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MJ10015 & MJ10016 T-NPN, Si, Darlington w/Base-Emitter Speedup Diode TO-3 Type Package

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° C	
Storage Temperature Range, T_{stg}	-65° to +200° C	
Thermal Resistance, Junction-to-Case, R_{thJC}	0.7° 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						
MJ10016			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 $\leq 2\%$.

