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MJD44H11T4G (NPN), MJD45H11T4G (PNP)
Complementary Power Transistors

DPAK for Surface Mount Applications

Designed for general purpose power and switching such as output or driver stages in applications such as switching regulators, converters, and power amplifiers.

Features

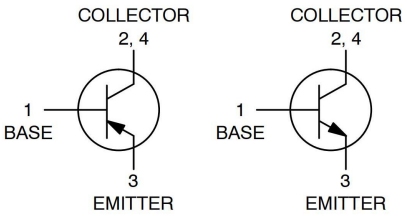
- Lead Formed for Surface Mount Application in Plastic Sleeves (No Suffix)
- Straight Lead Version in Plastic Sleeves ("−1" Suffix)
- Electrically Similar to Popular D44H/D45H Series
- Low Collector Emitter Saturation Voltage
- Fast Switching Speeds
- Complementary Pairs Simplifies Designs
- Epoxy Meets UL 94 V−0 @ 0.125 in
- These Devices are Pb−Free and are RoHS Compliant

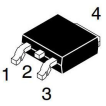
MAXIMUM RATINGS (T_A = 25°C, common for NPN and PNP, minus sign, "−", for PNP omitted, unless otherwise noted)

Rating	Symbol	Max	Unit
Collector−Emitter Voltage	V_{CEO}	80	Vdc
Emitter−Base Voltage	V_{EB}	5	Vdc
Collector Current − Continuous	I_C	8	Adc
Collector Current − Peak	I_{CM}	16	Adc
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

SILICON
POWER TRANSISTORS
8 AMPERES
80 VOLTS, 20 WATTS

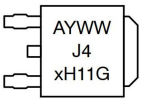
COMPLEMENTARY





DPAK
CASE 369C
STYLE 1

MARKING DIAGRAMS



DPAK

A	=	Assembly Location
Y	=	Year
WW	=	Work Week
J4xH11	=	Device Code x = 4 or 5
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
Lead Temperature for Soldering	T_L	260	°C

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

ELECTRICAL CHARACTERISTICS

(T_A = 25°C, common for NPN and PNP, minus sign, "−", for PNP omitted, unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector−Emitter Sustaining Voltage (I_C = 30 mA, I_B = 0)	$V_{CEO(sus)}$	80	–	–	Vdc
Collector Cutoff Current (V_{CE} = Rated V_{CEO}, V_{BE} = 0)	I_{CES}	–	–	1.0	μA
Emitter Cutoff Current (V_{EB} = 5 Vdc)	I_{EBO}	–	–	1.0	μA
ON CHARACTERISTICS					
Collector−Emitter Saturation Voltage (I_C = 8 Adc, I_B = 0.4 Adc)	$V_{CE(sat)}$	–	–	1	Vdc
Base−Emitter Saturation Voltage (I_C = 8 Adc, I_B = 0.8 Adc)	$V_{BE(sat)}$	–	–	1.5	Vdc
DC Current Gain (V_{CE} = 1 Vdc, I_C = 2 Adc) (V_{CE} = 1 Vdc, I_C = 4 Adc)	h_{FE}	 60 40	 – –	 – –	–
DYNAMIC CHARACTERISTICS					
Collector Capacitance (V_{CB} = 10 Vdc, f_{test} = 1 Mhz) MJD44H11T4G MJD45H11T4G	C_{cb}	 – –	 45 130	 – –	pF
Gain Bandwidth Product (I_C = 0.5 Adc, V_{CE} = 10 Vdc, f = 20 Mhz) MJD44H11T4G MJD45H11T4G	f_T	 – –	 85 90	 – –	MHz
SWITCHING TIMES					
Delay and Rise Times (I_C = 5 Adc, I_{B1} = 0.5 Adc) MJD44H11T4G MJD45H11T4G	$t_d + t_r$	 – –	 300 135	 – –	ns
Storage Time (I_C = 5 Adc, I_{B1} = I_{B2} = 0.5 Adc) MJD44H11T4G MJD45H11T4G	t_s	 – –	 500 500	 – –	ns
Fall Time (I_C = 5 Adc, I_{B1} = I_{B2} = 0.5 Adc) MJD44H11T4G MJD45H11T4G	t_f	 – –	 140 100	 – –	ns

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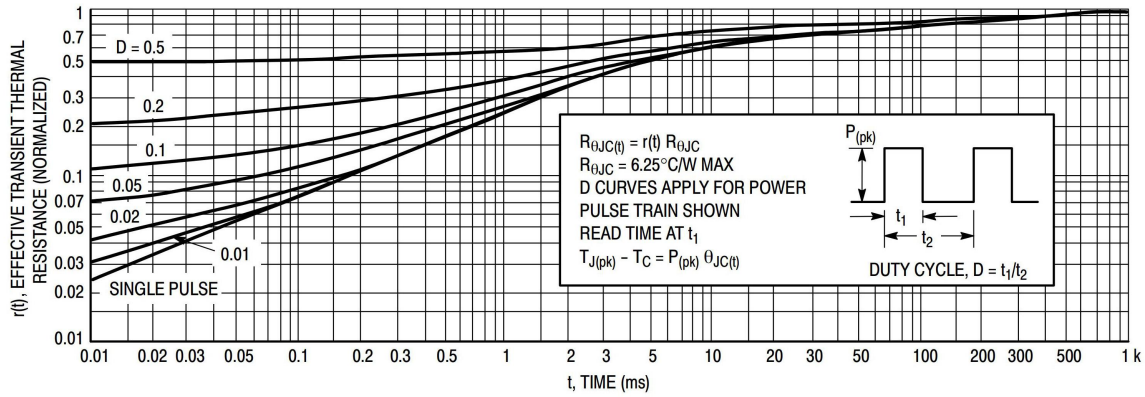

Figure 1. Thermal Response

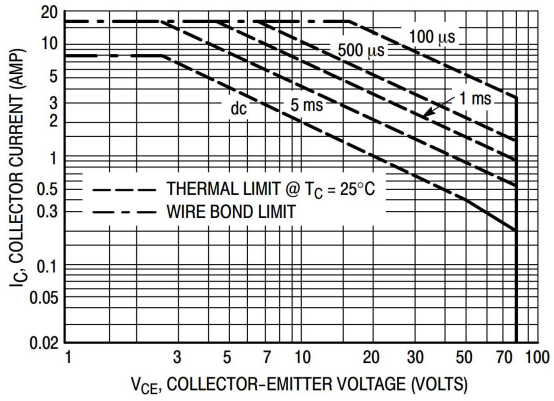

Figure 2. Maximum Forward Bias Safe Operating Area

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 2 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 $T_{J(pk)} \leq 150°C$. $T_{J(pk)}$ may be calculated from the data in Figure 1. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

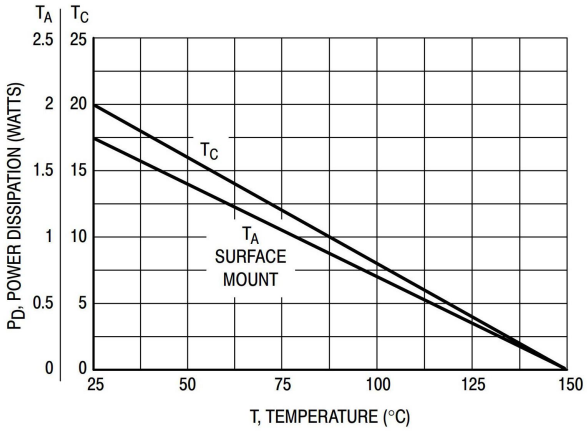

Figure 3. Power Derating

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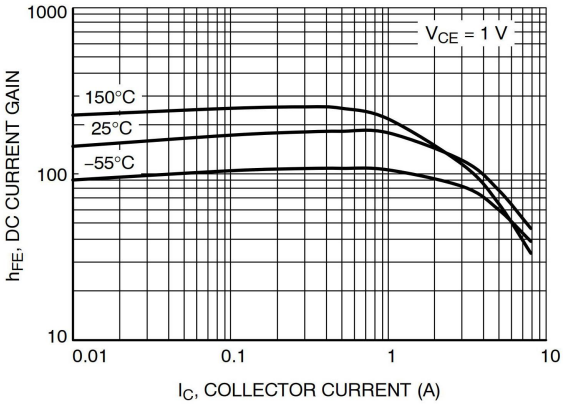

Figure 4. MJD44H11 DC Current Gain

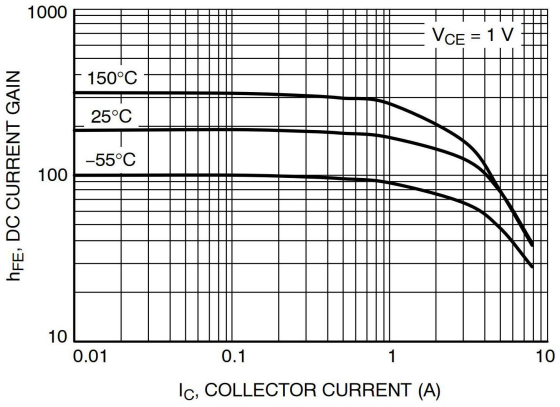

Figure 5. MJD45H11 DC Current Gain

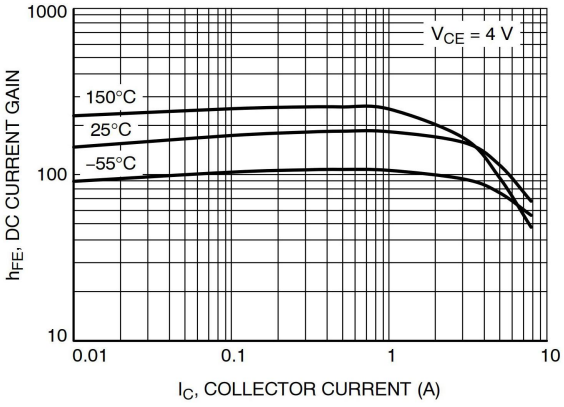

Figure 6. MJD44H11 DC Current Gain

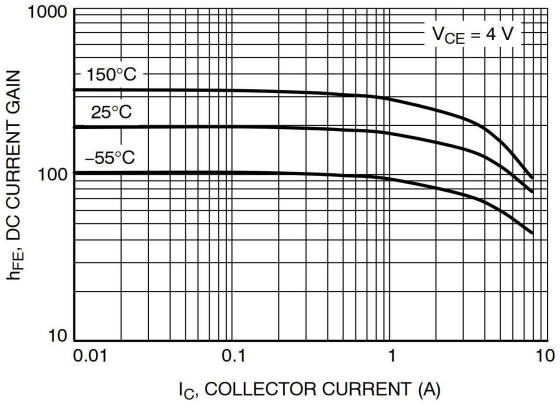

Figure 7. MJD45H11 DC Current Gain

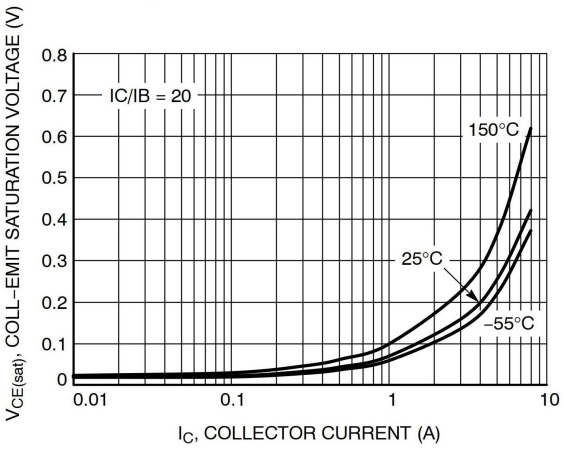

Figure 8. MJD44H11 Saturation Voltage $V_{CE(sat)}$

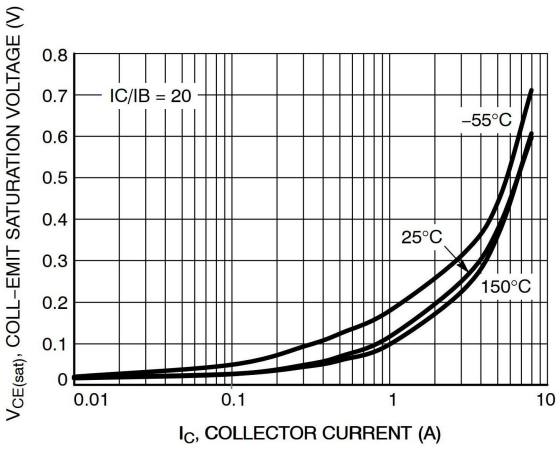

Figure 9. MJD45H11 Saturation Voltage $V_{CE(sat)}$

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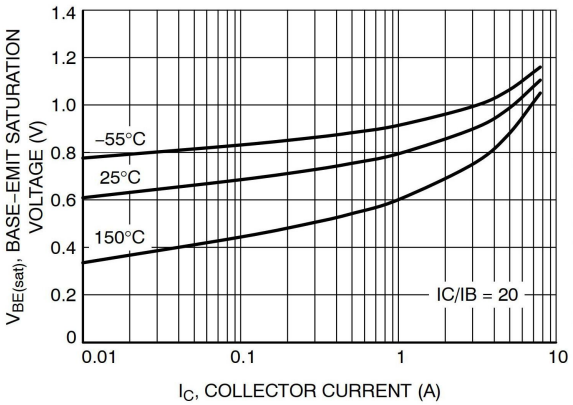

Figure 10. MJD44H11 Saturation Voltage $V_{BE(sat)}$

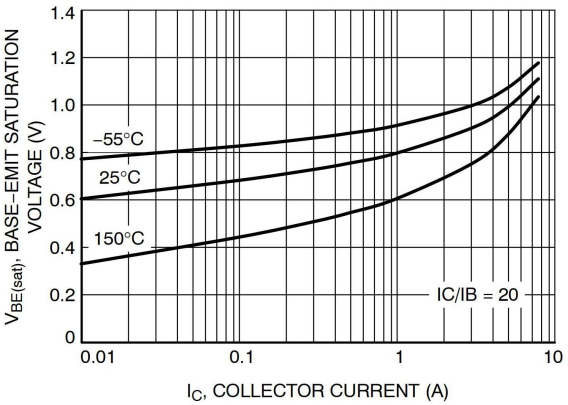

Figure 11. MJD45H11 Saturation Voltage $V_{BE(sat)}$

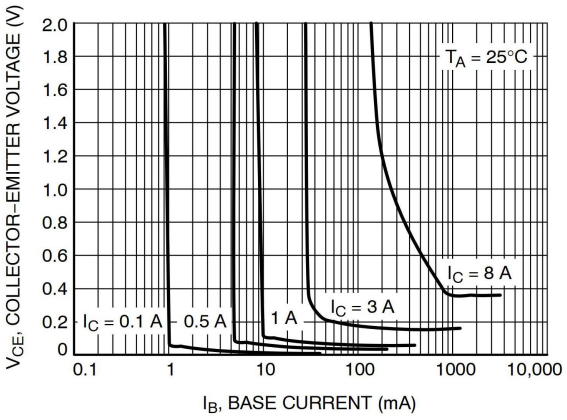

Figure 12. MJD44H11 Collector Saturation Region

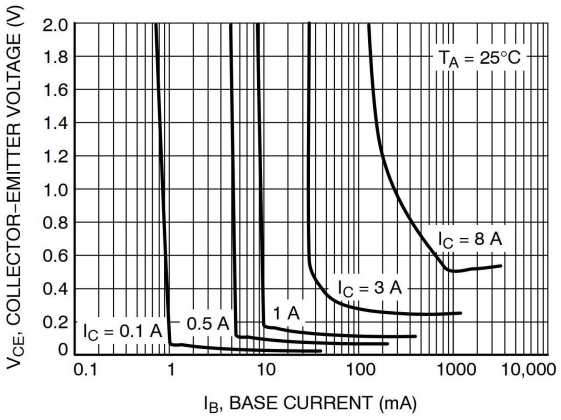

Figure 13. MJD45H11 Collector Saturation Region

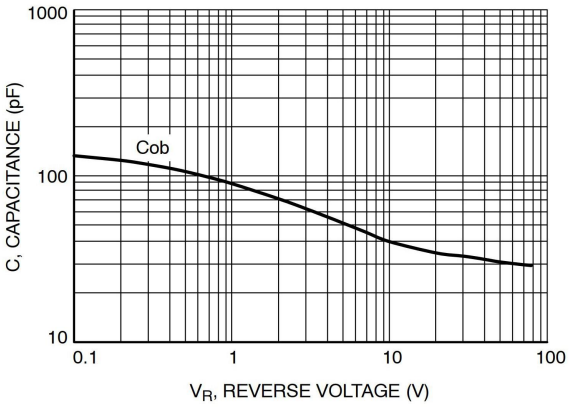

Figure 14. MJD44H11 Capacitance

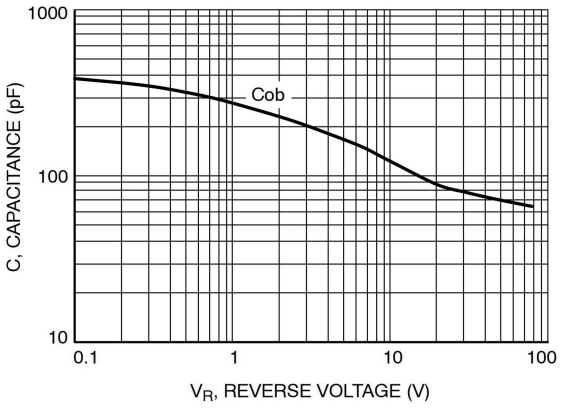

Figure 15. MJD45H11 Capacitance

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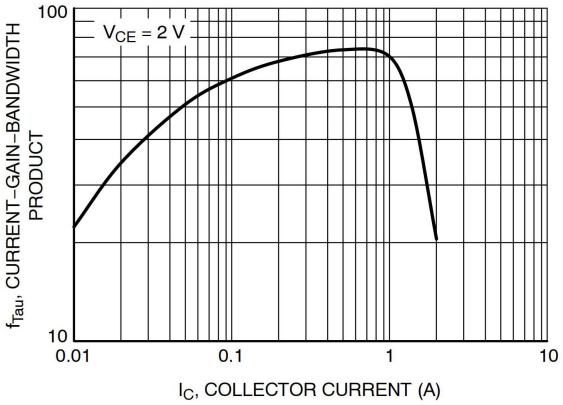

Figure 16. MJD44H11
Current−Gain−Bandwidth Product

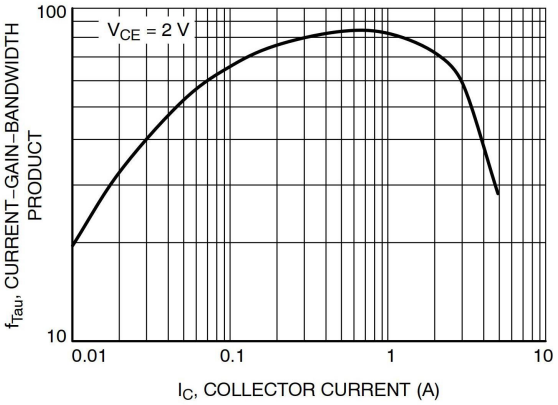

Figure 17. MJD45H11
Current−Gain−Bandwidth Product

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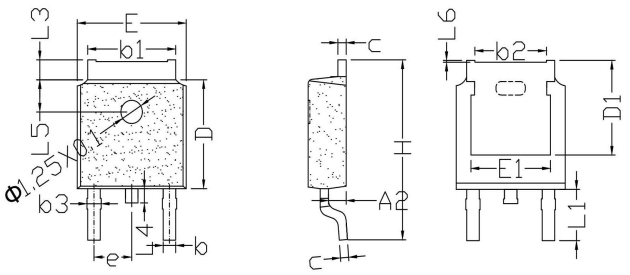
Ordering Information

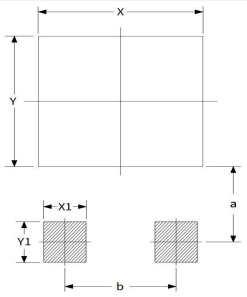
PACKAGE	PACKAGE CODE	UNIT WEIGHT(g)	REEL(pcs)	BOX(pcs)	CARTON(pcs)	DELIVERY MODE
TO-252	R3	0.305	2500	5000	25000	13''

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