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MJ10015 & MJ10016 T-NPN, Si, Darlington w/Base-Emitter Speedup Diode

Description:

The MJ10015 and MJ10016 are Darlington transistors in a TO3 type package designed for high-voltage, high-speed, power switching in inductive circuits where fall time is critical. They are particularly suited for line operated switch-mode applications.

Applications:

- Continuous Collector Current ($I_C = 50A$)
- Switching Regulators
- Inverters
- Solenoid and Relay Drivers
- Motor Controls

Absolute Maximum Ratings:

Collector-Emitter Voltage, V_{CEV}		
MJ10015		600V
MJ10016		700V
Collector-Emitter Voltage, $V_{CEO(SUS)}$		
MJ10015		400V
MJ10016		500V
Emitter-Base Voltage, V_{EBO}		8.0V
Collector Current		
Continuous, I_C		50A
Peak, I_{CM}		75A
Base Current, I_B		10A
Total Power Dissipation, P_D		
$T_C = +25^\circ C$		250W
$T_C = +100^\circ C$		143W
Derate Above $+25^\circ C$		1.43W/ $^\circ C$
Operating Junction Temperature Range, T_j		-65° to $+200^\circ C$
Storage Temperature Range, T_{stg}		-65° to $+200^\circ C$
Thermal Resistance, Junction-to-Case, R_{thJC}		0.7 $^\circ C/W$

Electrical Characteristics: ($T_C = +25^\circ C$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
Collector-Emitter Sustaining Voltage	$V_{CEO(SUS)}$	$I_C = 100mA, I_B = 0, V_{CLAMP} = \text{Rated } V_{CEO}$	400	—	—	V
MJ10015			500	—	—	V
Collector Cutoff Current	I_{CEV}	$V_{CEV} = \text{Rated Value}, V_{BE(OFF)} = 1.5V$	—	—	0.25	mA
Emitter Cutoff Current	I_{EBO}	$V_{EB} = 2.0V, I_C = 0$	—	—	350	mA

Electrical Characteristics (Cont'd): ($T_C = +25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
On Characteristics (Note 1)						
DC Current Gain	h_{FE}	$I_C = 20\text{A}, V_{CE} = 5.0\text{V}$	25	–	–	
		$I_C = 40\text{A}, V_{CE} = 5.0\text{V}$	10	–	–	
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 20\text{A}, I_B = 1.0\text{A}$	–	–	2.2	V
		$I_C = 50\text{A}, I_B = 10\text{A}$	–	–	5.0	V
Base–Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 20\text{A}, I_B = 1.0\text{A}$	–	–	2.75	V
Diode Forward Voltage	V_F	$I_F = 20\text{A}$	–	–	5.0	V
Dynamic Characteristics						
Output Capacitance	C_{ob}	$V_{CB} = 10\text{V}, I_E = 0, f = 100\text{kHz}$	–	–	750	pF
Switching Characteristics						
Delay Time	t_d	$V_{CC} = 250\text{V}, I_C = 20\text{A}, I_{B1} = 1.0\text{A},$ $V_{BE(off)} = 5\text{V}, t_p = 25\mu\text{s}, \text{Duty Cycle} \leq 2\%$	–	–	0.3	us
Rise Time	t_r		–	–	1.0	us
Storage Time	t_s		–	–	2.5	us
Fall Time	t_f		–	–	1.0	us

Note 1. Pulse Test: Pulse width = $300\mu\text{s}$, Duty Cycle $\leq 2\%$.

