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MJD148T4G
NPN Silicon Power Transistor

DPAK for Surface Mount Applications

Designed for general purpose amplifier and low speed switching applications.

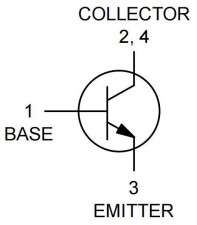
Features

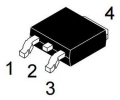
- High Gain
- Low Saturation Voltage
- High Current Gain − Bandwidth Product
- Epoxy Meets UL 94 V−0 @ 0.125 in
- These Devices are Pb−Free and are RoHS Compliant

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}	5.0	Vdc
Collector Current − Continuous	I_C	4.0	Adc
Collector Current − Peak	I_{CM}	7.0	Adc
Base Current	I_B	50	mAdc
Total Power Dissipation @ T_C = 25°C Derate above 25°C	P_D	 20 0.16	 W W/°C
Total Power Dissipation (Note 1) @ T_A = 25°C Derate above 25°C	P_D	 1.75 0.014	 W W/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−55 to +150	°C
ESD − Human Body Model	HBM	3B	V
ESD − Machine Model	MM	C	V

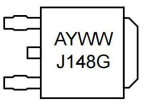
POWER TRANSISTOR
4.0 AMPERES
45 VOLTS, 20 WATTS





DPAK
CASE 369C
STYLE 1

MARKING DIAGRAM



A = Assembly Location
Y = Year
WW = Work Week
J148 = Device Code
G = Pb−Free Package

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THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction−to−Case	$R_{\theta JC}$	6.25	°C/W
Thermal Resistance, Junction−to−Ambient (Note 2)	$R_{\theta JA}$	71.4	°C/W

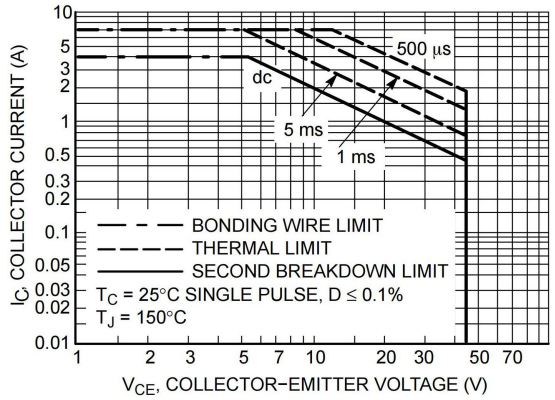
2. These ratings are applicable when surface mounted on the minimum pad sizes recommended.

ELECTRICAL CHARACTERISTICS (T_C = 25°C, unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector−Emitter Sustaining Voltage (Note 3) (I_C = 100 mAdc, I_B = 0)	$V_{CEO(sus)}$	45	−	Vdc
Collector Cutoff Current (V_{CB} = 45 Vdc, I_E = 0)	I_{CBO}	−	20	μAdc
Emitter Cutoff Current (V_{BE} = 5 Vdc, I_C = 0)	I_{EBO}	−	1	mAdc
ON CHARACTERISTICS (Note 3)				
DC Current Gain (I_C = 10 mAdc, V_{CE} = 5 Vdc) (I_C = 0.5 Adc, V_{CE} = 1 Vdc) (I_C = 2 Adc, V_{CE} = 1 Vdc) (I_C = 3 Adc, V_{CE} = 1 Vdc)	h_{FE}	 40 85 50 30	 − 375 − −	−
Collector−Emitter Saturation Voltage (I_C = 2 Adc, I_B = 0.2 Adc)	$V_{CE(sat)}$	−	0.5	Vdc
Base−Emitter On Voltage (I_C = 2 Adc, V_{CE} = 1 Vdc)	$V_{BE(on)}$	−	1.1	Vdc
DYNAMIC CHARACTERISTICS				
Current−Gain−Bandwidth Product (I_C = 250 mAdc, V_{CE} = 1 Vdc, f = 1 MHz)	f_T	3	−	MHz

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

3. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.



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 10 is based on $T_{J(pk)}$ = 150°C; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)}$ ≤ 150°C. $T_{J(pk)}$ may be calculated from the data in Figure 9. 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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TYPICAL CHARACTERISTICS

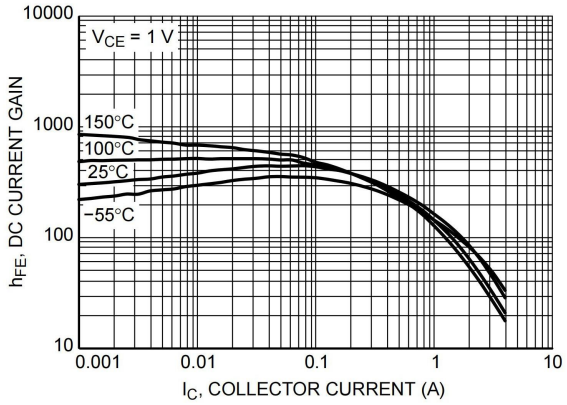

Figure 1. DC Current Gain

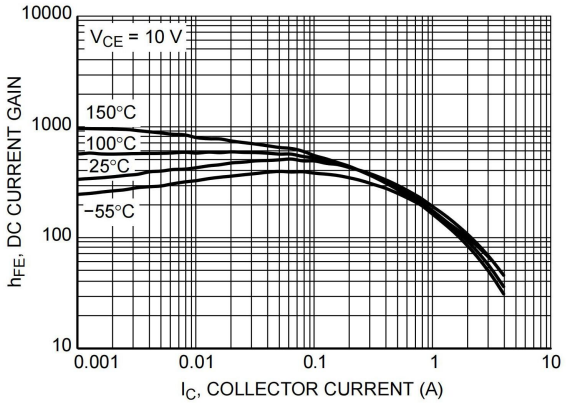

Figure 2. DC Current Gain

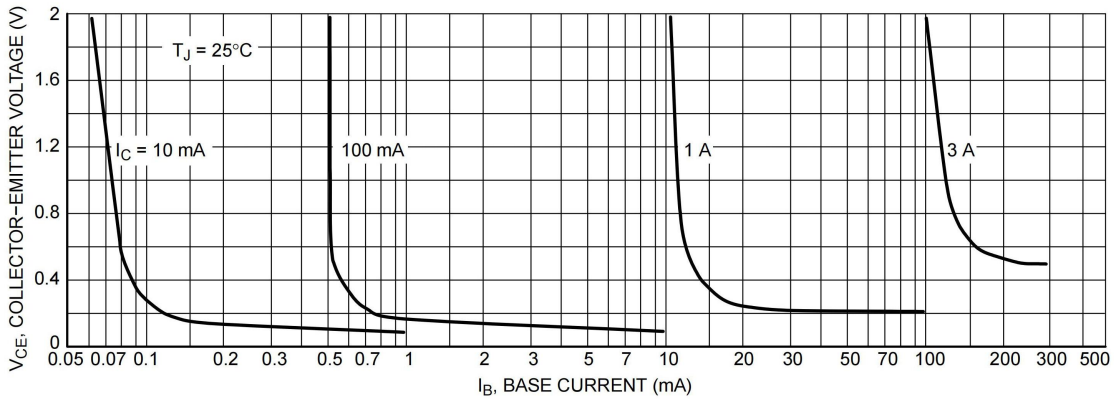

Figure 3. Collector Saturation Region

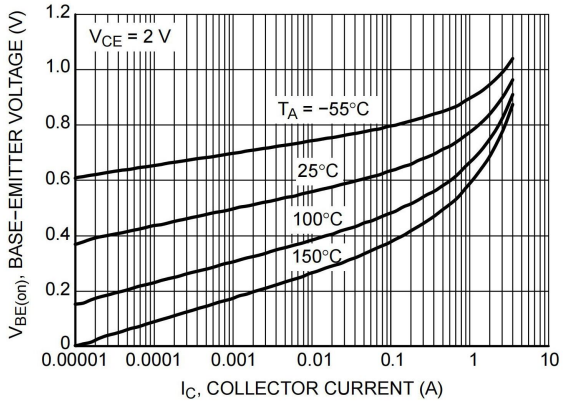

Figure 4. Base Emitter Voltage vs. Collector Current

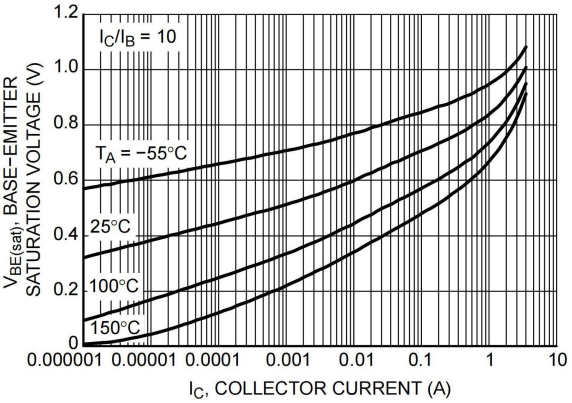

Figure 5. Base Emitter Saturation Voltage vs. Collector Current

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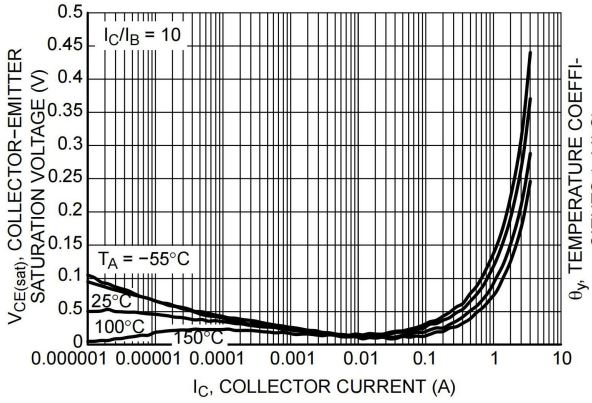

Figure 6. Collector Emitter Saturation Voltage vs. Collector Current

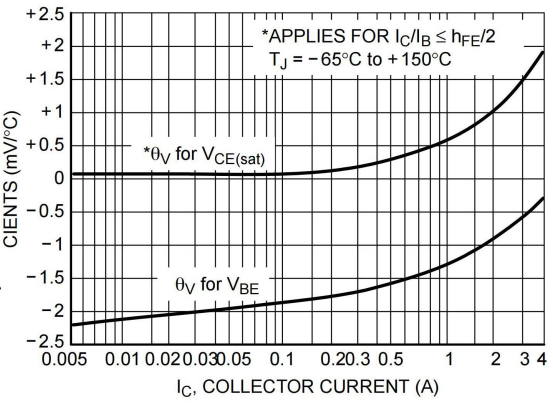

Figure 7. Temperature Coefficients

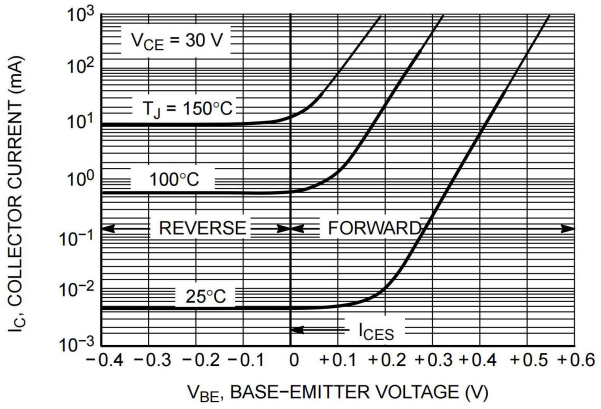

Figure 8. Collector Cut−Off Region

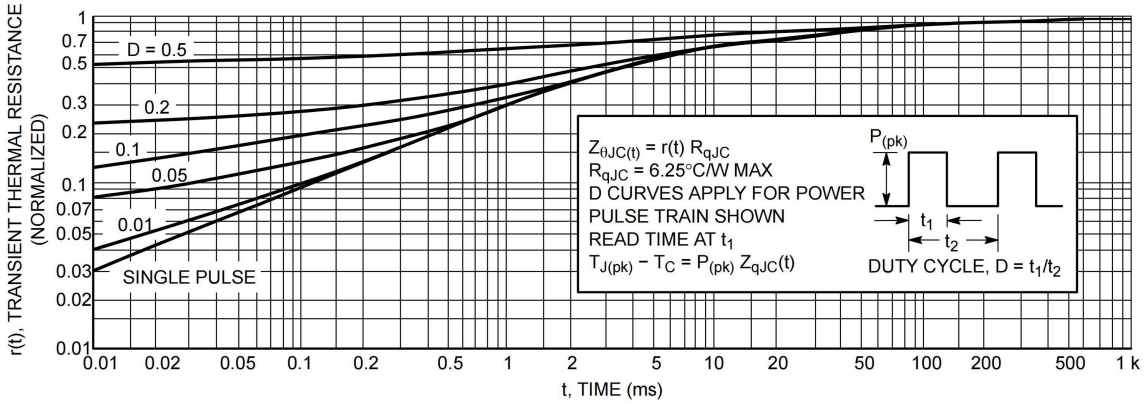

Figure 9. Thermal Response

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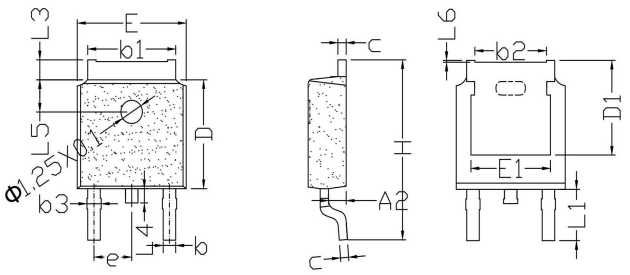
Ordering Information

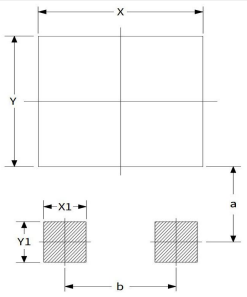
PACKAGE	PACKAGE CODE	UNIT WEIGHT(g)	REEL(pcs)	BOX(pcs)	CARTON(pcs)	DELIVERY MODE
TO-252	R3	0.305	2500	5000	25000	13''

Package Outline Dimensions (TO-252)



Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A2	0.90	1.10	0.035	0.043
b	0.66	0.86	0.026	0.034
b1	5.10	5.46	0.201	0.215
b2	4.27	4.37	0.168	0.172
b3	0.78	0.90	0.031	0.035
c	0.45	0.55	0.018	0.022
D	5.90	6.30	0.232	0.248
D1	5.35 REF.		0.211REF.	
E	6.30	6.70	0.248	0.264
E1	4.83 REF.		0.190 REF.	
e	2.18	2.38	0.086	0.094
H	9.80	10.4	0.386	0.409
L1	2.70	3.10	0.106	0.122
L3	0.80	1.20	0.031	0.047
L4	0.60	1.00	0.024	0.039
L5	1.8 REF.		0.071 REF.	
L6	-	0.12	-	0.005

Suggested Pad Layout



Symbol	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
a	3.70	-	0.146	-
b	4.37	-	0.172	-
X	-	5.80	-	0.228
X1	-	1.20	-	0.047
Y	-	5.85	-	0.230
Y1	-	2.00	-	0.079