Darlington Power Transistors

multicomp PRO

NPN	PNP
MJ11032	MJ11033

50 Amperes
Complementary
Silicon Power
Darlington Transistors
120V
300W

Features

- High Gain Darlington performance
- High DC Current Gain: h_{FE} = 1,000 (Minimum) at I_C = 25A,
  h_{FE} = 400 (Minimum) at I_C = 50A
- Monolithic construction with built-in Base-Emitter Shunt Resistor

Complementary Silicon Power Darlington Transistors are designed for use as output devices in complementary general purpose amplifier applications

Absolute Maximum Ratings

Parameter	Symbol	Values	Unit
Collector - Emitter Voltage	V_{CEO}	120	V
Collector - Base Voltage	V_{CBO}		
Emitter - Base Voltage	V_{EBO}	5	
Collector Current - Continuous - Peak	I_C I_{CM}	50 100	A
Base Current	I_B	2	
Total Power Dissipation T_C = 25°C Derate above +25°C	P_D	300 1.71	W W / °C
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +200	°C

Thermal Characteristics

Parameter	Symbol	Maximum	Unit
Thermal Resistance Junction to Case	$R_{\theta JC}$	0.584	°C / W

Electrical Characteristics (T_{CASE} = 25°C unless otherwise specified)

Characteristic	Symbol	Minimum	Maximum	Unit
OFF Characteristics				
Collector - Emitter Sustaining Voltage (1) (I_C = 100mA, I_B = 0)	$V_{CEO\ (sus)}$	120	-	V
Collector Cut off Current (V_{CE} = 50V, I_B = 0)	I_{CEO}	-	2	mA
Collector - Emitter Leakage Current (V_{CE} = 120V, R_{BE} = 1kΩ) (V_{CE} = 120V, R_{BE} = 1kΩ, T_C = 125°C)	I_{CER}	-	2 10	
Emitter Cut off Current (V_{EB} = 5V, I_C = 0)	I_{EBO}	-	5	

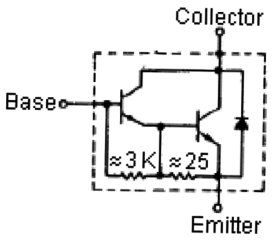
Characteristic	Symbol	Minimum	Maximum	Unit
ON Characteristics (1)				
DC Current Gain (I_C = 25A, V_{CE} = 5V) (I_C = 50A, V_{CE} = 5V)	h_{FE}	1,000 400	18,000	-
Collector - Emitter Saturation Voltage (I_C = 25A, I_B = 250mA) (I_C = 50A, I_B = 500mA)	$V_{CE\ (sat)}$	-	2.5 3.5	V
Base - Emitter Saturation Voltage (I_C = 25A, I_B = 200mA) (I_C = 50A, I_B = 300mA)	$V_{BE\ (sat)}$	-	3 4.5	
Dynamic Characteristics				
Small-Signal Current Gain (I_C = 10A, V_{CE} = 3V, f = 1kHz)	|hfe|	4	-	-

(1) Pulse Test : Pulse Width = 300μs, Duty Cycle ≤2%

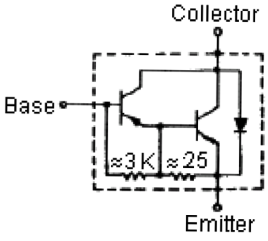
(2) f_T = |hfe| • ftest

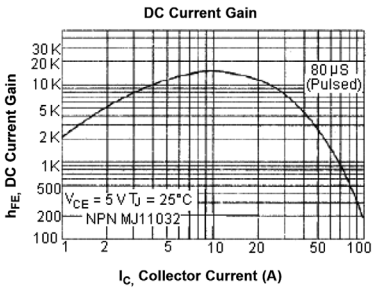
Internal Schematic Diagram

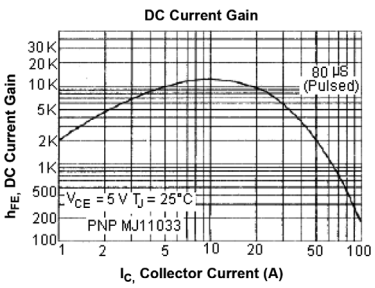
NPN
MJ11032

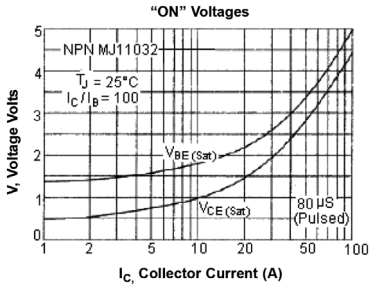


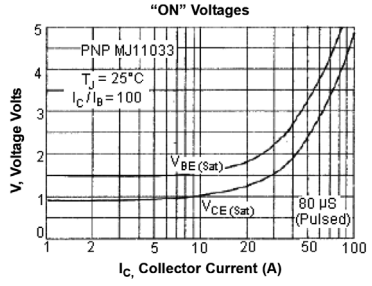
PNP
MJ11033

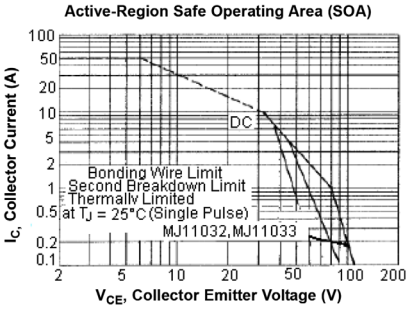












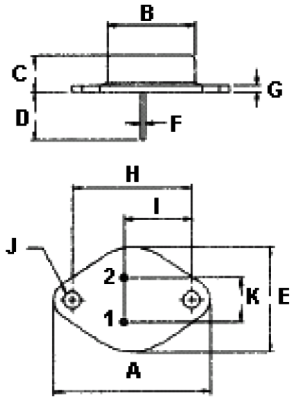
There are two limitations on the power handling ability of a transistor average junction temperature and second breakdown safe operating area curves indicate I_C - V_{CE} limits of the transistor that must be observed for reliable operation i.e, the transistor must not be subjected to greater dissipation than the curves indicate

The data of SOA curve is based on $T_{J(PK)}$ = 200°C; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(PK)}$ ≤200°C, At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown

Specification Table

$I_{C\ (av)}$ maximum (A)	V_{CEO} maximum (V)	h_{FE} minimum at I_C = 25 A	P_{tot} at 25°C (W)	Package	Type	Part Number
50	120	1,000	300	TO-3	NPN	MJ11032
					PNP	MJ11033

Diagram



Dimensions	Minimum	Maximum
A	38.75	39.96
B	19.28	22.23
C	7.96	9.28
D	11.18	12.19
E	25.2	26.67
F	0.92	1.09
G	1.38	1.62
H	29.9	30.4
I	16.64	17.3
J	3.88	4.36
K	10.67	11.18

Dimensions : Millimetres

Pin 1. Base
2. Emitter
Collector (Case)