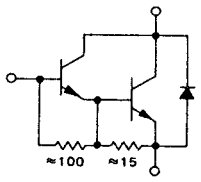
MOSPEC

SWITCHMODE SERIES
NPN SILICON POWER DARLINGTON TRANSISTORS

The MJ10000 and MJ10001 darlington transistors are designed for high-voltage, high-speed, power switching in inductive circuits where fall time is critical. They are particularly suited for line oper -ated switch-mode applications such as:

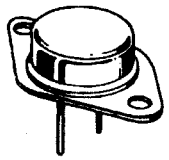
FEATURES:

*Continuous Collector Current - I_C = 20 A
*Switching Regulators
*Inverters
*Solenoid and Relay Drivers
*Motor Controls

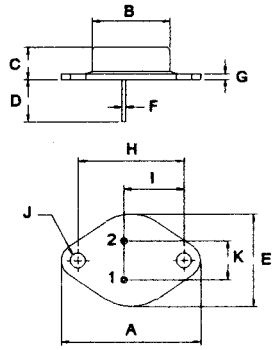


NPN
MJ10000
MJ10001

20 AMPERE
POWER DARLINGTON
TRANSISTORS
350-400 VOLTS
175 WATTS



TO-3



PIN 1.BASE
2.EMITTER
COLLECTOR(CASE)

DIM	MILLIMETERS	
	MIN	MAX
A	38.75	39.96
B	19.28	22.23
C	7.96	9.28
D	11.18	12.19
E	25.20	26.67
F	0.92	1.09
G	1.38	1.62
H	29.90	30.40
I	16.64	17.30
J	3.88	4.36
K	10.67	11.18

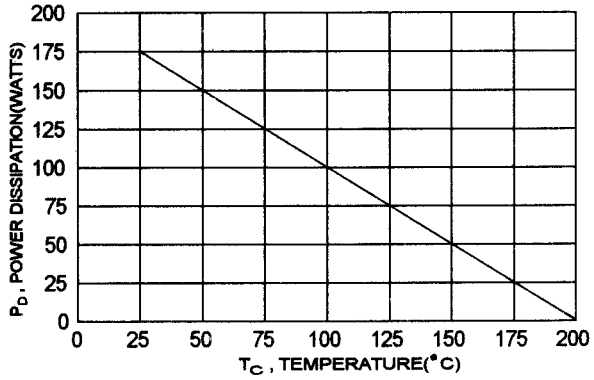
MAXIMUM RATINGS

Characteristic	Symbol	MJ10000	MJ10001	Unit
Collector-Emitter Voltage	V_{CEV}	450	500	V
Collector-Emitter Voltage	$V_{CEX(SUS)}$	400	450	V
Collector-Emitter Voltage	$V_{CEO(SUS)}$	350	400	V
Emitter-Base Voltage	V_{EBO}	8.0		V
Collector Current-Continuous -Peak	I_C I_{CM}	20 30		A
Base current	I_B	2.5		A
Total Power Dissipation @T_C=25°C @T_C= 100°C Derate above 25°C	P_D	175 100 1.0		W W W/°C
Operating and Storage Junction Temperature Range	T_J ,T_{STG}	- 65 to +200		°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	Rθjc	1.0	°C/W

FIGURE -1 POWER DERATING



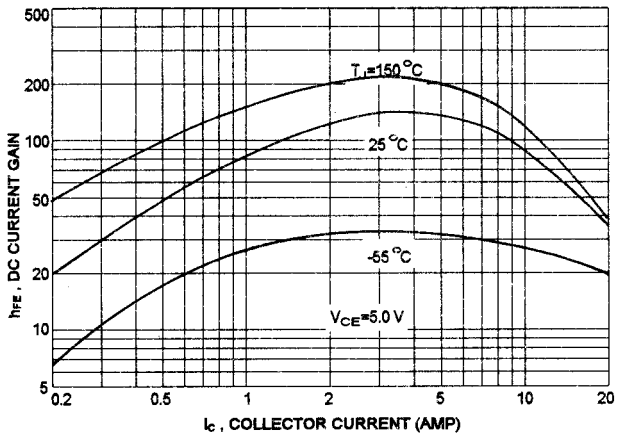
ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector - Emitter Sustaining Voltage (I_C = 250 mA, I_B = 0, V_{clamp}=Rate V_{CEO})	MJ10000 MJ10001	$V_{CEO(SUS)}$	350 400		V
Collector Cutoff Current (V_{CE}= Rated V_{CEV}, R_{BE}=50 ohm, T_C=100°C)		I_{CER}		5.0	mA
Collector Cutoff Current (V_{CEV}= Rated Value, $V_{BE(OFF)}$=1.5 V) (V_{CEV}= Rated Value, $V_{BE(OFF)}$=1.5 V, T_C=100°C)		I_{CEV}		0.25 5.0	mA
Emitter Cutoff Current (V_{EB} = 8.0 V , I_C = 0)		I_{EBO}		150	mA
ON CHARACTERISTICS (1)					
DC Current Gain (I_C = 5.0 A , V_{CE} = 5.0 V) (I_C = 10 A, V_{CE} = 5.0 V)		hFE	50 40	600 400	
Collector - Emitter Saturation Voltage (I_C = 10 A , I_B = 400mA) (I_C = 20 A, I_B = 1.0 A) (I_C = 10 A, I_B = 400mA, T_C=100°C)		$V_{CE(sat)}$		1.9 3.0 2.0	V
Base - Emitter Saturation Voltage (I_C = 10 A, I_B = 400mA) (I_C = 10 A, I_B =400mA, T_C=100°C)		$V_{BE(sat)}$		2.5 2.5	V
Diode Forward Voltage (I_F = 10 A)		V_F		5.0	V
DYNAMIC CHARACTERISTICS					
Small-Signal Current Gain(2) (I_C = 1.0 A, V_{CE} = 10 V, f = 1.0 MHz)		$\lvert h_{fe} \rvert$	10		
Output Capacitance (V_{CB}=10 V, I_E=0, f =100 kHz)		C_{ob}	100		pF
SWITCHING CHARACTERISTICS					
Delay Time	V_{CC} = 250 V, I_C = 10 A I_{B1} = 400 mA, $V_{BE(off)}$=5.0V tp = 50us, Duty Cycle ≦ 2%	t_d		0.2	us
Rise Time		t_r		0.6	us
Storage Time		t_s		3.5	us
Fall Time		t_f		2.4	us

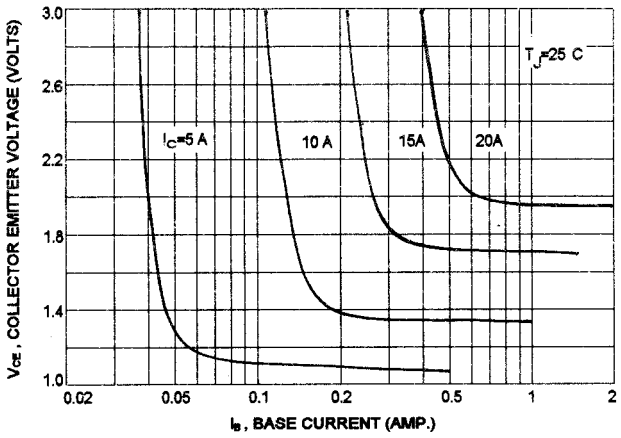
(1) Pulse Test: Pulse width = 300 us , Duty Cycle ≦ 2.0%

(2) $f_T = \lvert h_{fe} \rvert \cdot f_{test}$

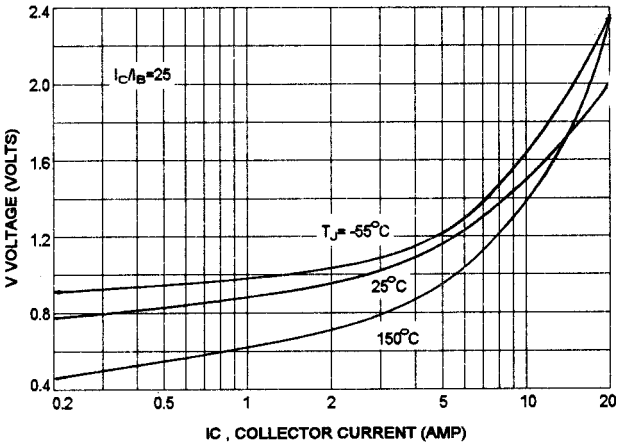
DC CURRENT GAIN



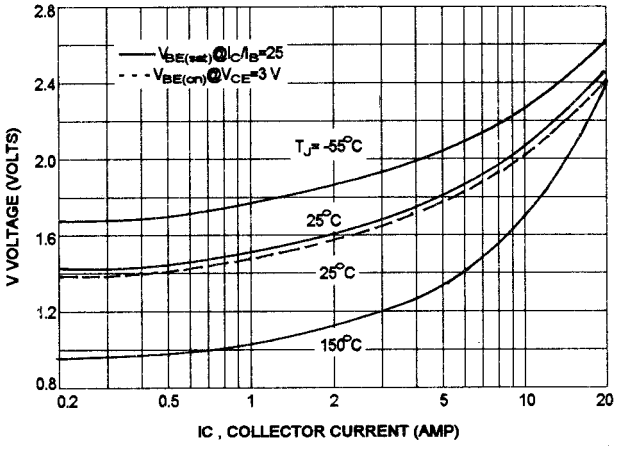
COLLECTOR SATURATION REGION



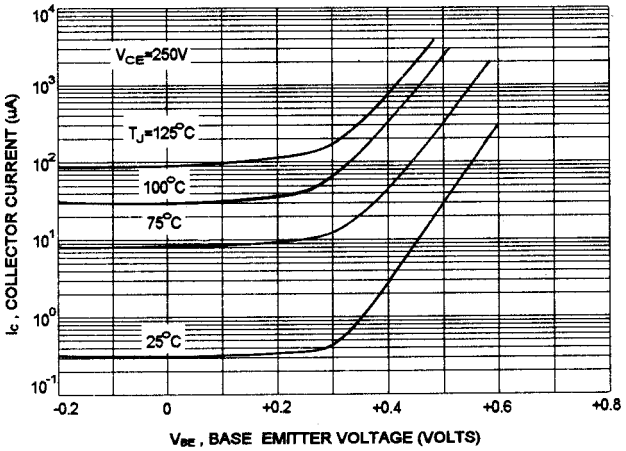
COLLECTOR EMITTER SATURATION VOLTAGE



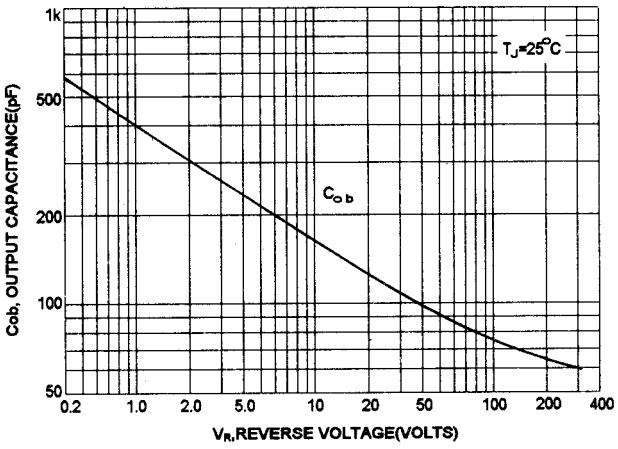
BASE EMITTER VOLTAGE



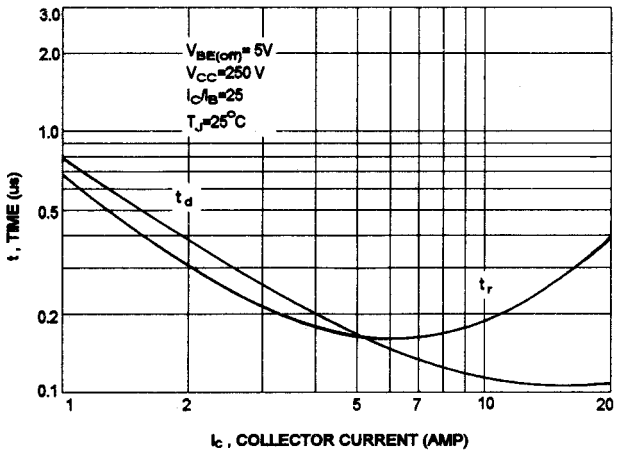
COLLECTOR CUT-OFF REGION



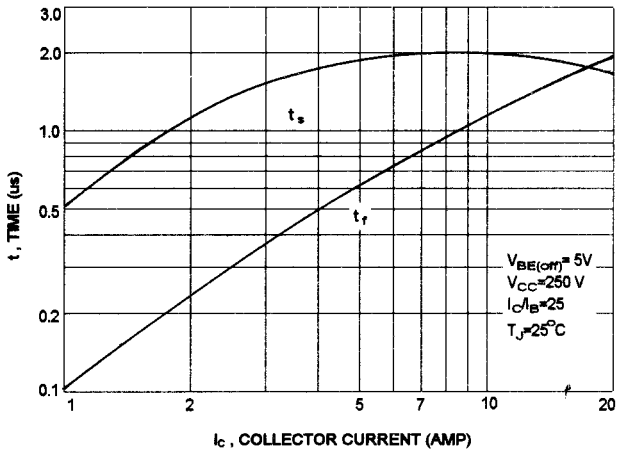
OUTPUT CAPACITANCES



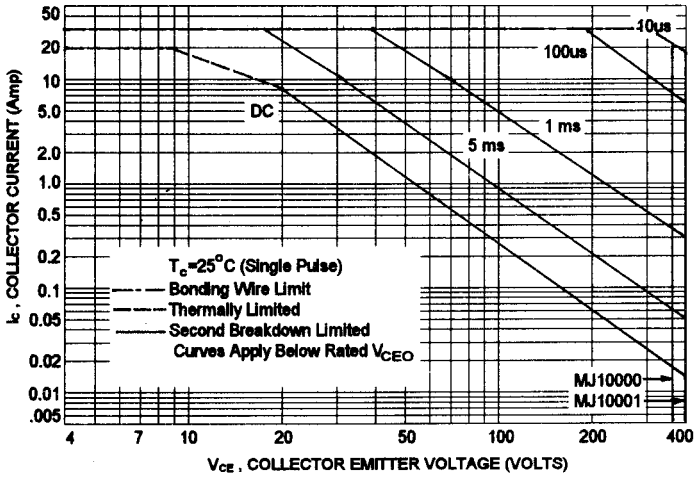
TURN-ON TIME



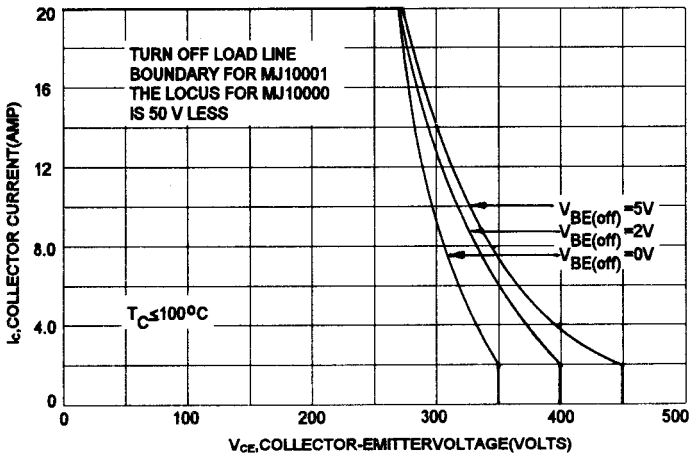
TURN-OFF TIME



ACTIVE REGION SAFE OPERATING AREA



REVERSE BIAS SWITCHING SAFE OPERATING AREA



Notice

MOSPEC reserves the rights to make changes of the content herein the document anytime without notification. MOSPEC or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies. Please refer to MOSPEC website for the last document.

MOSPEC disclaims any and all liability arising out of the application or use of any product including damages incidentally and consequentially incurred.

Application shown on the herein document are examples of standard use and operation. Customers are responsible for comprehending suitable use in particular applications. MOSPEC makes no representation or warranty that such application will be suitable for the specified use without further testing or modification.

The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by MOSPEC for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of MOSPEC or others.

These MOSPEC products are intended for usage in general electronic equipment. Please make sure to consult with MOSPEC before you use these MOSPEC products in equipment which require specialized quality and/or reliability, and in equipment which could have major impact to the welfare of human life (atomic energy control, aeronautics , traffic control, combustion control, safety devices etc.)