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MJ10021
T–NPN, Si, Darlington
w/Base–Emitter Speedup Diode

Description:

The MJ10021 is a Darlington transistor in a TO3 type package designed for high–voltage, high–speed, power switching in inductive circuits where fall time is critical. This device is particularly suited for line operated switchmode applications.

Features:

- Continuous Collector Current – I_C = 60A

Applications:

- Switching Regulators
- Inverters
- Solenoid and Relay Drivers
- AC and DC Motor Controls

Absolute Maximum Ratings:

Collector–Emitter Voltage, V_{CEV} 250V
Collector–Emitter Voltage, $V_{CEO(SUS)}$ 350V
Emitter–Base Voltage, V_{EBO} 8.0V
Collector Current
  Continuous, I_C 60A
  Peak, I_{CM} 100A
Base Current, I_B 20A
Total Power Dissipation, P_D
  T_C = +25°C 250W
  T_C = +100°C 143W
  Derate Above +25°C . . . . . 1.43W/°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°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		250	–	–	V
Collector Cutoff Current	I_{CEV}	V_{CEV} = 250V, $V_{BE(OFF)}$ = 1.5V		–	–	0.25	mA
			T_C = 150°C	–	–	5.0	mA
	I_{CER}	V_{CEV} = 250V, R_{BE} = 50Ω, T_C = +100°C		–	–	5.0	mA
Emitter Cutoff Current	I_{EBO}	V_{EB} = 2V, I_C = 0		–	–	175	mA

Electrical Characteristics (Cont'd): (T_C = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
On Characteristics (Note 1)							
DC Current Gain	h_{FE}	I_C = 15A, V_{CE} = 5V		75	–	1000	
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 30A, I_B = 1.2A		–	–	2.2	V
		I_C = 60A, I_B = 4A		–	–	4.0	V
		I_C = 30A, I_B 1.2A, T_C = +100°C		–	–	2.4	V
Base–Emitter Saturation Voltage	$V_{BE(sat)}$	I_C = 30A, I_B = 1.2A		–	–	3.0	V
			T_C = +100°C	–	–	3.5	V
Diode Forward Voltage	V_F	I_F = 30A		–	–	5.0	V
Dynamic Characteristics							
Output Capacitance	C_{ob}	V_{CB} = 10V, I_E = 0, f = 1kHz		160	–	750	pF
Switching Characteristics							
Delay Time	t_d	V_{CC} = 175V, I_C = 30A, I_{B1} = 1.2A, $V_{BE(off)}$ = 5V, tp = 25us, Duty Cycle ≤ 2%		–	–	0.2	us
Rise Time	t_r			–	–	1.0	us
Storage Time	t_s			–	–	3.5	us
Fall Time	t_f			–	–	0.8	us

Note 1. Pulse Test: Pulse width = 300μs, Duty Cycle ≤ 2%.