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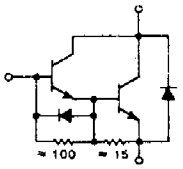
SWITCHMODE SERIES
NPN SILICON POWER DARLINGTON TRANSISTORS
WITH BASE-EMITTER SPEEDUP DIODE

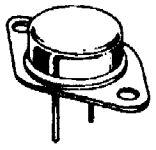
The MJ10024 and MJ10025 darlington transistors are designed for high-voltage, high-speed, power switching in inductive circuits where fall time is critical. They are particularly suited for line oper -ated switchmode applications such as:

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

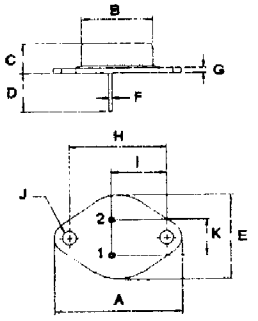


NPN
MJ10024
MJ10025

20 AMPERE
POWER DARLINGTON
TRANSISTORS
750-850 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	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

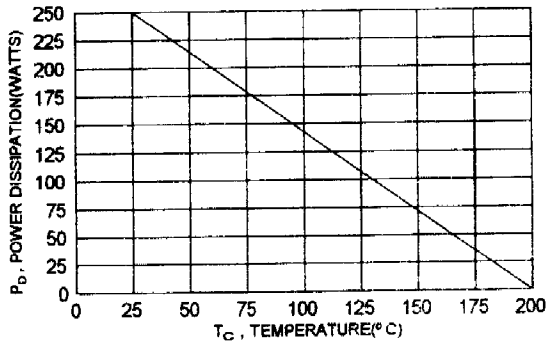
MAXIMUM RATINGS

Characteristic	Symbol	MJ10024	MJ10025	Unit
Collector-Emitter Voltage	V_{CEV}	1000	1200	V
Collector-Emitter Voltage	$V_{CEO(SUS)}$	750	850	V
Emitter-Base Voltage	V_{EBO}	8.0		V
Collector Current-Continuous -Peak	I_C I_{CM}	20 40		A
Base current	I_B	10		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



Quality Semi-Conductors

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)	MJ10024 MJ10025	$V_{CEO(SUS)}$	750 850		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 = 5.0 A , V_{CE} = 5.0 V)		hFE	50	600	
Collector - Emitter Saturation Voltage (I_C = 10 A , I_B = 1.0 A) (I_C = 20 A, I_B = 5.0 A) (I_C = 10 A , I_B = 1.0 A ,T_C=100 °C)		$V_{CE(sat)}$		2.2 5.0 2.5	V
Base - Emitter Saturation Voltage (I_C = 10 A, I_B = 1.0 A) (I_C = 10 A , I_B = 1.0 A ,T_C=100 °C)		$V_{BE(sat)}$		2.5 2.5	V
Diode Forward Voltage (I_F = 10 A)		V_F		4.0	V
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB}=10 V, I_E=0, f =1.0 kHz)		C_{ob}	100	600	pF
SWITCHING CHARACTERISTICS					
Delay Time	V_{CC} = 250 V, I_C = 10 A	t_d		0.4	us
Rise Time	I_{B1} = 1.0A, $V_{BE(off)}$=5.0V	t_r		1.8	us
Storage Time	tp = 50us,Duty Cycle ≦ 2%	t_s		5.0	us
Fall Time		t_f		1.8	us

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

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

Characteristic	Symbol	Min	Max	Unit
ON CHARACTERISTICS (1)				
MJ10042				
DC Current Gain (I_C = 25 Adc, V_{CE} = 5.0 Vdc) (I_C = 25 Adc, V_{CE} = 10 Vdc)	h_{FE}	 35 40	 — —	
Collector-Emitter Saturation Voltage (I_C = 25 Adc, I_B = 2.0 Adc) (I_C = 37.5 Adc, I_B = 7.5 Adc) (I_C = 25 Adc, I_B = 2.0 Adc, T_C = 100°C)	$V_{CE(sat)}$	 — — —	 2.0 5.0 2.5	Vdc
Base-Emitter Saturation Voltage (I_C = 25 Adc, I_B = 2.0 Adc) (I_C = 25 Adc, I_B = 2.0 Adc, T_C = 100°C)	$V_{BE(sat)}$	 — —	 3.0 3.0	Vdc
MJ10045				
DC Current Gain (I_C = 50 Adc, V_{CE} = 5.0 Vdc) (I_C = 50 Adc, V_{CE} = 10 Vdc)	h_{FE}	 50 60	 — —	
Collector-Emitter Saturation Voltage (I_C = 50 Adc, I_B = 1.67 Adc) (I_C = 75 Adc, I_B = 6.0 Adc) (I_C = 50 Adc, I_B = 1.67 Adc, T_C = 100°C)	$V_{CE(sat)}$	 — — —	 2.0 3.3 2.5	Vdc
Base-Emitter Saturation Voltage (I_C = 50 Adc, I_B = 1.67 Adc) (I_C = 50 Adc, I_B = 1.67 Adc, T_C = 100°C)	$V_{BE(sat)}$	 — —	 3.0 3.0	Vdc
MJ10048				
DC Current Gain (I_C = 100 Adc, V_{CE} = 5.0 Vdc) (I_C = 100 Adc, V_{CE} = 10 Vdc)	h_{FE}	 75 90	 — —	
Collector-Emitter Saturation Voltage (I_C = 100 Adc, I_B = 2.75 Adc) (I_C = 100 Adc, I_B = 2.75 Adc, T_C = 100°C)	$V_{CE(sat)}$	 — —	 2.0 2.5	Vdc
Base-Emitter Saturation Voltage (I_C = 100 Adc, I_B = 2.75 Adc) (I_C = 100 Adc, I_B = 2.75 Adc, T_C = 100°C)	$V_{BE(sat)}$	 — —	 3.0 3.0	Vdc

(1) Pulse Test: Pulse width of 300 μs, duty cycle ≤ 2.0%.