

MJD148

Preferred Device

NPN Silicon Power Transistor

DPAK For Surface Mount Applications

Designed for general purpose amplifier and low speed switching applications.

- Lead Formed for Surface Mount Applications in Plastic Sleeves (No Suffix)
- Lead Formed Version Available in 16 mm Tape and Reel ("T4" Suffix)
- High Gain — 50 Min @ $I_C = 2.0$ Amps
- Low Saturation Voltage — 0.5 V @ $I_C = 2.0$ Amps
- High Current Gain-Bandwidth Product — $f_T = 3.0$ MHz Min @ $I_C = 250$ mAdc

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	45	Vdc
Collector-Base Voltage	V_{CB}	45	Vdc
Emitter-Base Voltage	V_{EB}	5	Vdc
Collector Current — Continuous Peak	I_C	4 7	Adc
Base Current	I_B	50	mAdc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	20 0.16	Watts W/ $^\circ\text{C}$
Total Power Dissipation (Note 1) @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	1.75 0.014	Watts W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	6.25	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient (Note 1)	$R_{\theta JA}$	71.4	$^\circ\text{C}/\text{W}$

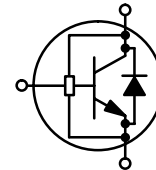
1. These ratings are applicable when surface mounted on the minimum pad sizes recommended.



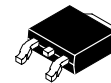
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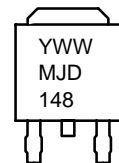
**2 AMPERES
1000 VOLTS
50 WATTS
POWER TRANSISTOR**



MARKING DIAGRAMS



DPAK
CASE 369A
STYLE 1



Y = Year
WW = Work Week
MJD18002 = Device Code

ORDERING INFORMATION

Device	Package	Shipping
MJD148-2	DPAK	3000/Tape & Reel

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ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Test Conditions	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Sustaining Voltage (Note 2)	$I_C = 100 \text{ mAdc}, I_B = 0$	$V_{CEO(sus)}$	45	–	Vdc
Collector Cutoff Current	$V_{CB} = 45 \text{ Vdc}, I_E = 0$	I_{CBO}	–	20	μAdc
Emitter Cutoff Current	$V_{BE} = 5 \text{ Vdc}, I_C = 0$	I_{EBO}	–	1	mAdc

ON CHARACTERISTICS

DC Current Gain (Note 2)	$I_C = 10 \text{ mAdc}, V_{CE} = 5 \text{ Vdc}$	h_{FE}	40	–	–
	$I_C = 0.5 \text{ Adc}, V_{CE} = 1 \text{ Vdc}$		85	375	
	$I_C = 2 \text{ Adc}, V_{CE} = 1 \text{ Vdc}$		50	–	
	$I_C = 3 \text{ Adc}, V_{CE} = 1 \text{ Vdc}$		30	–	
Collector–Emitter Saturation Voltage (Note 2)	$I_C = 2 \text{ Adc}, I_B = 0.2 \text{ Adc}$	$V_{CE(sat)}$	–	0.5	Vdc
Base–Emitter On Voltage (Note 2)	$I_C = 2 \text{ Adc}, V_{CE} = 1 \text{ Vdc}$	$V_{BE(on)}$	–	1.1	Vdc

DYNAMIC CHARACTERISTICS

Current–Gain–Bandwidth Product	$I_C = 250 \text{ mAdc}, V_{CE} = 1 \text{ Vdc}, f = 1 \text{ MHz}$	f_T	3	–	MHz
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2. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2\%$.

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TYPICAL CHARACTERISTICS

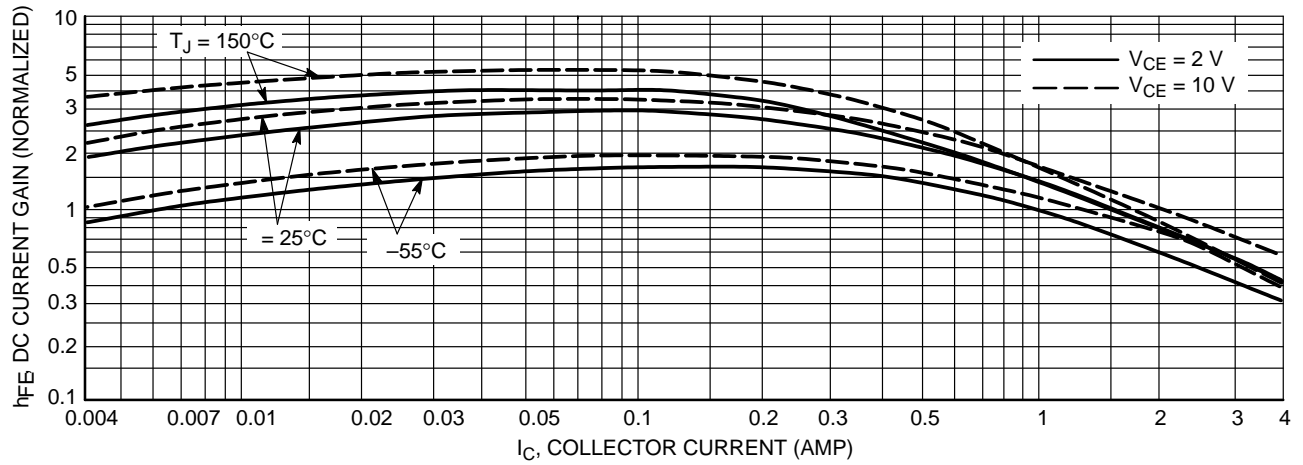


Figure 1. DC Current Gain

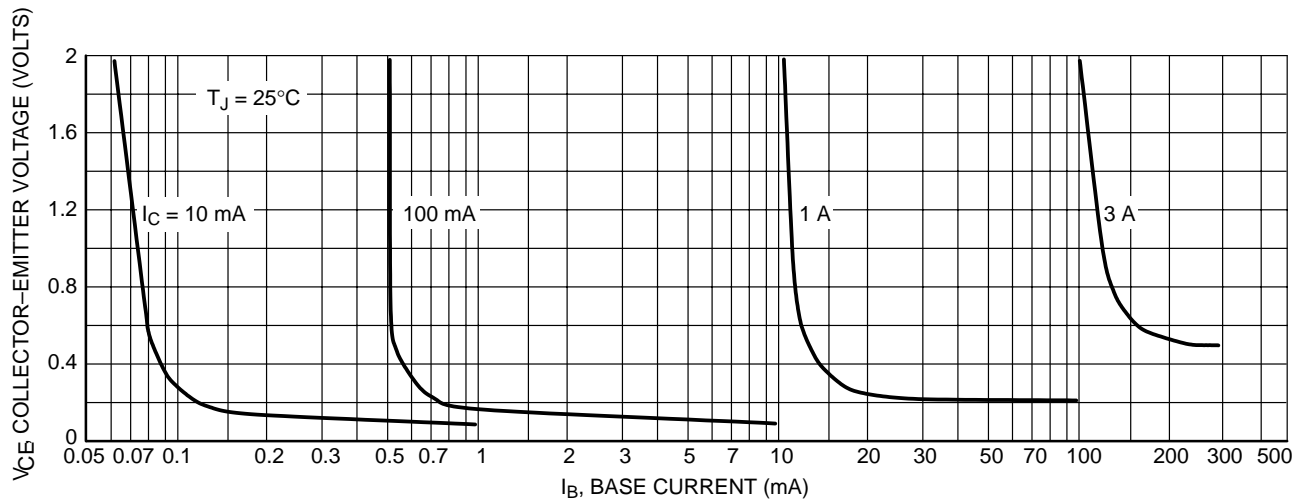


Figure 2. Collector Saturation Region

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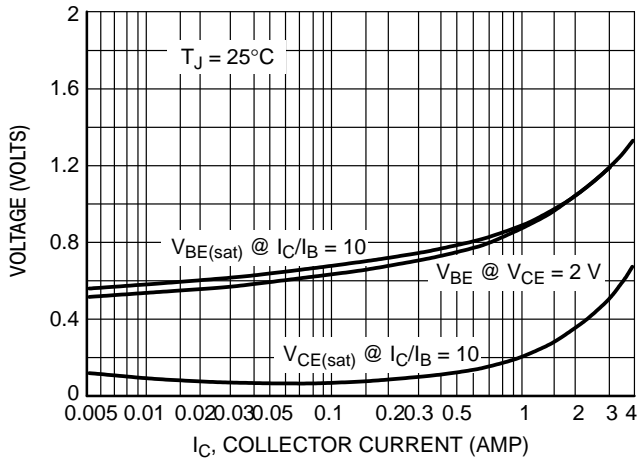


Figure 3. "On" Voltages

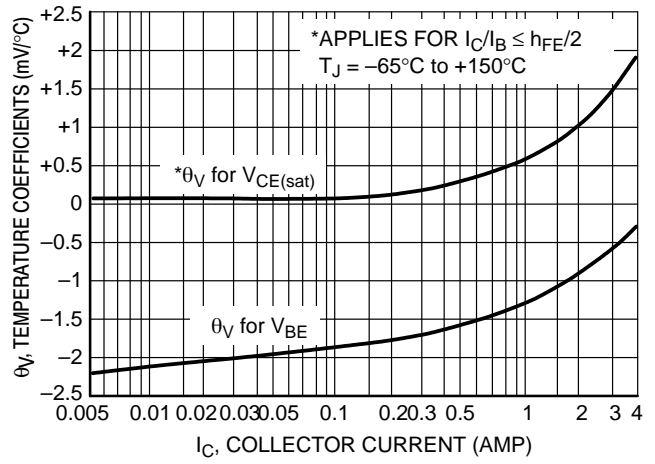


Figure 4. Temperature Coefficients

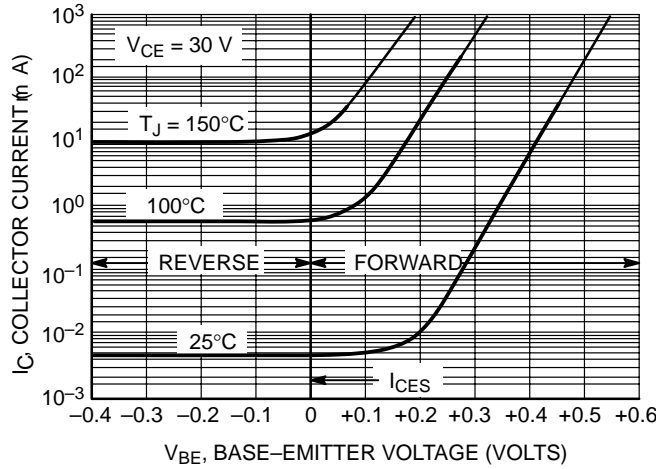


Figure 5. Collector Cut-Off Region

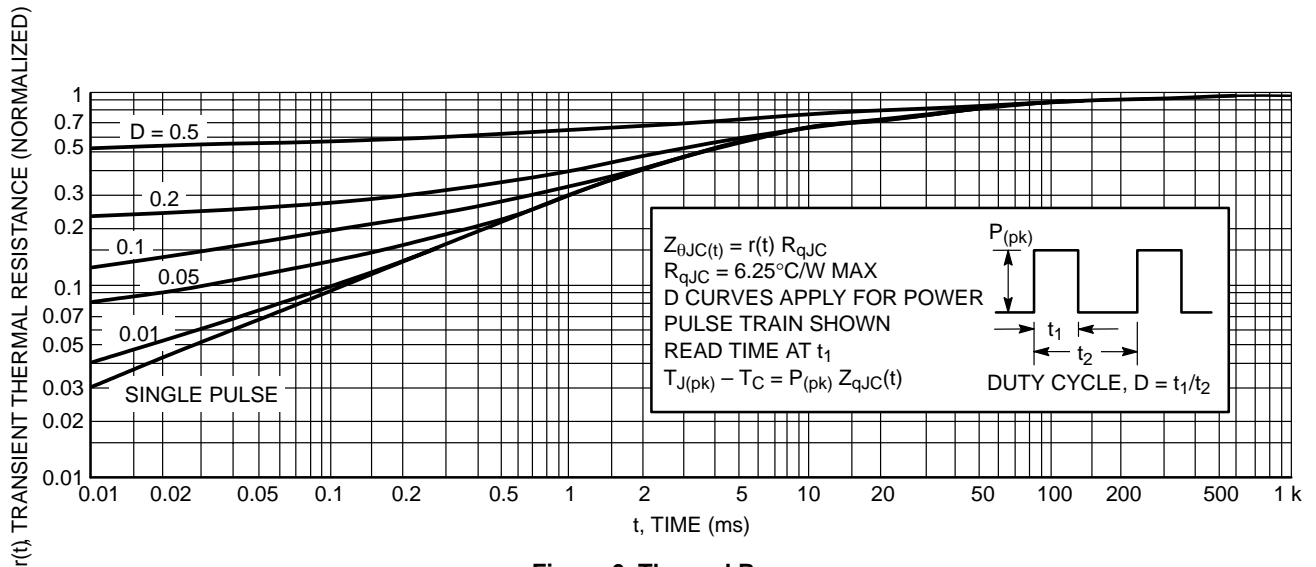


Figure 6. Thermal Response

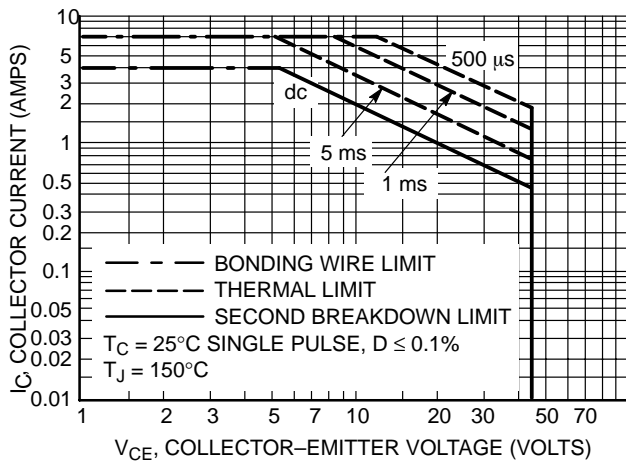


Figure 7. Maximum Rated Forward Bias

FORWARD BIAS SAFE OPERATING AREA INFORMATION

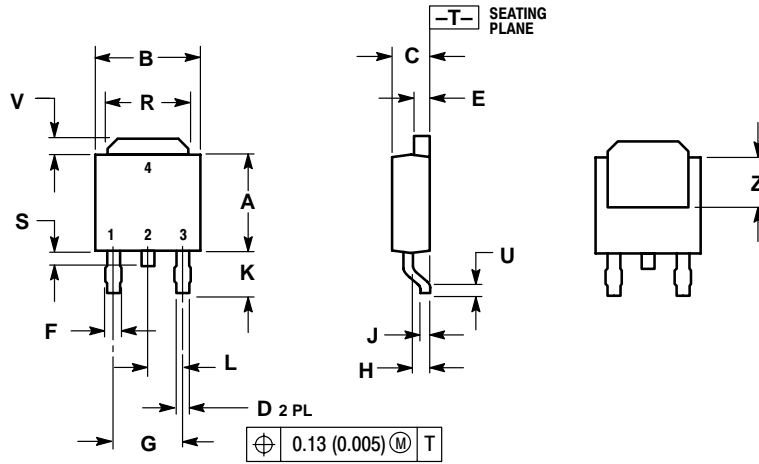
There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation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

The data of Figure 7 is based on $T_{J(pk)} = 150^\circ\text{C}$; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150^\circ\text{C}$. $T_{J(pk)}$ may be calculated from the data in Figure 6. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

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PACKAGE DIMENSIONS

DPAK CASE 369A-13 ISSUE AB

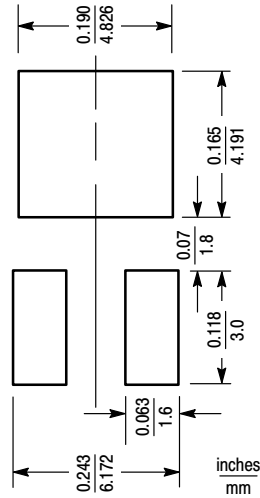


- NOTES:
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.


DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.235	0.250	5.97	6.35
B	0.250	0.265	6.35	6.73
C	0.086	0.094	2.19	2.38
D	0.027	0.035	0.69	0.88
E	0.033	0.040	0.84	1.01
F	0.037	0.047	0.94	1.19
G	0.180 BSC		4.58 BSC	
H	0.034	0.040	0.87	1.01
J	0.018	0.023	0.46	0.58
K	0.102	0.114	2.60	2.89
L	0.090 BSC		2.29 BSC	
R	0.175	0.215	4.45	5.46
S	0.020	0.050	0.51	1.27
U	0.020	---	0.51	---
V	0.030	0.050	0.77	1.27
Z	0.138	---	3.51	---

- STYLE 1:
 PIN 1. BASE
 2. COLLECTOR
 3. EMITTER
 4. COLLECTOR

Minimum Pad Sizes Recommended for Surface Mounted Applications



Notes

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