ON Semiconductor™

Complementary Power Transistors

DPAK For Surface Mount Applications

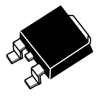
NPN
MJD44H11*
PNP
MJD45H11*

*ON Semiconductor Preferred Device

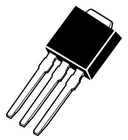
. . . for general purpose power and switching such as output or driver stages in applications such as switching regulators, converters, and power amplifiers.

- Lead Formed for Surface Mount Application in Plastic Sleeves (No Suffix)
- Straight Lead Version in Plastic Sleeves (“–1” Suffix)
- Lead Formed Version in 16 mm Tape and Reel for Surface Mount (“T4” Suffix)
- Electrically Similar to Popular D44H/D45H Series
- Low Collector Emitter Saturation Voltage — $V_{CE(sat)} = 1.0$ Volt Max @ 8.0 Amperes
- Fast Switching Speeds
- Complementary Pairs Simplifies Designs

SILICON
POWER TRANSISTORS
8 AMPERES
80 VOLTS
20 WATTS



CASE 369A–13



CASE 369–07

MAXIMUM RATINGS

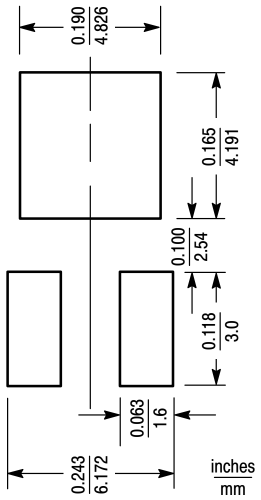
Rating	Symbol	D44H11 or D45H11	Unit
Collector–Emitter Voltage	V_{CEO}	80	Vdc
Emitter–Base Voltage	V_{EB}	5	Vdc
Collector Current — Continuous Peak	I_C	8 16	Adc
Total Power Dissipation @ $T_C = 25°C$ Derate above 25°C	P_D	20 0.16	Watts W/°C
Total Power Dissipation (1) @ $T_A = 25°C$ Derate above 25°C	P_D	1.75 0.014	Watts W/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–55 to 150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	6.25	°C/W
Thermal Resistance, Junction to Ambient (1)	$R_{\theta JA}$	71.4	°C/W
Lead Temperature for Soldering	T_L	260	°C

(1) These ratings are applicable when surface mounted on the minimum pad size recommended.

MINIMUM PAD SIZES RECOMMENDED FOR SURFACE MOUNTED APPLICATIONS



Preferred devices are ON Semiconductor recommended choices for future use and best overall value.

ELECTRICAL CHARACTERISTICS (T_C = 25°C 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}	—	—	10	μA
Emitter Cutoff Current (V_{EB} = 5 Vdc)	I_{EBO}	—	—	50	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)	h_{FE}	60	—	—	—
DC Current Gain (V_{CE} = 1 Vdc, I_C = 4 Adc)		40	—	—	
DYNAMIC CHARACTERISTICS					
Collector Capacitance (V_{CB} = 10 Vdc, f_{test} = 1 MHz) MJD44H11 MJD45H11	C_{cb}	— —	130 230	— —	pF
Gain Bandwidth Product (I_C = 0.5 Adc, V_{CE} = 10 Vdc, f = 20 MHz) MJD44H11 MJD45H11	f_T	— —	50 40	— —	MHz
SWITCHING TIMES					
Delay and Rise Times (I_C = 5 Adc, I_{B1} = 0.5 Adc) MJD44H11 MJD45H11	$t_d + t_r$	— —	300 135	— —	ns
Storage Time (I_C = 5 Adc, I_{B1} = I_{B2} = 0.5 Adc) MJD44H11 MJD45H11	t_s	— —	500 500	— —	ns
Fall Time (I_C = 5 Adc, I_{B1} = I_{B2} = 0.5 Adc) MJD44H11 MJD45H11	t_f	— —	140 100	— —	ns

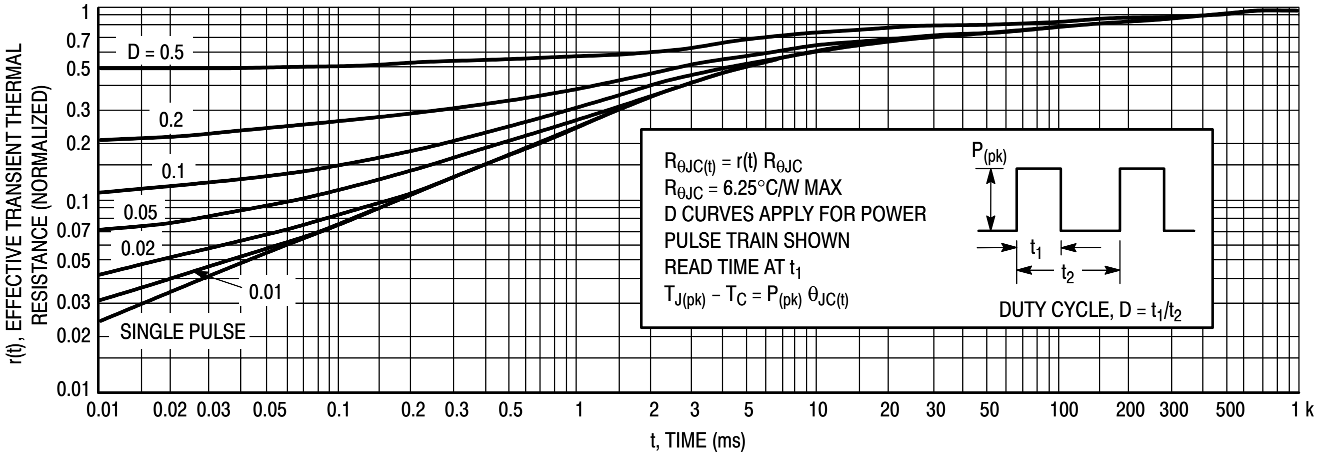


Figure 1. Thermal Response

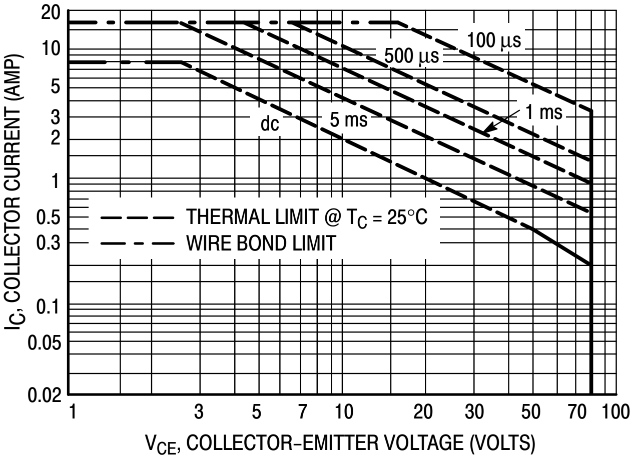


Figure 2. Maximum Forward Bias Safe Operating Area

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.

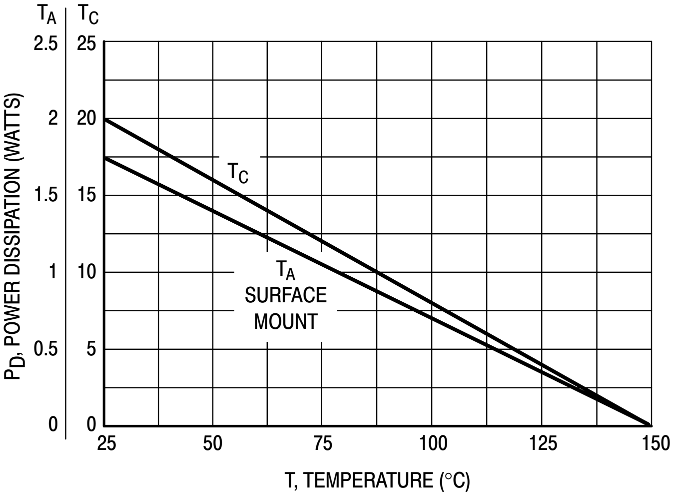


Figure 3. Power Derating

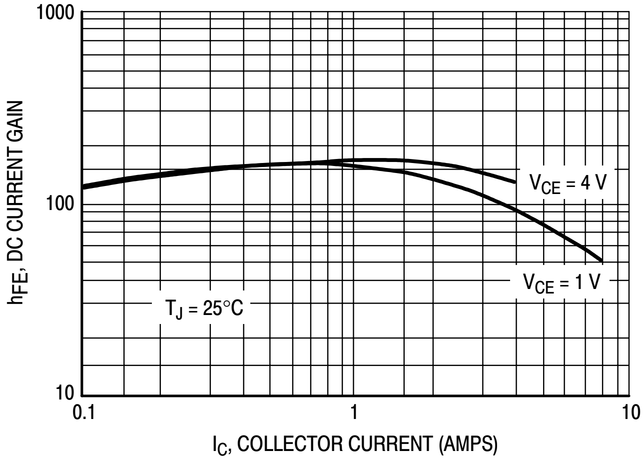


Figure 4. MJD44H11 DC Current Gain

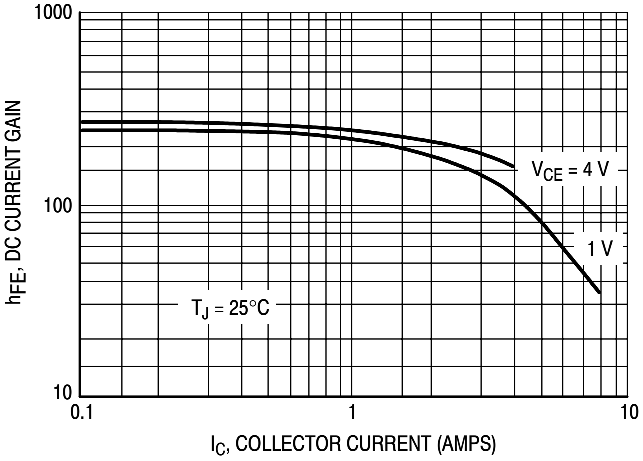


Figure 5. MJD45H11 DC Current Gain

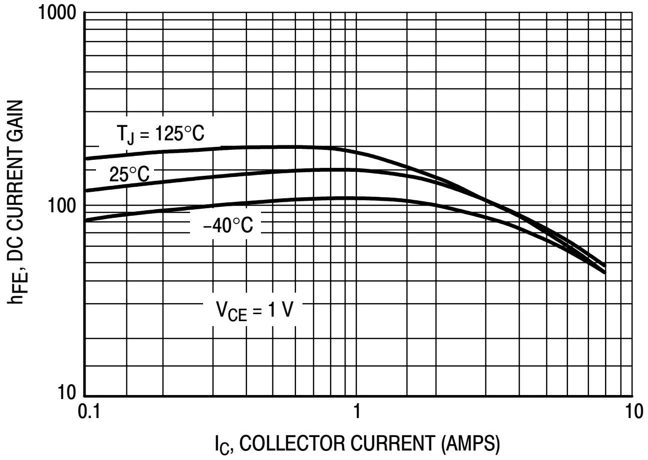


Figure 6. MJD44H11 Current Gain versus Temperature

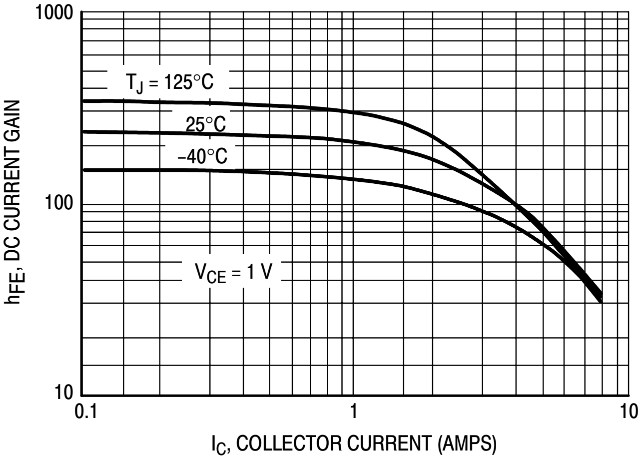


Figure 7. MJD45H11 Current Gain versus Temperature

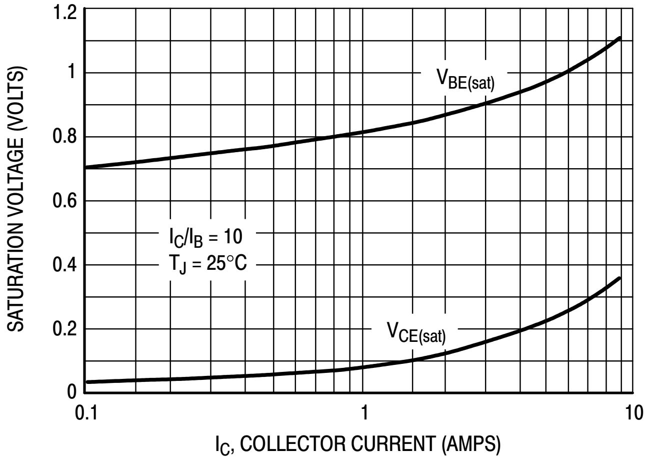


Figure 8. MJD44H11 On−Voltages

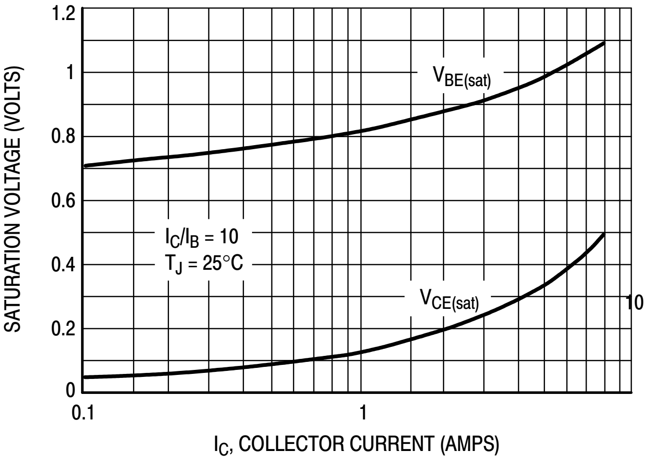
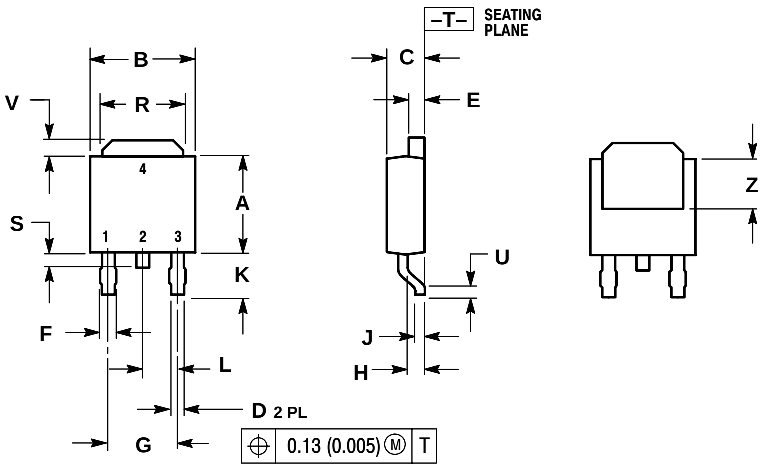


Figure 9. MJD45H11 On−Voltages

PACKAGE DIMENSIONS

DPAK
CASE 369A–13
ISSUE AA



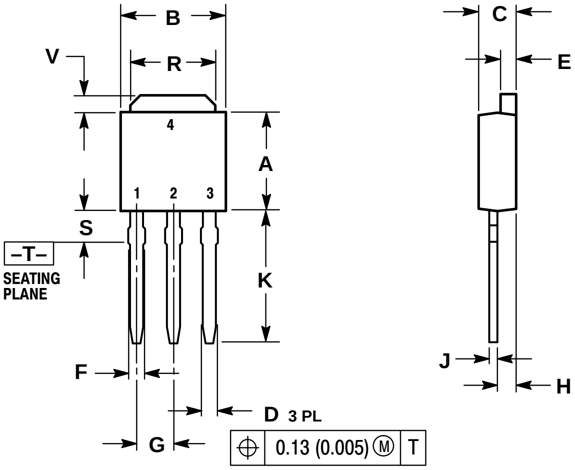
NOTES:

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

	INCHES		MILLIMETERS	
DIM	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	---

PACKAGE DIMENSIONS

DPAK
CASE 369–07
ISSUE M



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F	0.037	0.047	0.94	1.19
G	0.090 BSC		2.29 BSC	
H	0.034	0.040	0.87	1.01
J	0.018	0.023	0.46	0.58
K	0.350	0.380	8.89	9.65
R	0.175	0.215	4.45	5.46
S	0.050	0.090	1.27	2.28
V	0.030	0.050	0.77	1.27

Notes

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