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MJ10024
Silicon NPN Transistor
HV Darlington Power Amp, Switch w/Base–Emitter Speedup Diode
TO–3 Type Package

Description:

The MJ10024 is a silicon NPN Darlington transistor in a TO–3 type package designed for high voltage, high–speed, power switching in inductive circuits where fall–time is critical. It is particularly suited for line operated switch–mode applications.

Applications:

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

Absolute Maximum Ratings:

Collector–Emitter Voltage, V_{CEV} 1000V
Collector–Emitter Voltage, $V_{CEO(sus)}$ 750V
Emitter–Base Voltage, V_{EBO} 8V
Collector Current, I_C
  Continuous 20A
  Peak 30A
Base Current, I_B 10A
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		750	–	–	V
Collector Cutoff Current	I_{CEV}	V_{CEV} = 1000V, $V_{BE(off)}$ = 1.5V		–	–	0.25	mA
			T_C = +100°C	–	–	5.0	mA
	I_{CER}	V_{CE}= 1000V, 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}	V_{CE} = 5V, I_C = 5A		50	–	600	
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 10A, I_B = 1A		–	–	2.2	V
			T_C = +100°C	–	–	2.5	V
		I_C = 20A, I_B = 5A		–	–	5.0	V
Base–Emitter Saturation Voltage	$V_{BE(sat)}$	I_C = 10A, I_B = 1A		–	–	2.5	V
			T_C = +100°C	–	–	2.5	V
Diode Forward Voltage	V_F	I_F = 10A		–	–	5.0	V
Dynamic Characteristics							
Output Capacitance	C_{ob}	V_{CB} = 10V, I_E = 0, f = 1kHz		100	–	600	pF
Switching Characteristics							
Delay Time	t_d	V_{CC} = 250V, I_C = 10A, I_{B1} = 1A, $V_{BE(off)}$ = 5V, t_p = 50μs, Duty Cycle ≤ 2%		–	–	0.4	μs
Rise Time	t_r			–	–	1.8	μs
Storage Time	t_s			–	–	5.0	μs
Fall Time	t_f			–	–	1.8	μs

Note 1. Pulse test: Pulse Width = 300μs, Duty Cycle ≤ 2%.