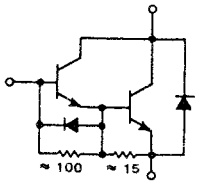
MOSPEC

SWITCHMODE SERIES
NPN SILICON POWER DARLINGTON TRANSISTORS
WITH BASE-EMITTER SPEEDUP DIODE

The MJ10020 and MJ10021 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 switchmode applications such as:

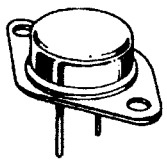
FEATURES:

*Continuous Collector Current - I_C = 60 A
*Switching Regulators
*Inverters
*Solenoid and Relay Drivers
*AC and DC Motor Controls

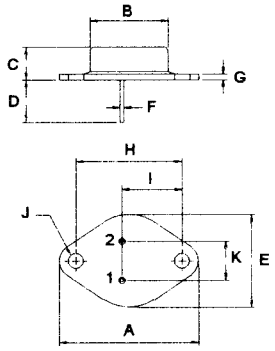


NPN
MJ10020
MJ10021

60 AMPERE
POWER DARLINGTON
TRANSISTORS
200-250 VOLTS
250 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	1.46	1.55
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

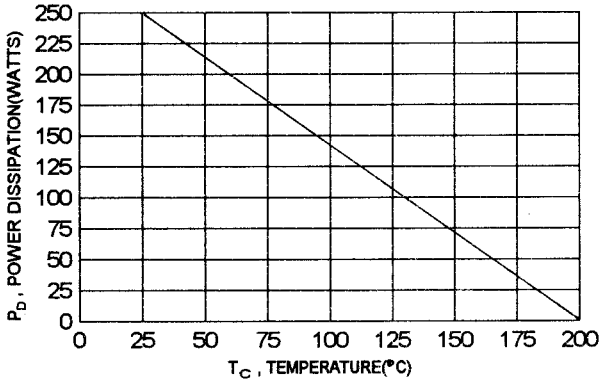
MAXIMUM RATINGS

Characteristic	Symbol	MJ10020	MJ10021	Unit
Collector-Emitter Voltage	V_{CEV}	200	250	V
Collector-Emitter Voltage	$V_{CEO(SUS)}$	300	350	V
Emitter-Base Voltage	V_{EBO}	8.0		V
Collector Current-Continuous -Peak	I_C I_{CM}	60 100		A
Base current	I_B	20		A
Total Power Dissipation @T_C=25°C @T_C= 100°C Derate above 25°C	P_D	250 143 1.43		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	0.7	°C/W

FIGURE -1 POWER DERATING



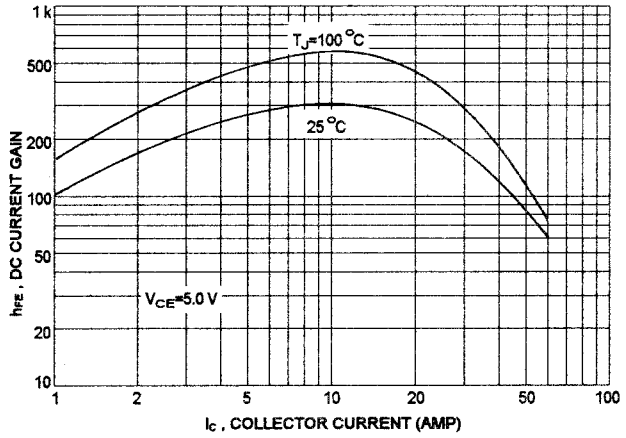
ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector - Emitter Sustaining Voltage (I_C = 100 mA, I_B = 0) MJ10020 / MJ10021	$V_{CEO(SUS)}$	200 / 250		V
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=150 °C)	I_{CEV}		0.25 / 5.0	mA
Collector Cutoff Current (V_{CEV}= Rated V_{CEV}, R_{BE}=50 Ω , T_C=100 °C)	I_{CER}		5.0	mA
Emitter Cutoff Current (V_{EB} = 2.0 V , I_C = 0)	I_{EBO}		175	mA
ON CHARACTERISTICS (1)				
DC Current Gain (I_C = 15 A , V_{CE} = 5.0 V)	hFE	75	1000	
Collector - Emitter Saturation Voltage (I_C = 30 A , I_B = 1.2 A) (I_C = 60 A, I_B = 4.0 A) (I_C = 30 A , I_B = 1.2 A , T_C=100 °C)	$V_{CE(sat)}$		2.2 / 4.0 / 2.4	V
Base - Emitter Saturation Voltage (I_C = 30 A, I_B = 1.2 A) (I_C = 30 A , I_B = 1.2 A , T_C=100 °C)	$V_{BE(sat)}$		3.0 / 3.5	V
Diode Forward Voltage (I_F = 30 A)	V_F		5.0	V
DYNAMIC CHARACTERISTICS				
Output Capacitance (V_{CB}=10 V, I_E=0, f =1.0 kHz)	C_{ob}	160	750	pF
SWITCHING CHARACTERISTICS				
Delay Time	t_d		0.2	us
Rise Time	t_r		1.0	us
Storage Time	t_s		3.5	us
Fall Time	t_f		0.8	us

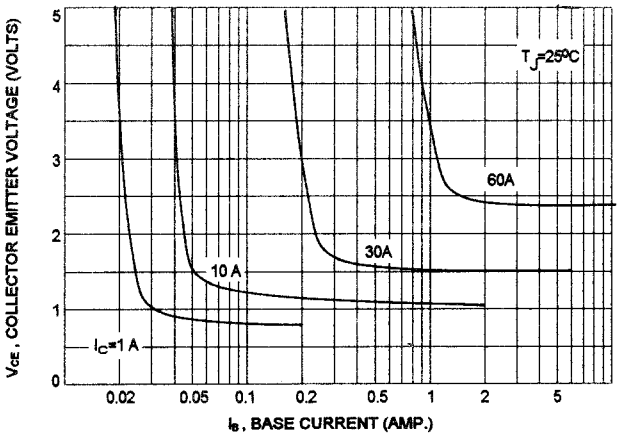
V_{CC} = 175 V, I_C = 30 A
I_{B1} = 1.2A, $V_{BE(off)}$=5.0V
tp = 25us, Duty Cycle ≦ 2%

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

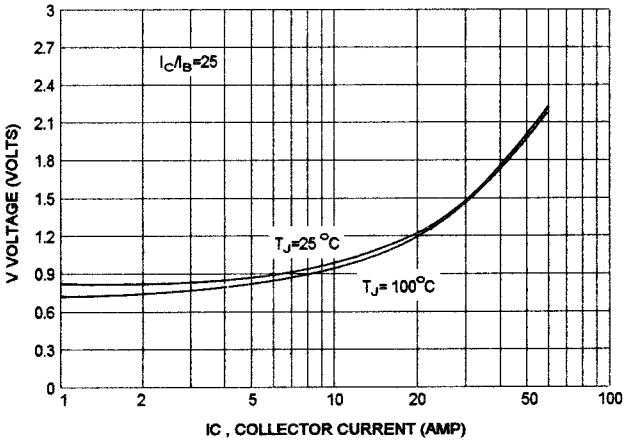
DC CURRENT GAIN



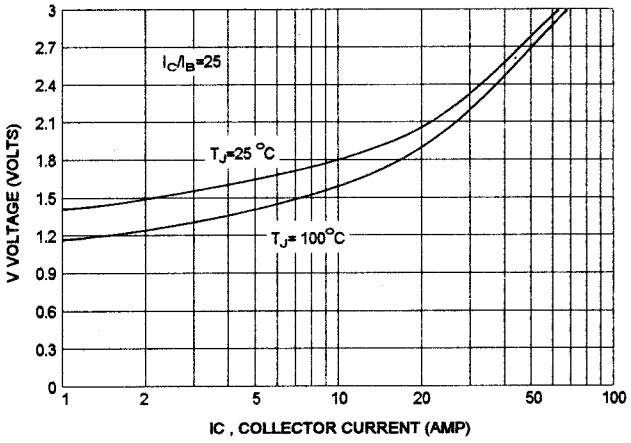
COLLECTOR SATURATION REGION



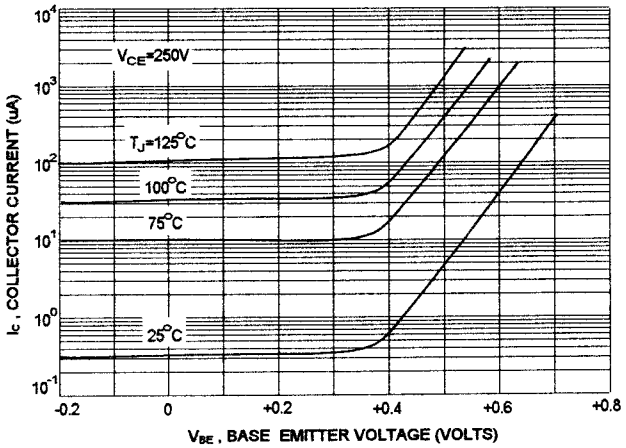
COLLECTOR EMITTER SATURATION VOLTAGE



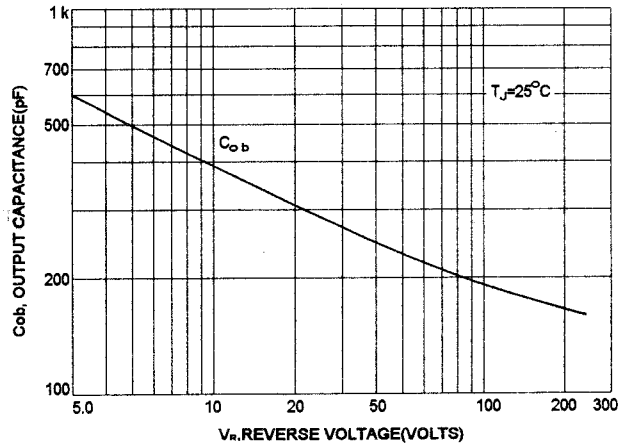
BASE - EMITTER VOLTAGE



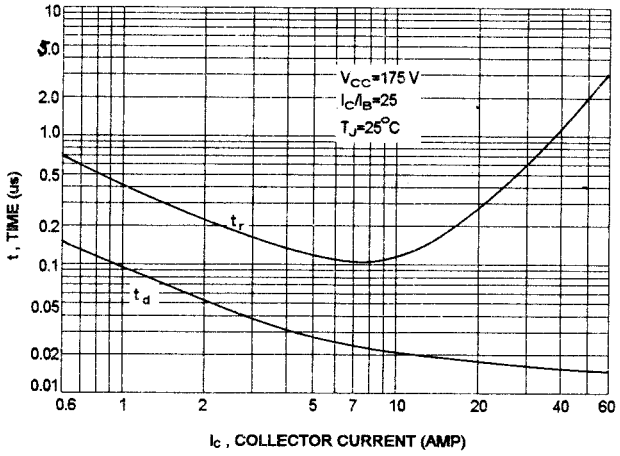
COLLECTOR CUT-OFF REGION



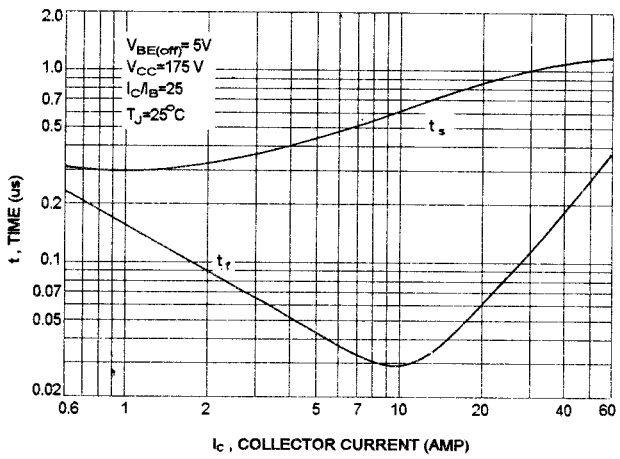
OUTPUT CAPACITANCES



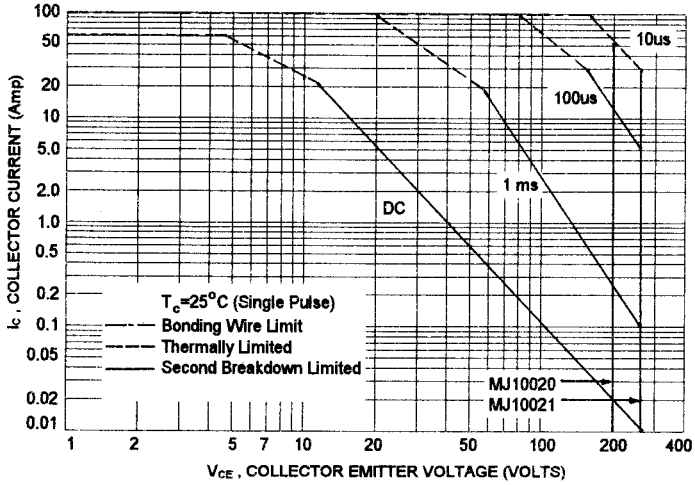
TURN-ON TIME



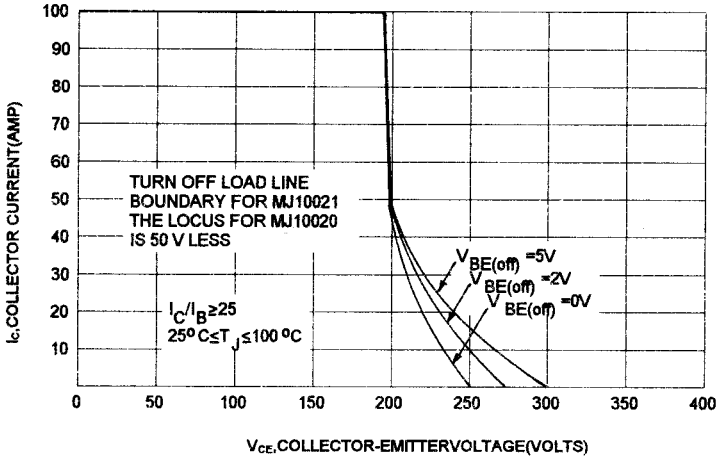
TURN-OFF TIME



ACTIVE REGION SAFE OPERATING AREA



REVERSE BIAS SWITCHING SAFE OPERATING AREA



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