$
t_{OFF}	Turn-Off Time	BSR81		8	10	ns	(MOSFET switching times are essentially independent of operating temperature.)

THERMAL RESISTANCE

R_{thJC}	Junction-to-Case	BSR81			6.25	$^\circ\text{C/W}$	
R_{thJA}	Junction-to-Ambient	BSR81			80	$^\circ\text{C/W}$	Free Air Operation

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S	Continuous Source Current (Body Diode)	BSR81			-1.7	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier 
I_{SM}	Source Current ¹ (Body Diode)	BSR81			-3	A	
V_{SD}	Diode Forward Voltage ¹	BSR81		-1.2		V	$T_C = 25^\circ\text{C}$, $I_S = -1.7\text{A}$, $V_{GS} = 0$

¹ Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2\%$

Data Sheet Curves: VNMA06

N-Channel Enhancement Mode MOSPOWER

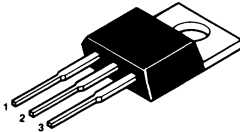
APPLICATIONS

- Switching Regulators
- Converters
- Motor Drivers

PRODUCT SUMMARY

Part Number	V_{DSS} Volts	$r_{DS(ON)}$ (ohms)	Package
BSR82	80	4	T0-220AB

= VN 88 AD



PIN 1 — Gate
PIN 2 & TAB — Drain
PIN 3 — Source

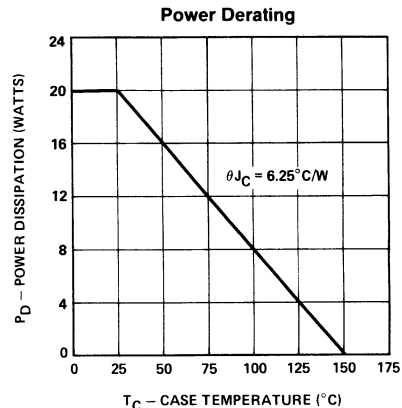
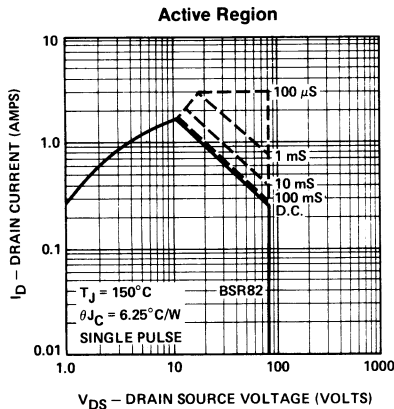
T0-220AB

For Additional Curves
See Section 5: VNMA09

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Parameter	BSR82	Units
V_{DS} Drain-Source Voltage	80	V
V_{DGR} Drain-Gate Voltage ($R_{GS} = 1\text{ M}\Omega$)	80	V
$I_D @ T_C = 25^\circ\text{C}$ Continuous Drain Current	± 1.72	A
$I_D @ T_C = 100^\circ\text{C}$ Continuous Drain Current	± 1.08	A
I_{DM} Pulsed Drain Current ¹	± 3	A
V_{GS} Gate-Source Voltage	± 40	V
$P_D @ T_C = 25^\circ\text{C}$ Max. Power Dissipation	20	W
$P_D @ T_C = 100^\circ\text{C}$ Max. Power Dissipation	8	W
Junction to Case Linear Derating Factor	0.16	$W/^\circ\text{C}$
Junction to Ambient Linear Derating Factor	0.0125	$W/^\circ\text{C}$
T_J Operating and Storage Temperature Range	-55 To $+150$	$^\circ\text{C}$
Lead Temperature (1/16" from case for 10 secs.)	300	$^\circ\text{C}$

¹ Pulse Test: Pulsewidth $\leq 300\mu\text{sec}$, Duty Cycle $\leq 2\%$



ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

STATIC

Parameter	Type	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS} Drain-Source Breakdown Voltage	BSR82	80	110		V	$V_{GS} = 0$ $I_D = 10\ \mu\text{A}$
$V_{GS(th)}$ Gate-Threshold Voltage	BSR82	0.8	1.5	2.5	V	$V_{DS} = V_{GS}$, $I_D = 1\ \text{mA}$
I_{GSSF} Gate-Body Leakage Forward	BSR82		1	100	nA	$V_{GS} = +15\text{V}$
I_{GSSR} Gate-Body Leakage Reverse	BSR82		-1	-100	nA	$V_{GS} = -15\text{V}$
I_{DSS} Zero Gate Voltage Drain Current	BSR82		1	10	μA	$V_{DS} = \text{Max. Rating}$, $V_{GS} = 0$
	BSR82		50	500	μA	$V_{DS} = \text{Max. Rating}$, $V_{GS} = 0$ $T_C = 125^\circ\text{C}$
$I_{D(on)}$ On-State Drain Current ¹	BSR82	1.5	2		A	$V_{DS} \geq 2V_{DS(ON)}$, $V_{GS} = 10\text{V}$
$V_{DS(on)}$ Static Drain-Source On-State Voltage ¹	BSR82		1	1.5	V	$V_{GS} = 5\text{V}$, $I_D = 0.3\text{A}$
	BSR82		3.2	4	V	$V_{GS} = 10\text{V}$, $I_D = 1\text{A}$
$R_{DS(on)}$ Static Drain-Source On-State Resistance ¹	BSR82		3.6	5	Ω	$V_{GS} = 5\text{V}$, $I_D = 0.3\text{A}$
	BSR82		3.2	4	Ω	$V_{GS} = 10\text{V}$, $I_D = 1\text{A}$
$R_{DS(on)}$ Static Drain-Source On-State Resistance ¹	BSR82		4	5.5	Ω	$V_{GS} = 10\text{V}$, $I_D = 1\text{A}$, $T_C = 125^\circ\text{C}$


DYNAMIC

g_{fs} Forward Transconductance ¹	BSR82	170	195		mS	$V_{DS} \geq 2V_{DS(ON)}$, $I_D = 0.5\text{A}$
C_{iss} Input Capacitance	BSR82		35	50	pF	$V_{GS} = 0$, $V_{DS} = 25\text{V}$ $f = 1\ \text{MHz}$
C_{oss} Output Capacitance	BSR82		33	40	pF	
C_{rss} Reverse Transfer Capacitance	BSR82		2	10	pF	
t_{ON} Turn-On Time	BSR82		8	10	ns	$V_{DD} = 25\text{V}$, $I_D \cong 1\text{A}$ $R_g = 25\ \Omega$, $R_L = 23\ \Omega$ (MOSFET switching times are essentially independent of operating temperature.)
t_{OFF} Turn-Off Time	BSR82		8	10	ns	

THERMAL RESISTANCE

R_{thJC} Junction-to-Case	BSR82			6.25	$^\circ\text{C/W}$	
R_{thJA} Junction-to-Ambient	BSR82			80	$^\circ\text{C/W}$	Free Air Operation

BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS

I_S Continuous Source Current (Body Diode)	BSR82			-1.7	A	Modified MOSPOWER symbol showing the integral P-N Junction rectifier 
I_{SM} Source Current ¹ (Body Diode)	BSR82			-3	A	
V_{SD} Diode Forward Voltage ¹	BSR82		-1.2		V	$T_C = 25^\circ\text{C}$, $I_S = -1.7\text{A}$, $V_{GS} = 0$

¹ Pulse Test: Pulse Width $\leq 300\ \mu\text{sec}$, Duty Cycle $\leq 2\%$

Data Sheet Curves: VNMA09