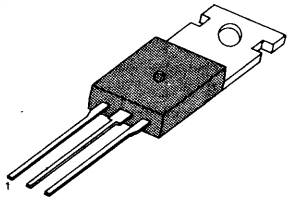
HIGH VOLTAGE, HIGH QUALITY

HIGH SPPED SWITCHING: t_f=0.1μS

- **WIDE SOA**

TO-220



1. Base 2. Collector 3. Emitter

ABSOLUTE MAXIMUM RATINGS (T_a=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	800	V
Collector-Emitter Voltage	V_{CEO}	500	V
Emitter-Base Voltage	V_{EBO}	7	V
Collector Current (DC)	I_C	3	A
Collector Current (Pulse)	I_C	6	A
Base Current (DC)	I_B	1	A
Collector Dissipation	P_C	40	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55~150	°C

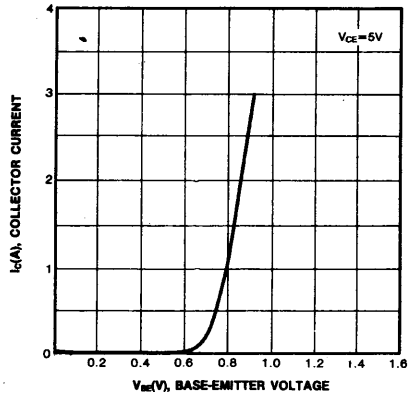
ELECTRICAL CHARACTERISTICS (T_a=25°C)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Collector Base Breakdown Voltage	BV_{CBO}	I_C=1mA, I_E=0	800			V
Collector Emitter Breakdown Voltage	BV_{CEO}	I_C=5mA, R_{BE}=∞	500			V
Emitter Base Breakdown Voltage	BV_{EBO}	I_E=1mA, I_C=0	7			V
Collector Emitter Sustaning Voltage	V_{CEX}(sus)	I_C=1.5A, I_B1=−I_B2=0.6A L=2mH, Clamped	500			V
Collector Cutoff Current	I_{CBO}	V_{CB}=500V, I_E=0			10	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=5V, I_C=0			10	μA
DC Current Gain	$h_{EE}1$	V_{CE}=5V, I_C=0.3A	15		50	
	$h_{FE}2$	V_{CE}=5V, I_C=1.5A	8			
Collector Emitter Saturation Voltage	V_{CE}(sat)	I_C=1.5A, I_B=0.3A			1	V
Base Emitter Saturation Voltage	V_{BE}(sat)	I_C=1.5A, I_B=0.3A			1.5	V
Output Capacitance	C_{OB}	V_{CB}=10V, f=1MHz		50		pF
Current Gain Bandwidth Product	f_T	V_{CE}=10V, I_C=0.3A		18		MHz
Turn On Time	t_{on}	V_{CC}=200V			0.5	μS
Storage Time	t_S	5I_B1=−2.5I_B2=I_C=2A			3	μS
Fall Time	t_f	RL=100ohm			0.3	μS

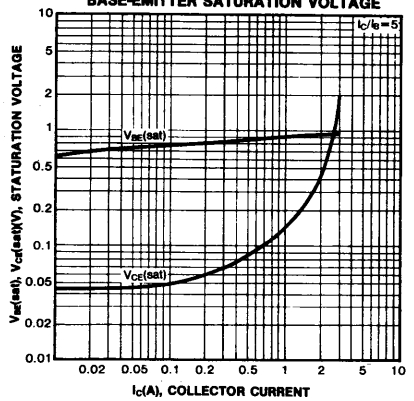
h_{FE} CLASSIFICATION

Classification	R	O	Y
$h_{FE}1$	15-30	20-40	30-50

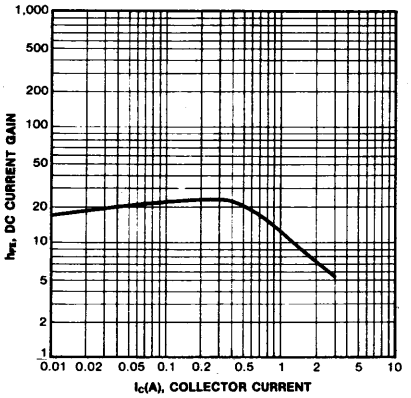
BASE-EMITTER ON VOLTAGE



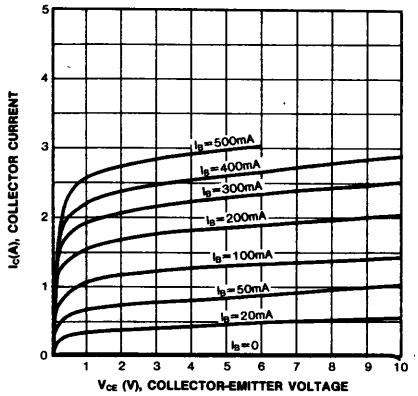
COLLECTOR-EMITTER SATURATION VOLTAGE
BASE-EMITTER SATURATION VOLTAGE



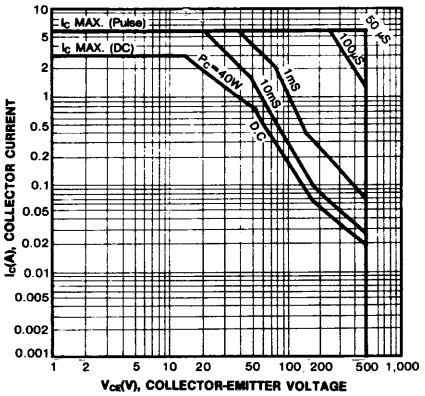
DC CURRENT GAIN



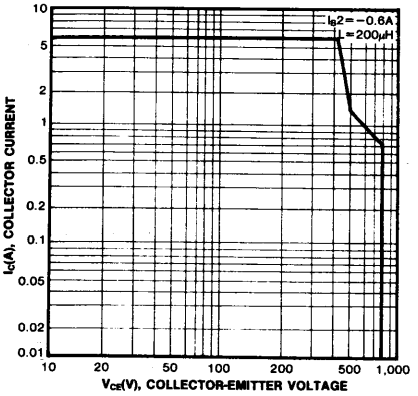
STATIC CHARACTERISTIC



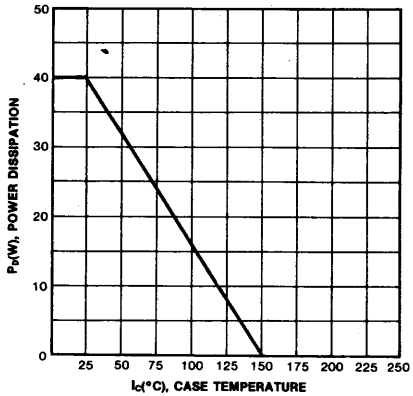
FORWARD BIAS SAFE OPERATING AREA



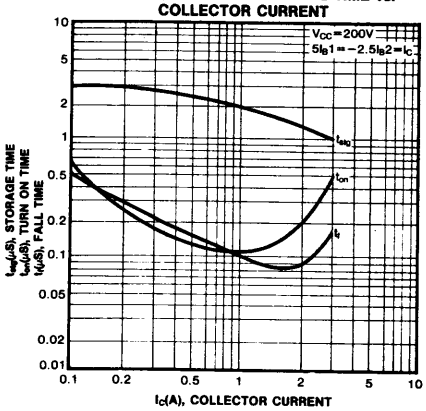
REVERSE BIAS SAFE OPERATING AREA



POWER DERATING



TURN ON, STORAGE AND FALL TIME vs. COLLECTOR CURRENT

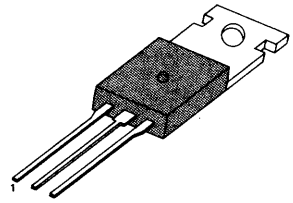


3

HIGH VOLTAGE AND HIGH RELIABILITY

HIGH SPEED SWITCHING: t_f = 0.1 μS (Typ)
WIDE SOA

TO-220



1. Base 2. Collector 3. Emitter

ABSOLUTE MAXIMUM RATINGS (T_a=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	800	V
Collector-Emitter Voltage	V_{CEO}	500	V
Emitter-Base Voltage	V_{EBO}	7	V
Collector Current (DC)	I_C	5	A
Collector Current (Pulse)	I_C	10	A
Base Current	I_B	2	A
Collector Dissipation	P_C	50	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55~150	°C

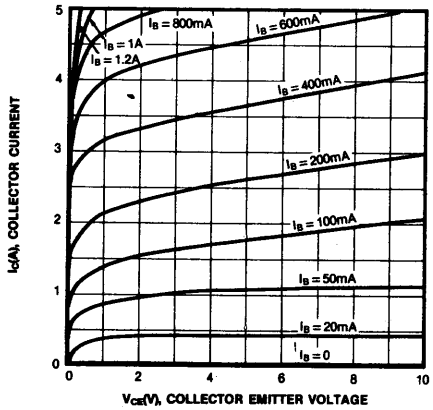
ELECTRICAL CHARACTERISTICS (T_a=25°C)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Collector Base Breakdown Voltage	BV_{CBO}	I_C=1mA, I_E=0	800			V
Collector Emitter Breakdown Voltage	BV_{CEO}	I_C=5mA, R_{BE}=∞	500			V
Emitter Base Breakdown Voltage	BV_{EBO}	I_E=1mA, I_C=0	7			V
Collector Emitter Sustaining Voltage	V_{CEX}(sus)	I_C=2.5A, I_B1=−I_B2=1A L=1mH, Clamped	500			V
Collector Cutoff Current	I_{CBO}	V_{CB}=500V, I_E=0			10	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=5V, I_C=0			10	μA
DC Current Gain	$h_{FE}1$	V_{CE}=5V, I_C=0.6A	15		50	
	$h_{FE}2$	V_{CE}=5V, I_C=3A	8			
Collector Emitter Saturation Voltage	V_{CE}(sat)	I_C=3A, I_B=0.6A			1	V
Base Emitter Saturation Voltage	V_{BE}(sat)	I_C=3A, I_B=0.6A			1.5	V
Output Capacitance	C_{ob}	V_{CB}=10V, I_E=0, f=1MHz		80		pF
Current Gain Bandwidth Product	f_T	V_{CE}=10V, I_C=0.6A		18		MHz
Trun On Time	t_{on}	V_{CC}=200V			0.5	μS
Storage Time	t_S	5I_B1=−2.5I_B2=I_C=4A			3	μS
Fall Time	t_f	RL=50Ω			0.3	μS

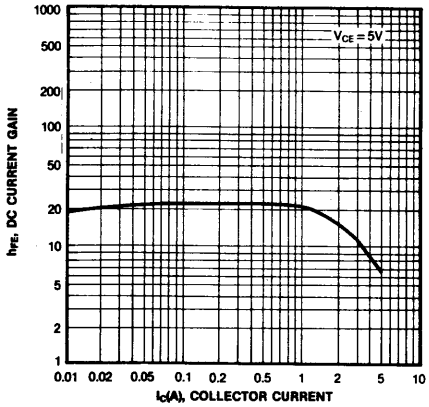
h_{FE} (1) CLASSIFICATION

Classification	R	O	Y
h_{FE} 1	15-30	20-40	30-50

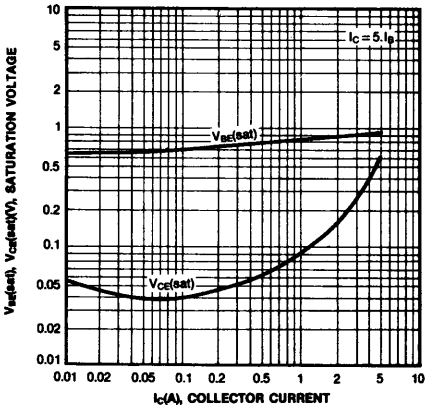
STATIC CHARACTERISTIC



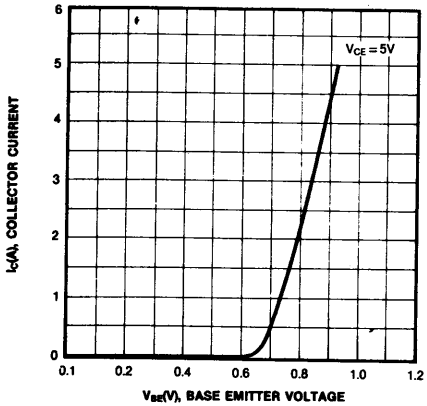
DC CURRENT GAIN



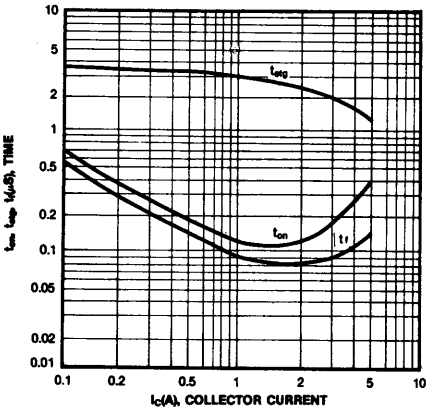
BASE EMITTER SATURATION VOLTAGE
COLLECTOR EMITTER SATURATION VOLTAGE



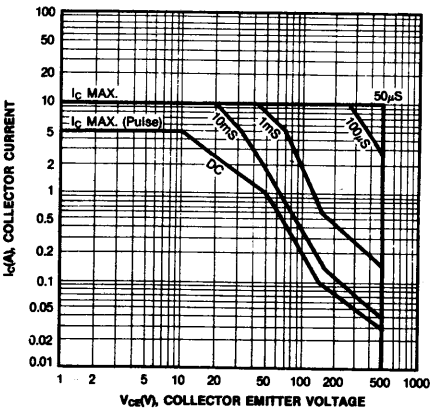
BASE EMITTER ON VOLTAGE



SWITCHING TIME

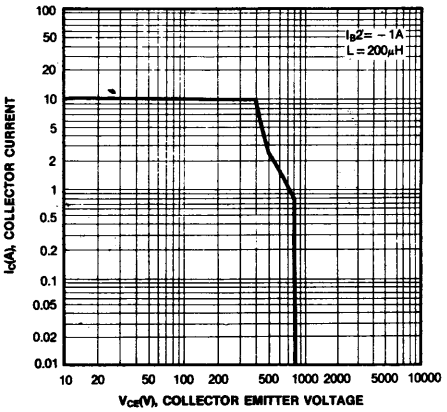


SAFE OPERATING AREA

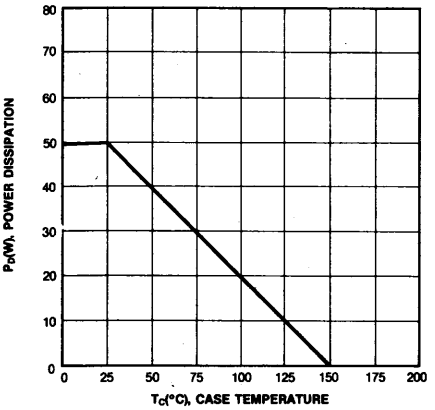


3

REVERSE BIAS SAFE OPERATING AREA



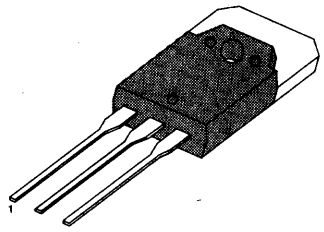
POWER DERATING



HIGH VOLTAGE AND HIGH RELIABILITY

HIGH SPEED SWITCHING: t_f = 0.1 μS (Typ)
WIDE SOA

TO-3P



1. Base 2. Collector 3. Emitter

ABSOLUTE MAXIMUM RATINGS (T_a=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	800	V
Collector-Emitter Voltage	V_{CEO}	500	V
Emitter-Base Voltage	V_{EBO}	7	V
Collector Current (DC)	I_C	4	A
Collector Current (Pulse)	I_C	8	A
Base Current	I_B	1.5	A
Collector Dissipation	P_C	60	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55~150	°C

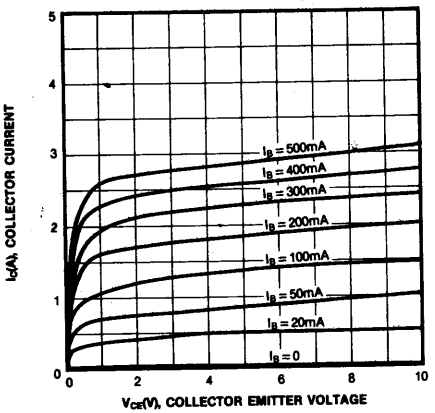
ELECTRICAL CHARACTERISTICS (T_a=25°C)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Collector Base Breakdown Voltage	BV_{CBO}	I_C=1mA, I_E=0	800			V
Collector Emitter Breakdown Voltage	BV_{CEO}	I_C=5mA, R_{BE}=∞	500			V
Emitter Base Breakdown Voltage	BV_{EBO}	I_E=1mA, I_C=0	7			V
Collector Emitter Sustaining Voltage	V_{CEX}(sus)	I_C=1.5A, I_B1=−I_B2=0.6A L=1mH, Clamped	500			V
Collector Cutoff Current	I_{CBO}	V_{CB}=500V, I_E=0			10	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=5V, I_C=0			10	μA
DC Current Gain	$h_{FE}1$	V_{CE}=5V, I_C=0.3A	15		50	
	$h_{FE}2$	V_{CE}=5V, I_C=1.5A	8			
Collector Emitter Saturation Voltage	V_{CE}(sat)	I_C=1.5A, I_B=0.3A			1	V
Base Emitter Saturation Voltage	V_{BE}(sat)	I_C=1.5A, I_B=0.3A			1.5	V
Output Capacitance	C_{ob}	V_{CB}=10V, I_E=0, f=1MHz		50		pF
Current Gain Bandwidth Product	f_T	V_{CE}=10V, I_C=0.3A		18		MHz
Trun On Time	t_{on}	V_{CC}=200V			0.5	μS
Storage Time	t_S	$5I_B1$=−$2.5I_B2$=I_C=2A			3	μS
Fall Time	t_f	RL=100Ω			0.3	μS

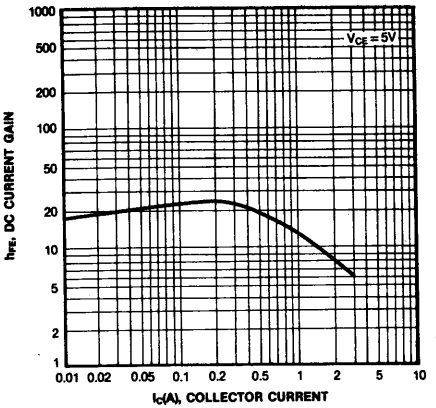
h_{FE} (1) CLASSIFICATION

Classification	R	O	Y
h_{FE} 1	15-30	20-40	30-50

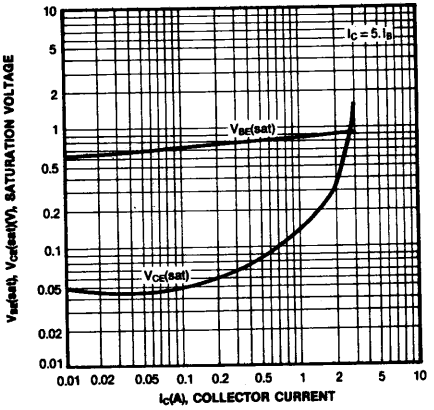
STATIC CHARACTERISTIC



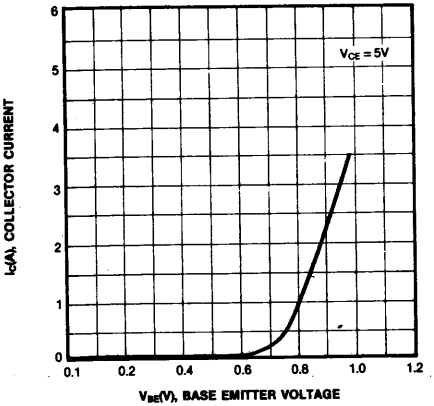
DC CURRENT GAIN



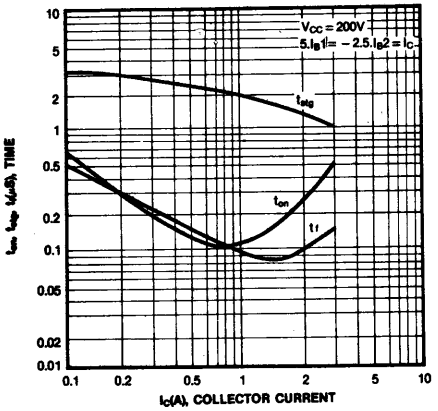
BASE EMITTER SATURATION VOLTAGE
COLLECTOR EMITTER SATURATION VOLTAGE



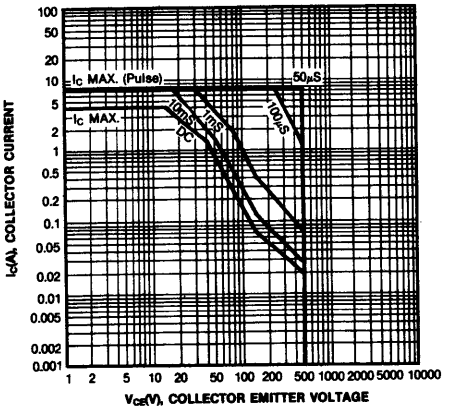
BASE EMITTER ON VOLTAGE



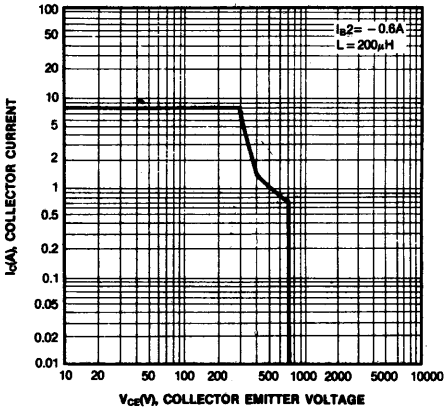
SWITCHING TIME



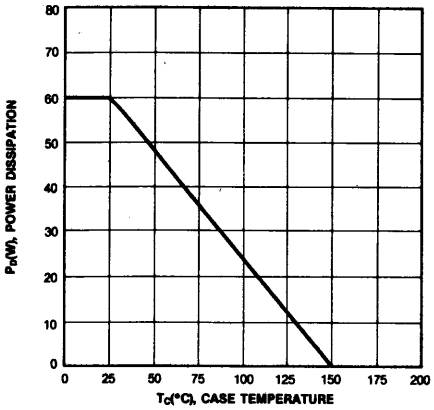
SAFE OPERATING AREA



REVERSE BIAS SAFE OPERATING AREA



POWER DERATING



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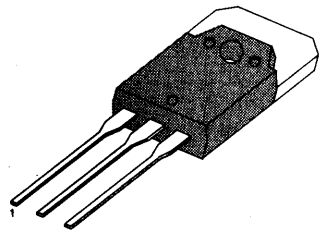
HIGH VOLTAGE AND HIGH RELIABILITY

HIGH SPEED SWITCHING: t_f = 0.1 μS (Typ)
WIDE SOA

TO-3P



1. Base 2. Collector 3. Emitter

ABSOLUTE MAXIMUM RATINGS (T_a=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	800	V
Collector-Emitter Voltage	V_{CEO}	500	V
Emitter-Base Voltage	V_{EBO}	7	V
Collector Current (DC)	I_C	7	A
Collector Current (Pulse)	I_C	14	A
Base Current	I_B	3	A
Collector Dissipation	P_C	80	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55~150	°C

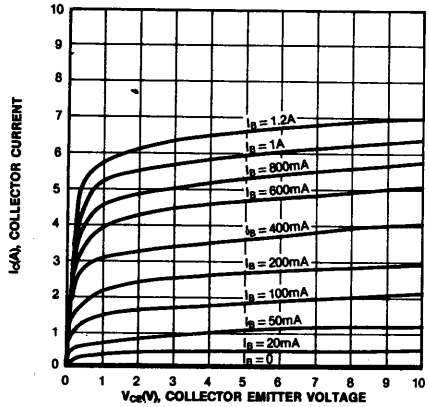
ELECTRICAL CHARACTERISTICS (T_a=25°C)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Collector Base Breakdown Voltage	BV_{CBO}	I_C=1mA, I_E=0	800			V
Collector Emitter Breakdown Voltage	BV_{CEO}	I_C=5mA, R_{BE}=∞	500			V
Emitter Base Breakdown Voltage	BV_{EBO}	I_E=1mA, I_C=0	7			V
Collector Emitter Sustaining Voltage	V_{CEX}(sus)	I_C=2.5A, I_B1=−I_B2=1A L=1mH, Clamped	500			V
Collector Cutoff Current	I_{CBO}	V_{CB}=500V, I_E=0			10	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=5V, I_C=0			10	μA
DC Current Gain	$h_{FE}1$	V_{CE}=5V, I_C=0.6A	15		50	
	$h_{FE}2$	V_{CE}=5V, I_C=3A	8			
Collector Emitter Saturation Voltage	V_{CE}(sat)	I_C=3A, I_B=0.6A			1	V
Base Emitter Saturation Voltage	V_{BE}(sat)	I_C=3A, I_B=0.6A			1.5	V
Output Capacitance	C_{ob}	V_{CB}=10V, I_E=0, f=1MHz		80		pF
Current Gain Bandwidth Product	f_T	V_{CE}=10V, I_C=0.6A		18		MHz
Trun On Time	t_{on}	V_{CC}=200V			0.5	μS
Storage Time	t_S	$5I_B1$=−$2.5I_B2$=I_C=4A			3	μS
Fall Time	t_f	RL=50Ω			0.3	μS

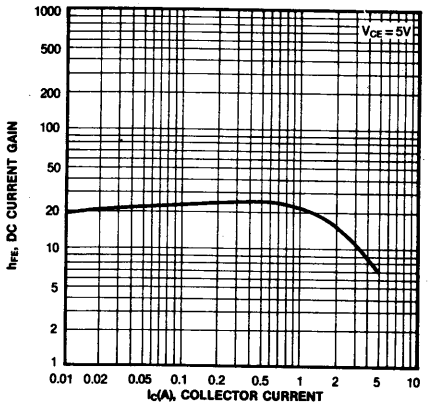
h_{FE} (1) CLASSIFICATION

Classification	R	O	Y
h_{FE} 1	15-30	20-40	30-50

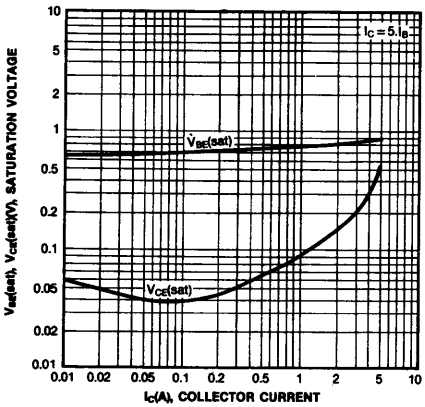
STATIC CHARACTERISTIC



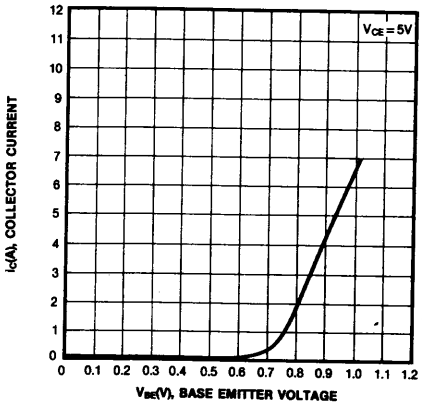
DC CURRENT GAIN



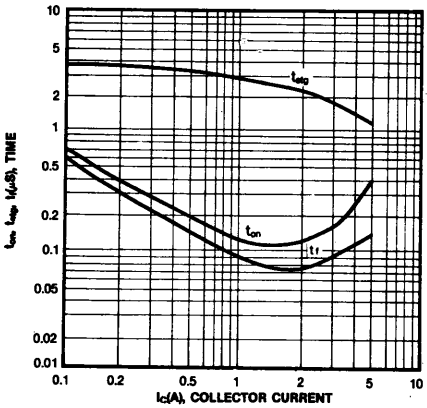
BASE EMITTER SATURATION VOLTAGE
COLLECTOR EMITTER SATURATION VOLTAGE



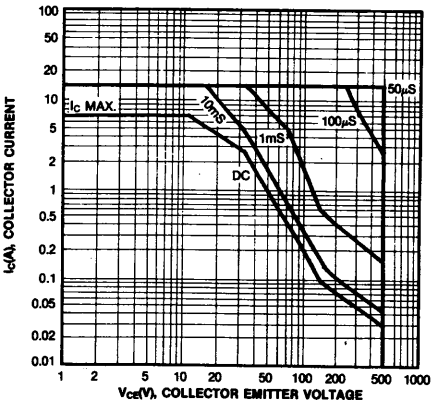
BASE EMITTER ON VOLTAGE



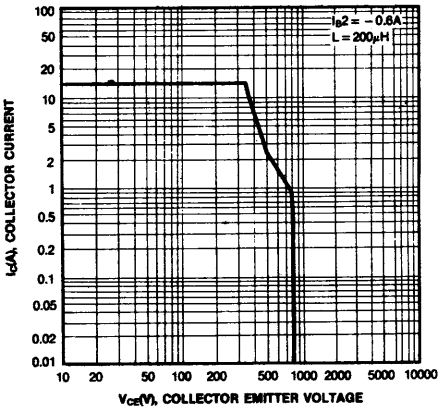
SWITCHING TIME



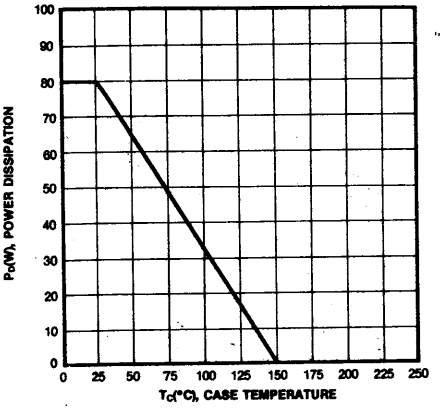
SAFE OPERATING AREA



REVERSE BIAS SAFE OPERATING AREA



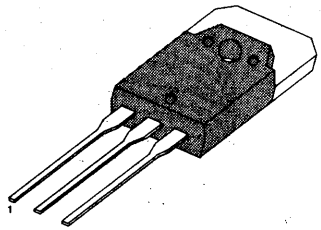
POWER DERATING



HIGH VOLTAGE AND HIGH RELIABILITY

HIGH SPEED SWITCHING
WIDE SOA

TO-3P



1. Base 2. Collector 3. Emitter

ABSOLUTE MAXIMUM RATINGS (T_a=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	800	V
Collector-Emitter Voltage	V_{CEO}	500	V
Emitter-Base Voltage	V_{EBO}	7	V
Collector Current (DC)	I_C	10	A
Collector Current (Pulse)	I_C	20	A
Base Current	I_B	3	A
Collector Dissipation	P_C	90	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55~150	°C

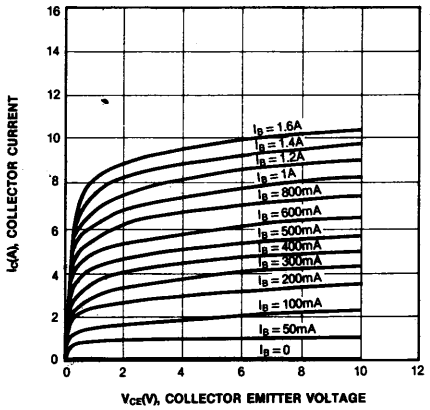
ELECTRICAL CHARACTERISTICS (T_a=25°C)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Collector Base Breakdown Voltage	BV_{CBO}	I_C=1mA, I_E=0	800			V
Collector Emitter Breakdown Voltage	BV_{CEO}	I_C=5mA, R_{BE}=∞	500			V
Emitter Base Breakdown Voltage	BV_{EBO}	I_E=1mA, I_C=0	7			V
Collector Emitter Sustaining Voltage	V_{CEX}(sus)	I_C=3.5A, I_B1=−I_B2=1.4A L=500μH, Clamped	500			V
Collector Cutoff Current	I_{CBO}	V_{CB}=500V, I_E=0			10	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=5V, I_C=0			10	μA
DC Current Gain	$h_{FE}1$	V_{CE}=5V, I_C=0.8A	15		50	
	$h_{FE}2$	V_{CE}=5V, I_C=4A	8			
Collector Emitter Saturation Voltage	V_{CE}(sat)	I_C=4A, I_B=0.8A			1	V
Base Emitter Saturation Voltage	V_{BE}(sat)	I_C=4A, I_B=0.8A			1.5	V
Output Capacitance	C_{ob}	V_{CB}=10V, I_E=0, f=1MHz		120		pF
Current Gain Bandwidth Product	f_T	V_{CE}=10V, I_C=0.8A		18		MHz
Trun On Time	t_{on}	V_{CC}=200V			0.5	μS
Storage Time	t_S	5I_B1=−2.5I_B2=I_C=5A			3	μS
Fall Time	t_f	RL=40Ω			0.3	μS

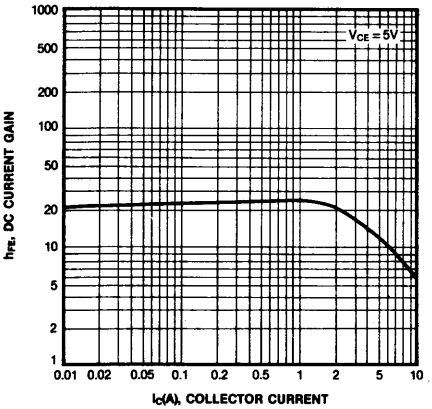
h_{FE} (1) CLASSIFICATION

Classification	R	O	Y
h_{FE} 1	15-30	20-40	30-50

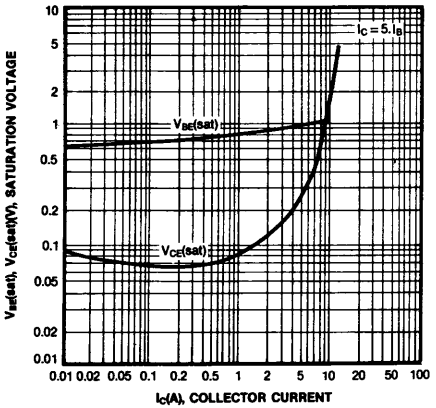
STATIC CHARACTERISTIC



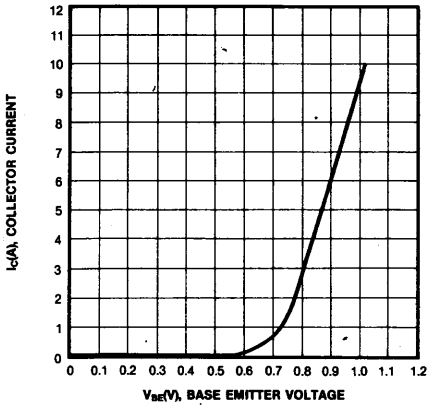
DC CURRENT GAIN



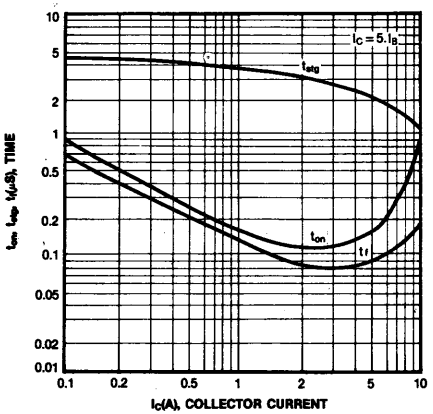
BASE EMITTER SATURATION VOLTAGE
COLLECTOR EMITTER SATURATION VOLTAGE



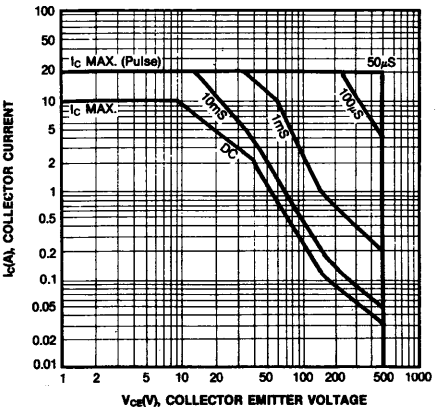
BASE EMITTER ON VOLTAGE



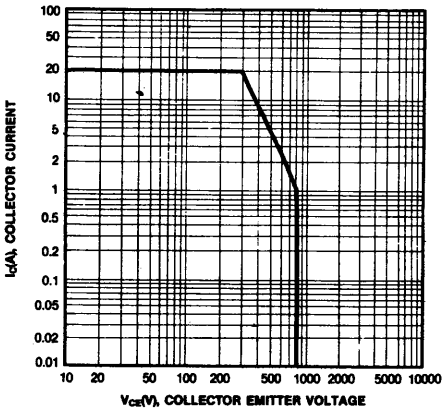
SWITCHING TIME



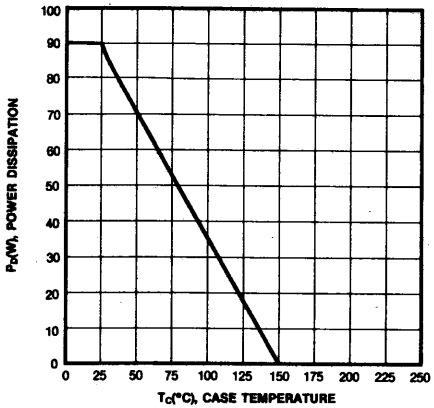
SAFE OPERATING AREA



REVERSE BIAS SAFE OPERATING AREA



POWER DERATING



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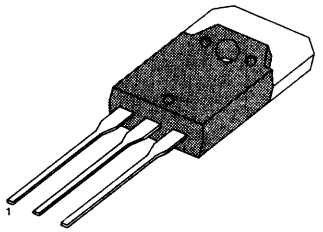
HIGH VOLTAGE AND HIGH RELIABILITY

HIGH SPEED SWITCHING
WIDE SOA

TO-3P



1. Base 2. Collector 3. Emitter

ABSOLUTE MAXIMUM RATINGS (T_a=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	800	V
Collector-Emitter Voltage	V_{CEO}	500	V
Emitter-Base Voltage	V_{EBO}	7	V
Collector Current (DC)	I_C	15	A
Collector Current (Pulse)	I_C	25	A
Base Current	I_B	4	A
Collector Dissipation	P_C	100	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55~150	°C

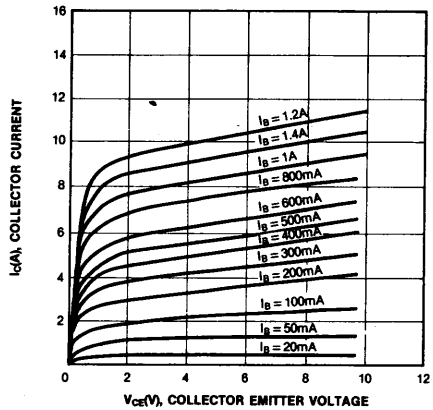
ELECTRICAL CHARACTERISTICS (T_a=25°C)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Collector Base Breakdown Voltage	BV_{CBO}	I_C=1mA, I_E=0	800			V
Collector Emitter Breakdown Voltage	BV_{CEO}	I_C=5mA, R_{BE}=∞	500			V
Emitter Base Breakdown Voltage	BV_{EBO}	I_E=1mA, I_C=0	7			V
Collector Emitter Sustaining Voltage	V_{CEX}(sus)	I_C=5A, I_B1=−I_B2=2A L=500μH, Clamped	500			V
Collector Cutoff Current	I_{CBO}	V_{CB}=500V, I_E=0			10	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=5V, I_C=0			10	μA
DC Current Gain	$h_{FE}1$	V_{CE}=5V, I_C=1.2A	15		50	
	$h_{FE}2$	V_{CE}=5V, I_C=6A	8			
Collector Emitter Saturation Voltage	V_{CE}(sat)	I_C=6A, I_B=1.2A			1	V
Base Emitter Saturation Voltage	V_{BE}(sat)	I_C=6A, I_B=1.2A			1.5	V
Output Capacitance	C_{ob}	V_{CB}=10V, I_E=0, f=1MHz		160		pF
Current Gain Bandwidth Product	f_T	V_{CE}=10V, I_C=1.2A		18		MHz
Trun On Time	t_{on}	V_{CC}=200V			0.5	μS
Storage Time	t_S	5I_B1=−2.5I_B2=I_C=7A			3	μS
Fall Time	t_f	RL=28.6Ω			0.3	μS

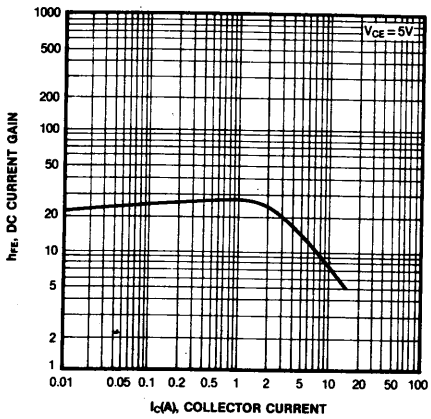
h_{FE} (1) CLASSIFICATION

Classification	R	O	Y
h_{FE} 1	15-30	20-40	30-50

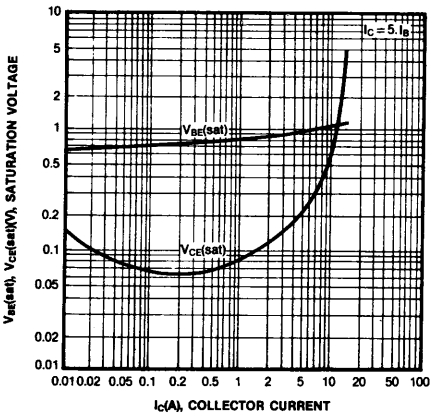
STATIC CHARACTERISTIC



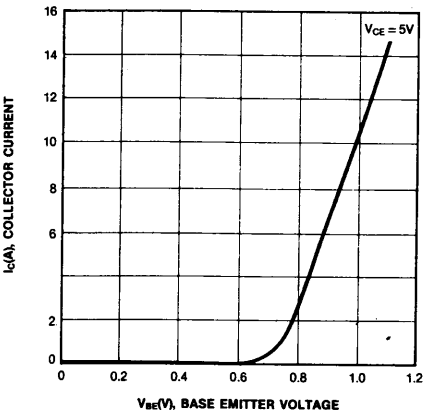
DC CURRENT GAIN



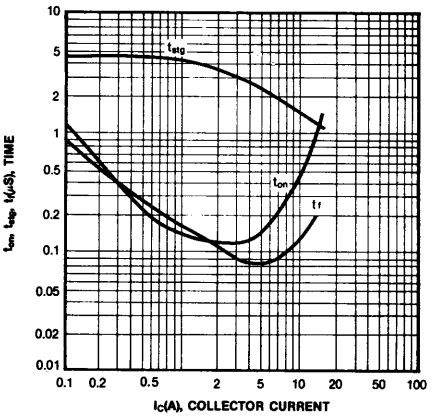
BASE EMITTER SATURATION VOLTAGE
COLLECTOR EMITTER SATURATION VOLTAGE



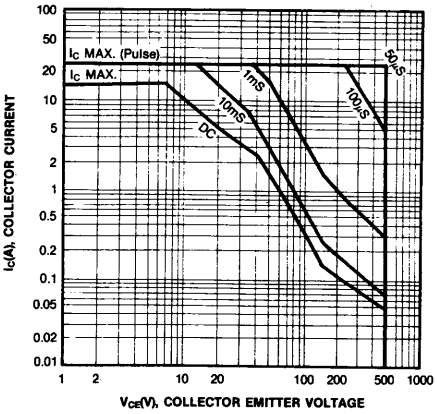
BASE EMITTER ON VOLTAGE



SWITCHING TIME



SAFE OPERATING AREA



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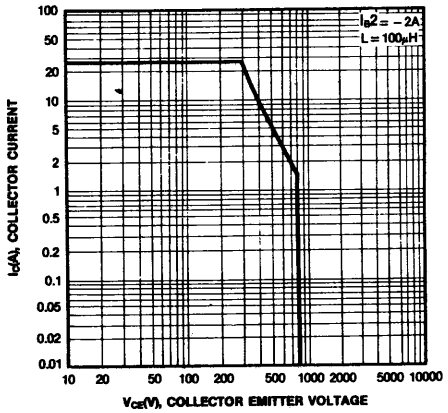
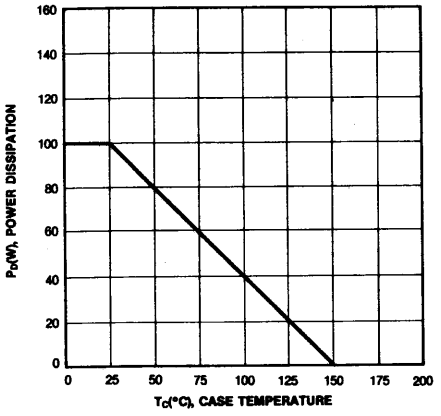
REVERSE BIAS SAFE OPERATING AREA



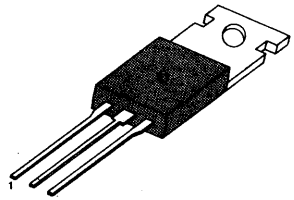
POWER DERATING



HIGH VOLTAGE AND HIGH RELIABILITY

HIGH SPEED SWITCHING
WIDE SOA

TO-220



1. Base 2. Collector 3. Emitter

ABSOLUTE MAXIMUM RATINGS (T_a=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	1100	V
Collector-Emitter Voltage	V_{CEO}	800	V
Emitter-Base Voltage	V_{EBO}	7	V
Collector Current (DC)	I_C	1.5	A
Collector Current (Pulse)	I_C	5	A
Base Current	I_B	0.8	A
Collector Dissipation	P_C	40	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55~150	°C

3

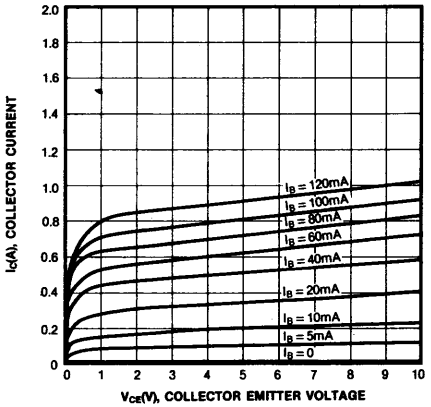
ELECTRICAL CHARACTERISTICS (T_a=25°C)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Collector Base Breakdown Voltage	BV_{CBO}	I_C=1mA, I_E=0	1100			V
Collector Emitter Breakdown Voltage	BV_{CEO}	I_C=5mA, R_{BE}=∞	800			V
Emitter Base Breakdown Voltage	BV_{EBO}	I_E=1mA, I_C=0	7			V
Collector Emitter Sustaining Voltage	V_{CEX}(sus)	I_C=0.75A I_B1=−I_B2=0.15A L=5mH, Clamped	800			V
Collector Cutoff Current	I_{CBO}	V_{CB}=800V, I_E=0			10	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=5V, I_C=0			10	μA
DC Current Gain	$h_{FE}1$	V_{CE}=5V, I_C=0.1A	10		40	
	$h_{FE}2$	V_{CE}=5V, I_C=0.5A	8			
Collector Emitter Saturation Voltage	V_{CE}(sat)	I_C=0.75A, I_B=0.15A			2	V
Base Emitter Saturation Voltage	V_{BE}(sat)	I_C=0.75A, I_B=0.15A			1.5	V
Output Capacitance	C_{ob}	V_{CB}=10V, I_E=0, f=1MHz		35		pF
Current Gain Bandwidth Product	f_T	V_{CE}=10V, I_C=0.1A		15		MHz
Trun On Time	t_{on}	V_{CC}=400V			0.5	μS
Storage Time	t_S	5I_B1=−2.5I_B2=I_C=1A			3	μS
Fall Time	t_f	RL=400Ω			0.3	μS

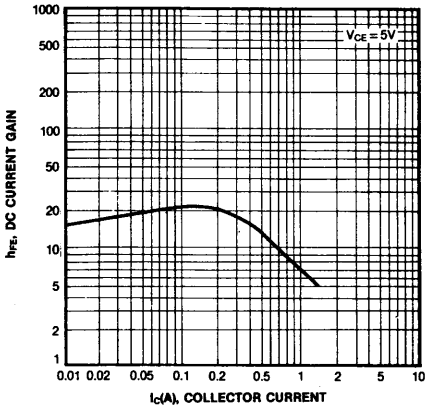
h_{FE} (1) CLASSIFICATION

Classification	N	R	O
h_{FE} 1	10-20	15-30	20-40

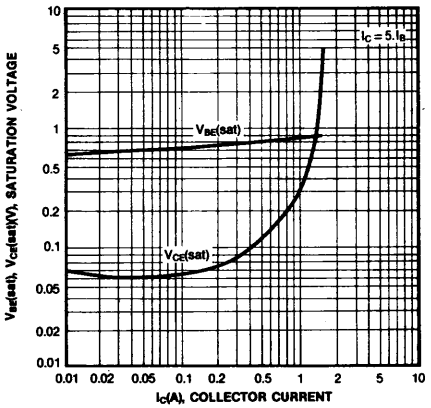
STATIC CHARACTERISTIC



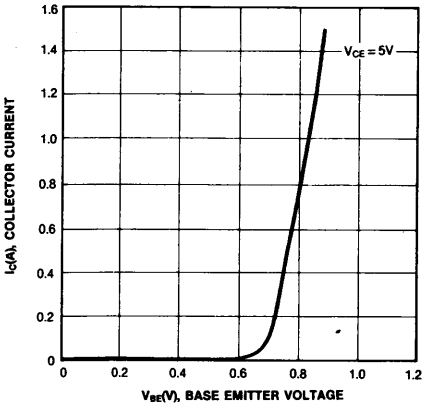
DC CURRENT GAIN



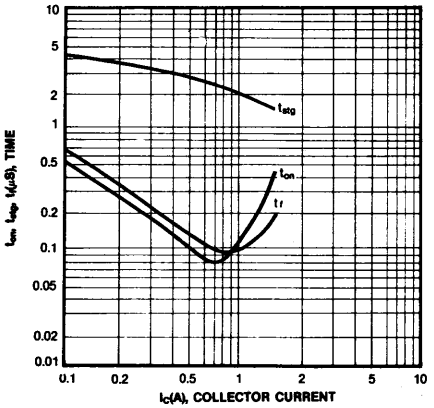
BASE EMITTER SATURATION VOLTAGE
COLLECTOR EMITTER SATURATION VOLTAGE



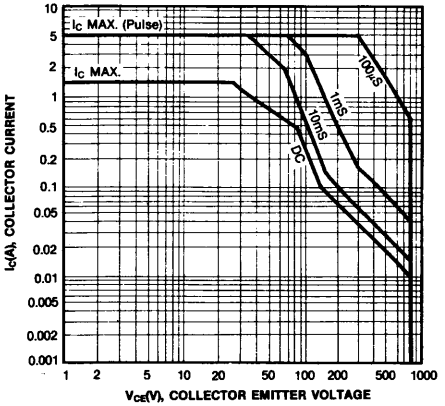
BASE EMITTER ON VOLTAGE



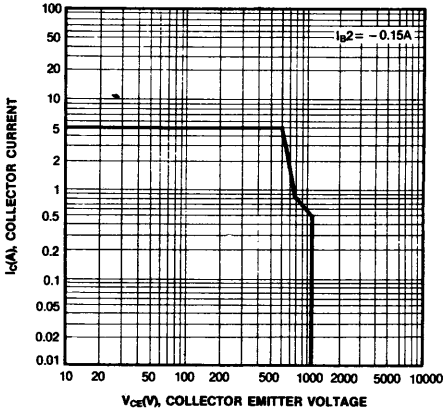
SWITCHING TIME



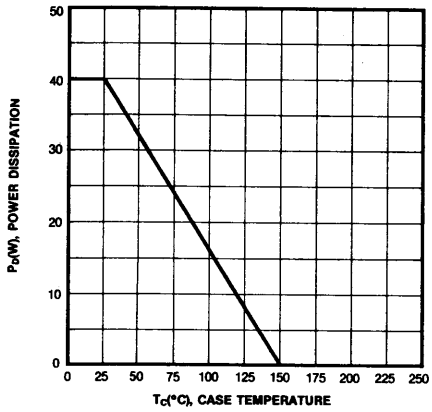
SAFE OPERATING AREA



REVERSE BIAS SAFE OPERATING AREA



POWER DERATING



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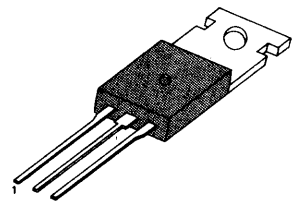
HIGH VOLTAGE AND HIGH RELIABILITY

HIGH SPEED SWITCHING
WIDE SOA

TO-220



1. Base 2. Collector 3. Emitter

ABSOLUTE MAXIMUM RATINGS (T_a=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	1100	V
Collector-Emitter Voltage	V_{CEO}	800	V
Emitter-Base Voltage	V_{EBO}	7	V
Collector Current (DC)	I_C	3	A
Collector Current (Pulse)	I_C	10	A
Base Current	I_B	1.5	A
Collector Dissipation	P_C	50	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55~150	°C

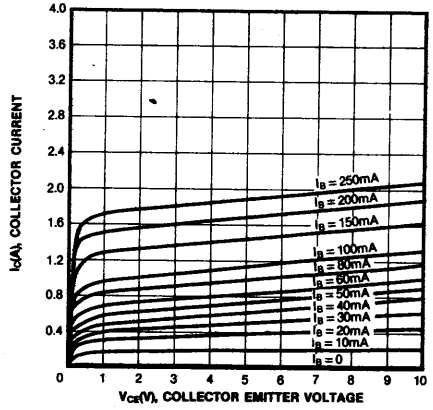
ELECTRICAL CHARACTERISTICS (T_a=25°C)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Collector Base Breakdown Voltage	BV_{CBO}	I_C=1mA, I_E=0	1100			V
Collector Emitter Breakdown Voltage	BV_{CEO}	I_C=5mA, R_{BE}=∞	800			V
Emitter Base Breakdown Voltage	BV_{EBO}	I_E=1mA, I_C=0	7			V
Collector Emitter Sustaining Voltage	V_{CEX}(sus)	I_C=1.5A, I_B1=−I_B2=0.3A L=2mH, Clamped	800			V
Collector Cutoff Current	I_{CBO}	V_{CB}=800V, I_E=0			10	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=5V, I_C=0			10	μA
DC Current Gain	$h_{FE}1$	V_{CE}=5V, I_C=0.2A	10		40	
	$h_{FE}2$	V_{CE}=5V, I_C=1A	8			
Collector Emitter Saturation Voltage	V_{CE}(sat)	I_C=1.5A, I_B=0.3A			2	V
Base Emitter Saturation Voltage	V_{BE}(sat)	I_C=1.5A, I_B=0.3A			1.5	V
Output Capacitance	C_{ob}	V_{CB}=10V, I_E=0, f=1MHz		60		pF
Current Gain Bandwidth Product	f_T	V_{CE}=10V, I_C=0.2A		15		MHz
Trun On Time	t_{on}	V_{CC}=400V			0.5	μS
Storage Time	t_S	5I_B1=−2.5I_B2=I_C=2A			3	μS
Fall Time	t_f	RL=200Ω			0.3	μS

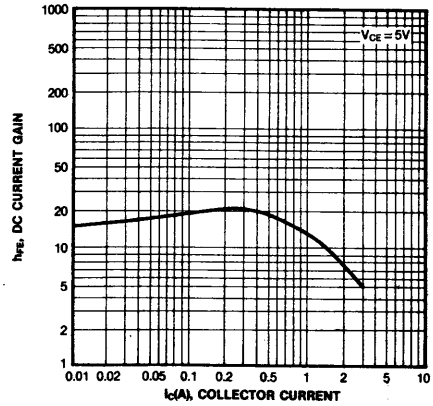
h_{FE} (1) CLASSIFICATION

Classification	N	R	O
h_{FE} 1	10-20	15-30	20-40

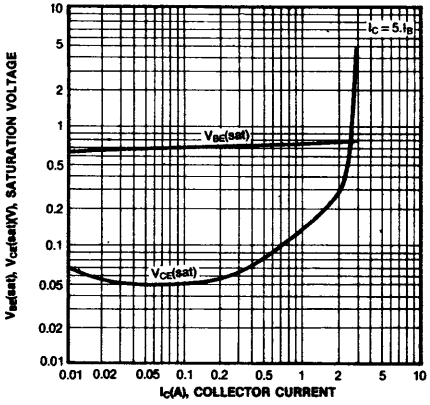
STATIC CHARACTERISTIC



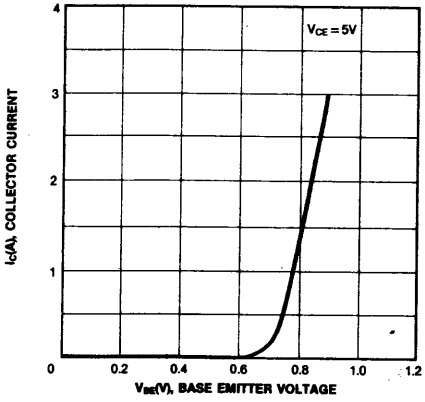
DC CURRENT GAIN



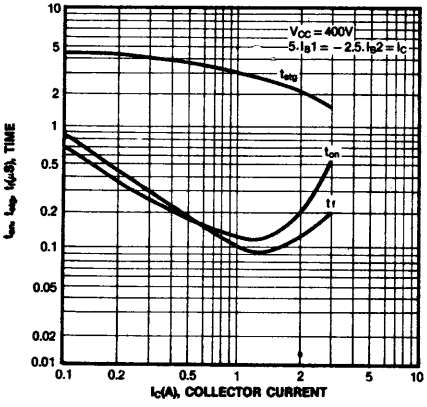
BASE EMITTER SATURATION VOLTAGE
COLLECTOR EMITTER SATURATION VOLTAGE



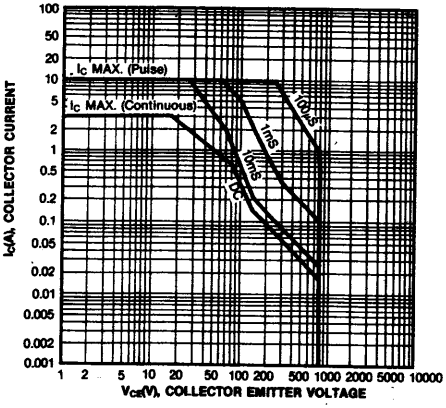
BASE EMITTER ON VOLTAGE



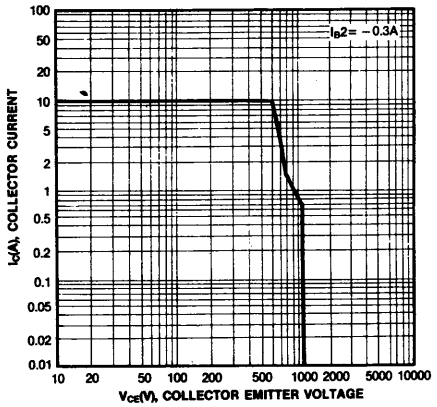
SWITCHING TIME



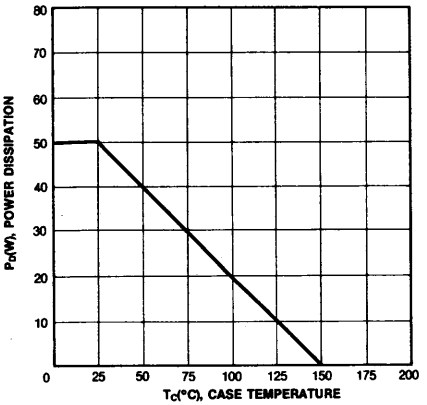
SAFE OPERATING AREA



REVERSE BIAS SAFE OPERATING AREA



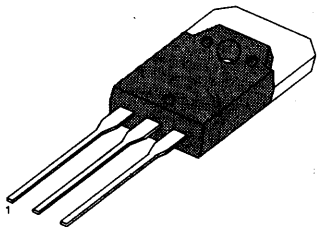
POWER DERATING



HIGH VOLTAGE AND HIGH RELIABILITY

HIGH SPEED SWITCHING
WIDE SOA

TO-3P



1. Base 2. Collector 3. Emitter

ABSOLUTE MAXIMUM RATINGS (T_a=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	1100	V
Collector-Emitter Voltage	V_{CEO}	800	V
Emitter-Base Voltage	V_{EBO}	7	V
Collector Current (DC)	I_C	3	A
Collector Current (Pulse)	I_C	10	A
Base Current	I_B	1.5	A
Collector Dissipation	P_C	80	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55∼150	°C

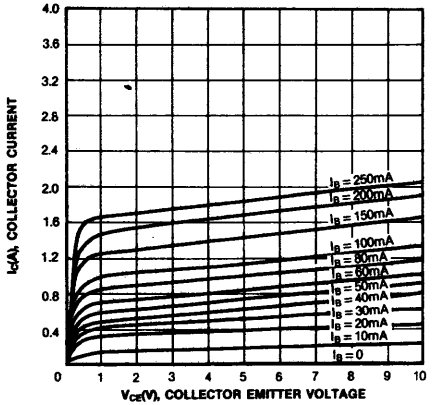
ELECTRICAL CHARACTERISTICS (T_a=25°C)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Collector Base Breakdown Voltage	BV_{CBO}	I_C=1mA, I_E=0	1100			V
Collector Emitter Breakdown Voltage	BV_{CEO}	I_C=5mA, R_{BE}=∞	800			V
Emitter Base Breakdown Voltage	BV_{EBO}	I_E=1mA, I_C=0	7			V
Collector Emitter Sustaining Voltage	V_{CEX}(sus)	I_C=1.5A, I_B1=−I_B2=0.3A L=2mH, Clamped	800			V
Collector Cutoff Current	I_{CBO}	V_{CB}=800V, I_E=0			10	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=5V, I_C=0			10	μA
DC Current Gain	$h_{FE}1$	V_{CE}=5V, I_C=0.2A	10		40	
	$h_{FE}2$	V_{CE}=5V, I_C=1A	8			
Collector Emitter Saturation Voltage	V_{CE}(sat)	I_C=1.5A, I_B=0.3A			2	V
Base Emitter Saturation Voltage	V_{BE}(sat)	I_C=1.5A, I_B=0.3A			1.5	V
Output Capacitance	C_{ob}	V_{CB}=10V, I_E=0, f=1MHz		60		pF
Current Gain Bandwidth Product	f_T	V_{CE}=10V, I_C=0.2A		15		MHz
Trun On Time	t_{on}	V_{CC}=400V			0.5	μS
Storage Time	t_S	5I_B1=−2.5I_B2=I_C=2A			3	μS
Fall Time	t_f	RL=200Ω			0.3	μS

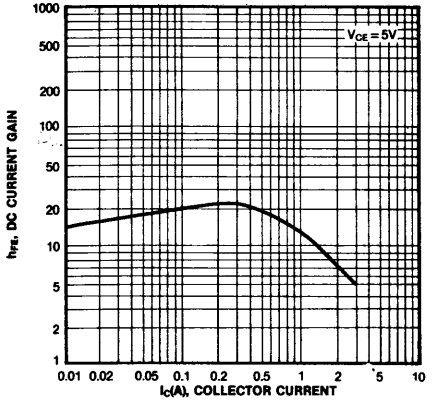
h_{FE} (1) CLASSIFICATION

Classification	N	R	O
h_{FE} 1	10-20	15-30	20-40

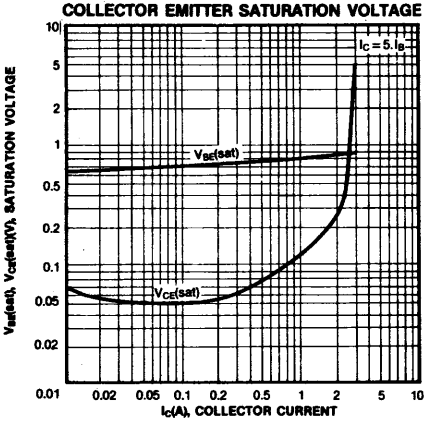
STATIC CHARACTERISTIC



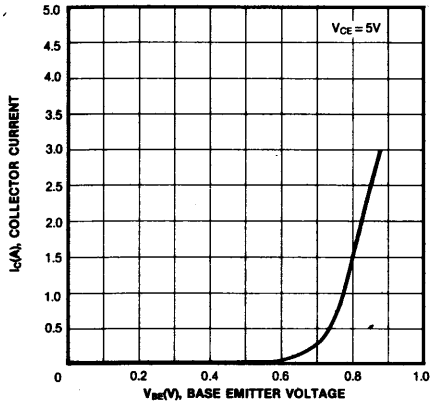
DC CURRENT GAIN



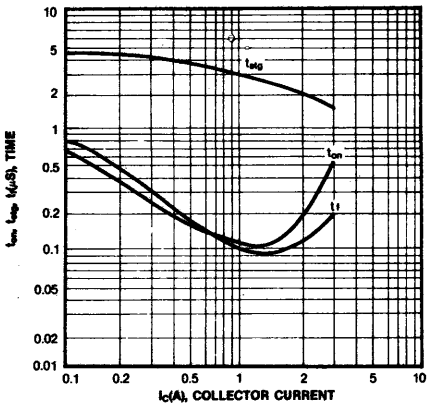
BASE EMITTER SATURATION VOLTAGE
COLLECTOR EMITTER SATURATION VOLTAGE



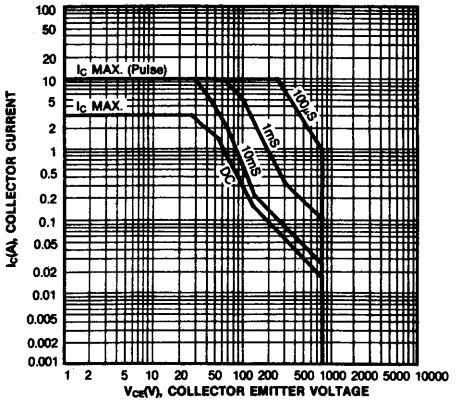
BASE EMITTER ON VOLTAGE



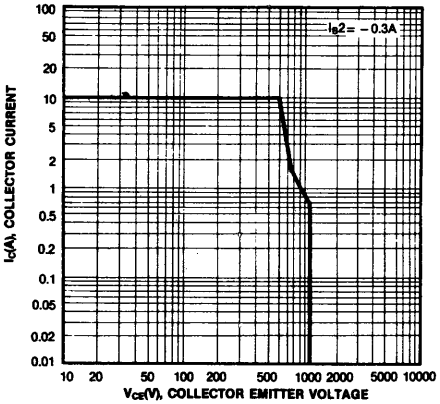
SWITCHING TIME



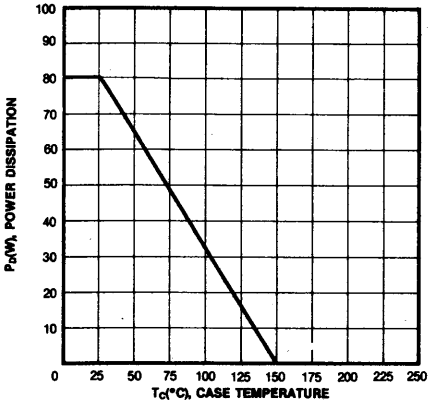
SAFE OPERATING AREA



REVERSE BIAS SAFE OPERATING AREA



POWER DERATING



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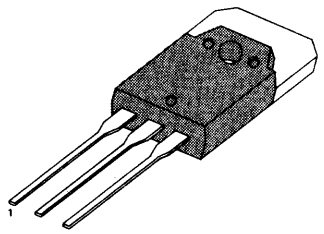
HIGH VOLTAGE AND HIGH RELIABILITY

HIGH SPEED SWITCHING
WIDE SOA

TO-3P



1. Base 2. Collector 3. Emitter

ABSOLUTE MAXIMUM RATINGS (T_a=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	1100	V
Collector-Emitter Voltage	V_{CEO}	800	V
Emitter-Base Voltage	V_{EBO}	7	V
Collector Current (DC)	I_C	4.5	A
Collector Current (Pulse)	I_C	15	A
Base Current	I_B	2	A
Collector Dissipation	P_C	90	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55∼150	°C

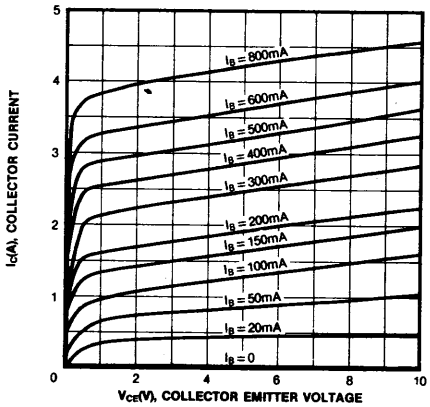
ELECTRICAL CHARACTERISTICS (T_a=25°C)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Collector Base Breakdown Voltage	BV_{CBO}	I_C=1mA, I_E=0	1100			V
Collector Emitter Breakdown Voltage	BV_{CEO}	I_C=5mA, R_{BE}=∞	800			V
Emitter Base Breakdown Voltage	BV_{EBO}	I_E=1mA, I_C=0	7			V
Collector Emitter Sustaining Voltage	V_{CEX}(sus)	I_C=2A, I_B1=−I_B2=0.4A L=2mH, Clamped	800			V
Collector Cutoff Current	I_{CBO}	V_{CB}=800V, I_E=0			10	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=5V, I_C=0			10	μA
DC Current Gain	$h_{FE}1$	V_{CE}=5V, I_C=0.3A	10		40	
	$h_{FE}2$	V_{CE}=5V, I_C=1.5A	8			
Collector Emitter Saturation Voltage	V_{CE}(sat)	I_C=2A, I_B=0.4A			2	V
Base Emitter Saturation Voltage	V_{BE}(sat)	I_C=2A, I_B=0.4A			1.5	V
Output Capacitance	C_{ob}	V_{CB}=10V, I_E=0, f=1MHz		90		pF
Current Gain Bandwidth Product	f_T	V_{CE}=10V, I_C=0.3A		15		MHz
Trun On Time	t_{on}	V_{CC}=400V			0.5	μS
Storage Time	t_S	5I_B1=−2.5I_B2=I_C=3A			3	μS
Fall Time	t_f	RL=133Ω			0.3	μS

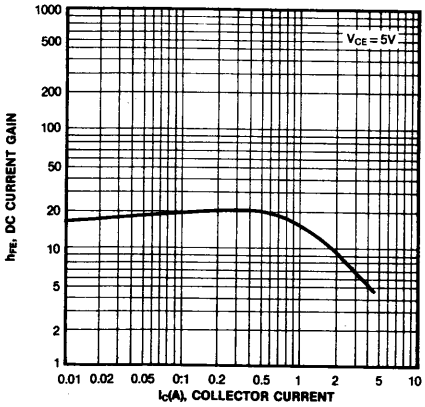
h_{FE} (1) CLASSIFICATION

Classification	N	R	O
h_{FE} 1	10-20	15-30	20-40

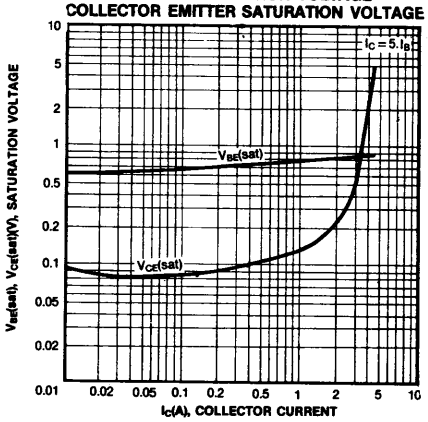
STATIC CHARACTERISTIC



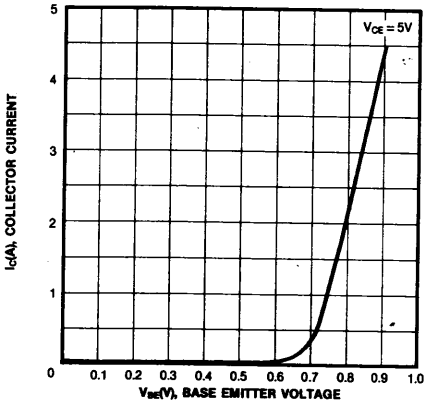
DC CURRENT GAIN



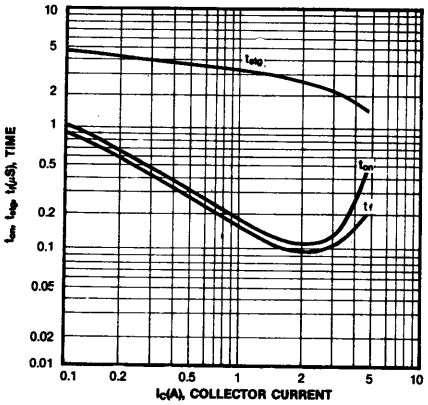
BASE EMITTER SATURATION VOLTAGE
COLLECTOR EMITTER SATURATION VOLTAGE



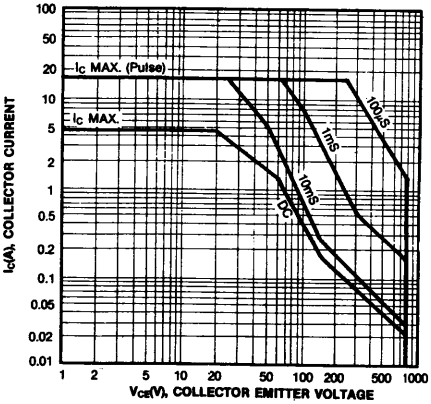
BASE EMITTER ON VOLTAGE



SWITCHING TIME

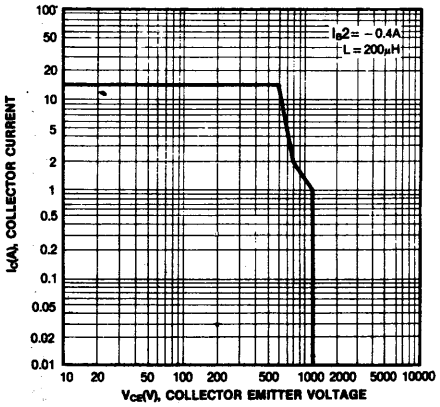


SAFE OPERATING AREA

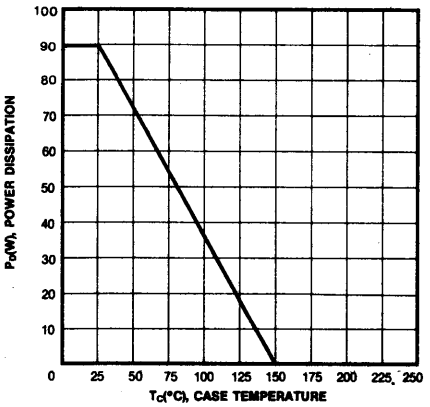


3

REVERSE BIAS SAFE OPERATING AREA



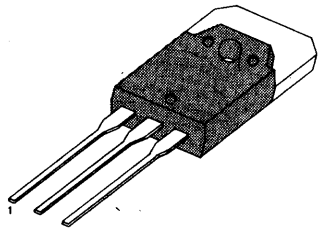
POWER DERATING



HIGH VOLTAGE AND HIGH RELIABILITY

HIGH SPEED SWITCHING
WIDE SOA

TO-3P



1. Base 2. Collector 3. Emitter

ABSOLUTE MAXIMUM RATINGS (T_a=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	1100	V
Collector-Emitter Voltage	V_{CEO}	800	V
Emitter-Base Voltage	V_{EBO}	7	V
Collector Current (DC)	I_C	6	A
Collector Current (Pulse)	I_C	20	A
Base Current	I_B	3	A
Collector Dissipation	P_C	100	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55~150	°C

3

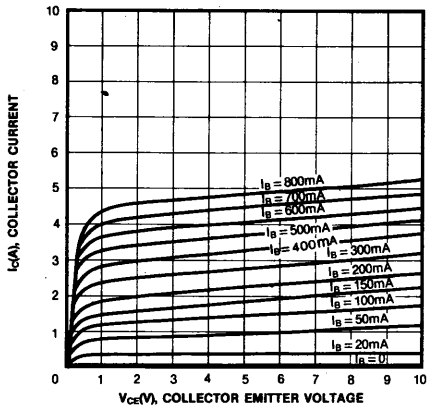
ELECTRICAL CHARACTERISTICS (T_a=25°C)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Collector Base Breakdown Voltage	BV_{CBO}	I_C=1mA, I_E=0	1100			V
Collector Emitter Breakdown Voltage	BV_{CEO}	I_C=5mA, R_{BE}=∞	800			V
Emitter Base Breakdown Voltage	BV_{EBO}	I_E=1mA, I_C=0	7			V
Collector Emitter Sustaining Voltage	V_{CEX}(sus)	I_C=3A, I_B1=−I_B2=0.6A L=1mH, Clamped	800			V
Collector Cutoff Current	I_{CBO}	V_{CB}=800V, I_E=0			10	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=5V, I_C=0			10	μA
DC Current Gain	$h_{FE}1$	V_{CE}=5V, I_C=0.4A	10		40	
	$h_{FE}2$	V_{CE}=5V, I_C=2A	8			
Collector Emitter Saturation Voltage	V_{CE}(sat)	I_C=3A, I_B=0.6A			2	V
Base Emitter Saturation Voltage	V_{BE}(sat)	I_C=3A, I_B=0.6A			1.5	V
Output Capacitance	C_{ob}	V_{CB}=10V, I_E=0, f=1MHz		120		pF
Current Gain Bandwidth Product	f_T	V_{CE}=10V, I_C=0.4A		15		MHz
Trun On Time	t_{on}	V_{CC}=400V			0.5	μS
Storage Time	t_S	5I_B1=−2.5I_B2=I_C=4A			3	μS
Fall Time	t_f	RL=100Ω			0.3	μS

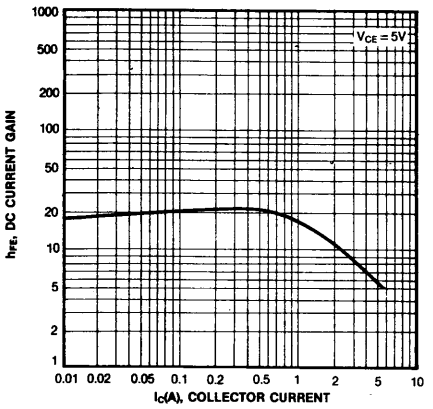
h_{FE} (1) CLASSIFICATION

Classification	N	R	O
h_{FE} 1	10-20	15-30	20-40

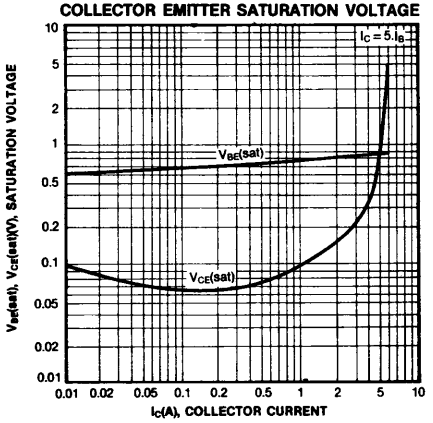
STATIC CHARACTERISTIC



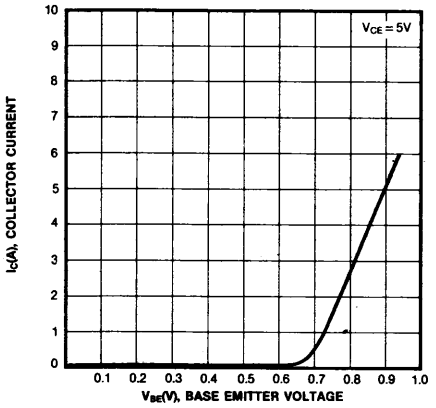
DC CURRENT GAIN



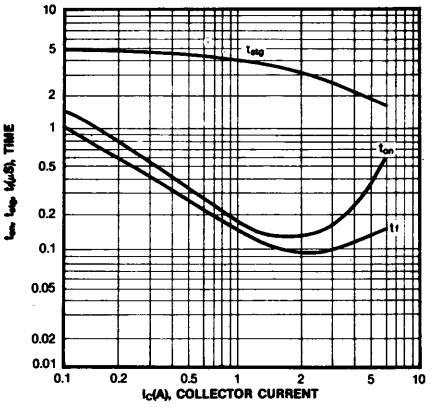
BASE EMITTER SATURATION VOLTAGE
COLLECTOR EMITTER SATURATION VOLTAGE



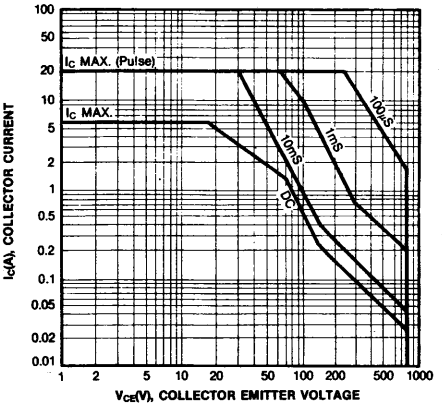
BASE EMITTER ON VOLTAGE



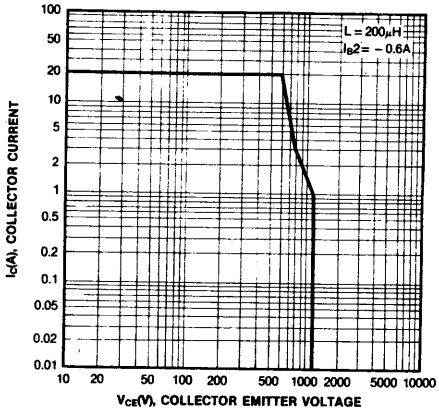
SWITCHING TIME



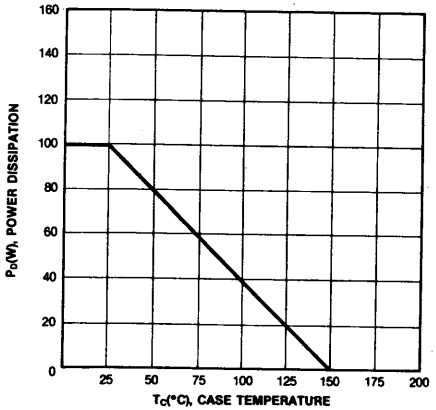
SAFE OPERATING AREA



REVERSE BIAS SAFE OPERATING AREA



POWER DERATING

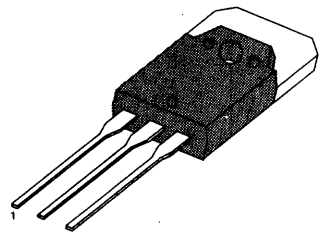


3

HIGH VOLTAGE AND HIGH RELIABILITY

HIGH SPEED SWITCHING
WIDE SOA

TO-3P



1. Base 2. Collector 3. Emitter

ABSOLUTE MAXIMUM RATINGS (T_a = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	1100	V
Collector-Emitter Voltage	V_{CEO}	800	V
Emitter-Base Voltage	V_{EBO}	7	V
Collector Current (DC)	I_C	8	A
Collector Current (Pulse)	I_C	25	A
Base Current	I_B	4	A
Collector Dissipation	P_C	140	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	−55∼150	°C

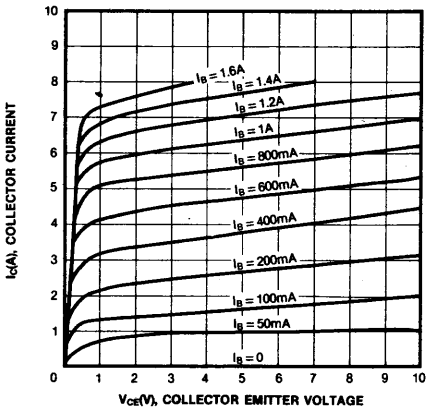
ELECTRICAL CHARACTERISTICS (T_a = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Collector Base Breakdown Voltage	BV_{CBO}	I_C=1mA, I_E=0	1100			V
Collector Emitter Breakdown Voltage	BV_{CEO}	I_C=5mA, R_{BE}=∞	800			V
Emitter Base Breakdown Voltage	BV_{EBO}	I_E=1mA, I_C=0	7			V
Collector Emitter Sustaining Voltage	V_{CEX}(sus)	I_C=4A, $2I_B1=-I_B2$=0.8A L=1mH, Clamped	800			V
Collector Cutoff Current	I_{CBO}	V_{CB}=800V, I_E=0			10	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=5V, I_C=0			10	μA
DC Current Gain	$h_{FE}1$	V_{CE}=5V, I_C=0.6A	10		40	
	$h_{FE}2$	V_{CE}=5V, I_C=3A	8			
Collector Emitter Saturation Voltage	V_{CE}(sat)	I_C=4A, I_B=0.8A			2	V
Base Emitter Saturation Voltage	V_{BE}(sat)	I_C=4A, I_B=0.8A			1.5	V
Output Capacitance	C_{ob}	V_{CB}=10V, I_E=0, f=1MHz		155		pF
Current Gain Bandwidth Product	f_T	V_{CE}=10V, I_C=0.6A		15		MHz
Trun On Time	t_{on}	V_{CC}=400V			0.5	μS
Storage Time	t_s	$5I_B1=-2.5I_B2=I_C$=6A			3	μS
Fall Time	t_f	RL=66.7Ω			0.3	μS

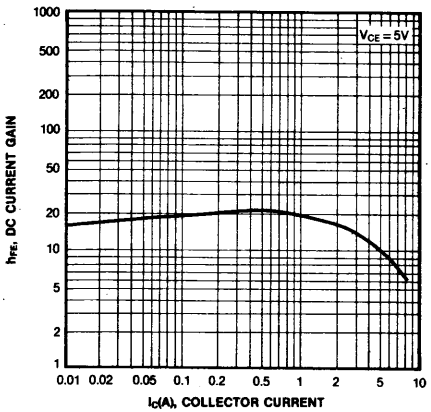
h_{FE} (1) CLASSIFICATION

Classification	N	R	O
h_{FE} 1	10-20	15-30	20-40

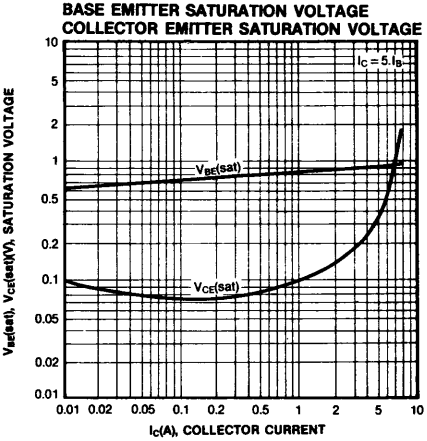
STATIC CHARACTERISTIC



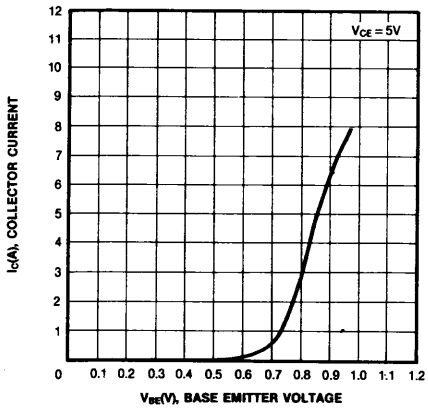
DC CURRENT GAIN



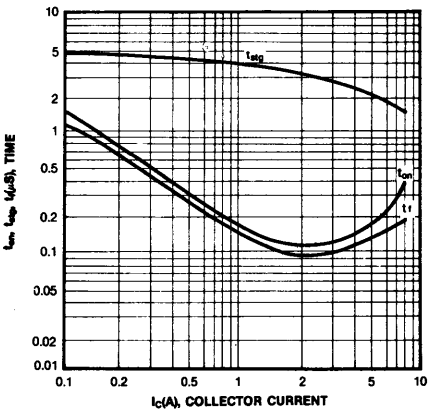
BASE EMITTER SATURATION VOLTAGE
COLLECTOR EMITTER SATURATION VOLTAGE



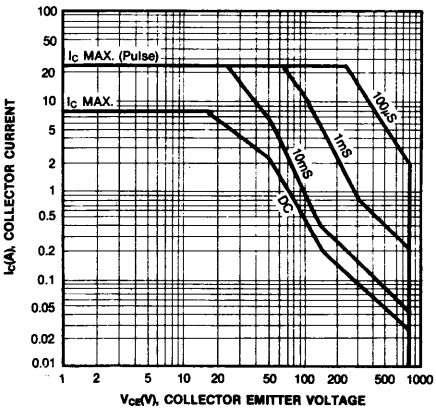
BASE EMITTER ON VOLTAGE



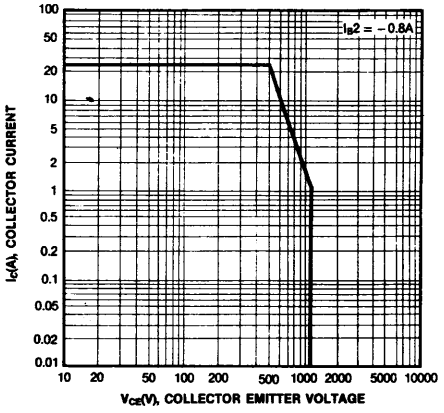
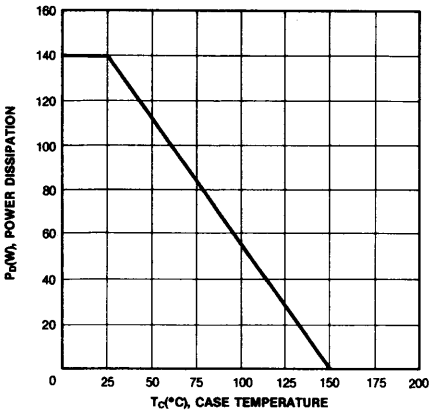
SWITCHING TIME



SAFE OPERATING AREA



REVERSE BIAS SAFE OPERATING AREA



POWER DERATING