

# Complementary Power Transistors

## DPAK for Surface Mount Applications

### MJD44H11 (NPN), MJD45H11 (PNP)

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
- NJV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC–Q101 Qualified and PPAP Capable
- These Devices are Pb–Free, Halogen Free/BFR Free and are RoHS Compliant

**MAXIMUM RATINGS** ( $T_A = 25^\circ\text{C}$ , common for NPN and PNP, minus sign, "–", for PNP omitted, unless otherwise noted)

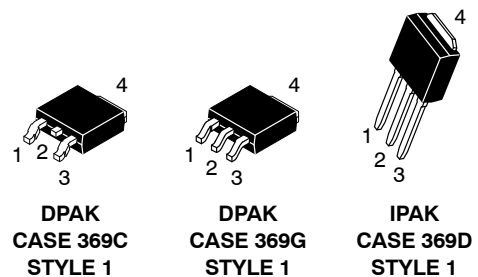
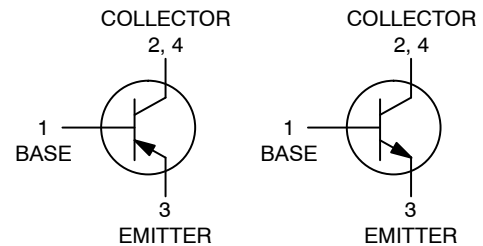
Rating	Symbol	Max	Unit
Collector–Emitter Voltage	$V_{CEO}$	80	Vdc
Emitter–Base Voltage	$V_{EB}$	5	Vdc
Collector Current – Continuous	$I_C$	8	Adc
Collector Current – Peak	$I_{CM}$	16	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	20 0.16	W W/ $^\circ\text{C}$
Total Power Dissipation (Note 1) @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.75 0.014	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	–55 to +150	$^\circ\text{C}$
ESD – Human Body Model	HBM	3B	V
ESD – Machine Model	MM	C	V

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

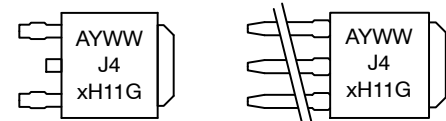
1. These ratings are applicable when surface mounted on the minimum pad sizes recommended.

## SILICON POWER TRANSISTORS 8 AMPERES 80 VOLTS, 20 WATTS

#### COMPLEMENTARY



#### MARKING DIAGRAMS



**DPAK**  
 A = Assembly Location  
 Y = Year  
 WW = Work Week  
 J4xH11 = Device Code  
 x = 4 or 5  
 G = Pb–Free Package

#### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 7 of this data sheet.

# MJD44H11 (NPN), MJD45H11 (PNP)

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	6.25	$^{\circ}\text{C/W}$
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	71.4	$^{\circ}\text{C/W}$
Lead Temperature for Soldering	$T_L$	260	$^{\circ}\text{C}$

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

## ELECTRICAL CHARACTERISTICS

( $T_A = 25^{\circ}\text{C}$ , common for NPN and PNP, minus sign, “–”, for PNP omitted, unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Collector-Emitter Sustaining Voltage ( $I_C = 30\text{ mA}$ , $I_B = 0$ )	$V_{CE(sus)}$	80	–	–	Vdc
Collector Cutoff Current ( $V_{CE} = \text{Rated } V_{CEO}$ , $V_{BE} = 0$ )	$I_{CES}$	–	–	1.0	$\mu\text{A}$
Emitter Cutoff Current ( $V_{EB} = 5\text{ Vdc}$ )	$I_{EBO}$	–	–	1.0	$\mu\text{A}$

### ON CHARACTERISTICS

Collector-Emitter Saturation Voltage ( $I_C = 8\text{ Adc}$ , $I_B = 0.4\text{ Adc}$ )	$V_{CE(sat)}$	–	–	1	Vdc
Base-Emitter Saturation Voltage ( $I_C = 8\text{ Adc}$ , $I_B = 0.8\text{ Adc}$ )	$V_{BE(sat)}$	–	–	1.5	Vdc
DC Current Gain ( $V_{CE} = 1\text{ Vdc}$ , $I_C = 2\text{ Adc}$ ) ( $V_{CE} = 1\text{ Vdc}$ , $I_C = 4\text{ Adc}$ )	$h_{FE}$	60 40	– –	– –	–

### DYNAMIC CHARACTERISTICS

Collector Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $f_{\text{test}} = 1\text{ Mhz}$ ) MJD44H11 MJD45H11	$C_{cb}$	– –	45 130	– –	pF
Gain Bandwidth Product ( $I_C = 0.5\text{ Adc}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 20\text{ Mhz}$ ) MJD44H11 MJD45H11	$f_T$	– –	85 90	– –	MHz

### SWITCHING TIMES

Delay and Rise Times ( $I_C = 5\text{ Adc}$ , $I_{B1} = 0.5\text{ Adc}$ ) MJD44H11 MJD45H11	$t_d + t_r$	– –	300 135	– –	ns
Storage Time ( $I_C = 5\text{ Adc}$ , $I_{B1} = I_{B2} = 0.5\text{ Adc}$ ) MJD44H11 MJD45H11	$t_s$	– –	500 500	– –	ns
Fall Time ( $I_C = 5\text{ Adc}$ , $I_{B1} = I_{B2} = 0.5\text{ Adc}$ ) MJD44H11 MJD45H11	$t_f$	– –	140 100	– –	ns

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.

## MJD44H11 (NPN), MJD45H11 (PNP)

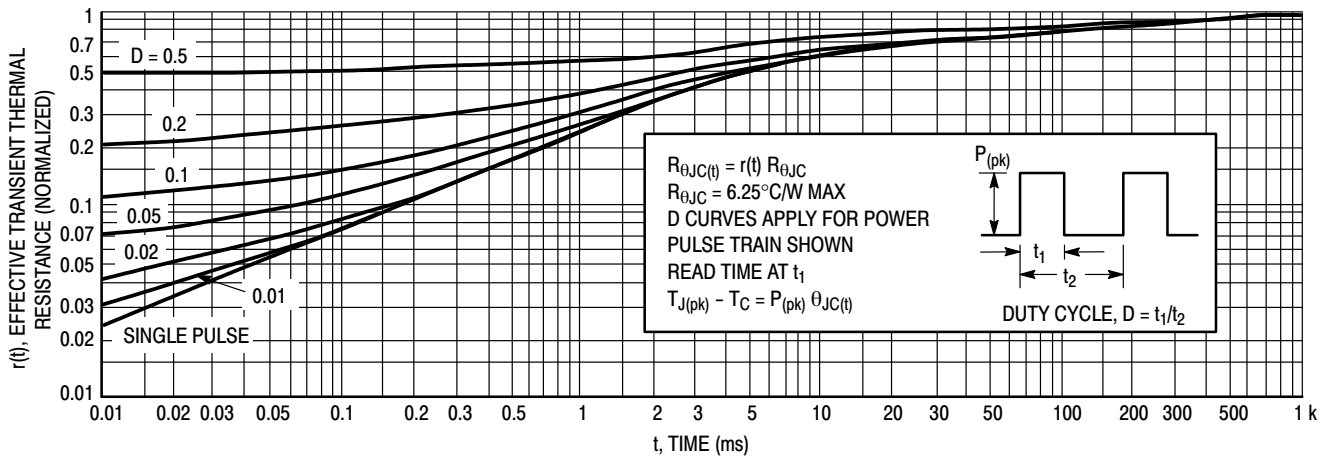


Figure 1. Thermal Response

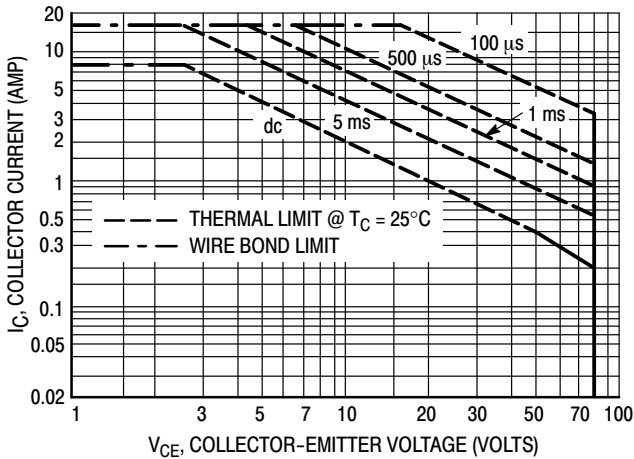


Figure 2. Maximum Forward Bias Safe Operating Area

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  $T_{J(pk)} = 150^\circ\text{C}$ ;  $T_C$  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 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.

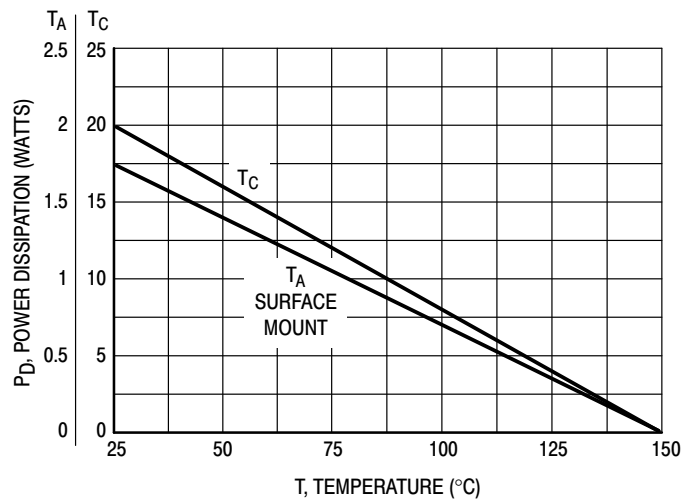


Figure 3. Power Derating

# MJD44H11 (NPN), MJD45H11 (PNP)

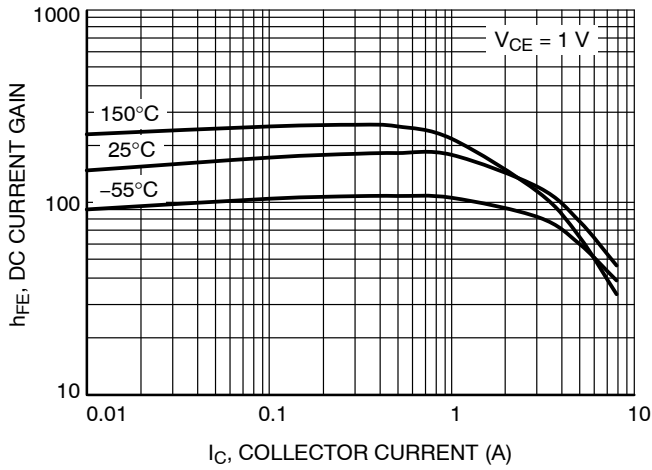


Figure 4. MJD44H11 DC Current Gain

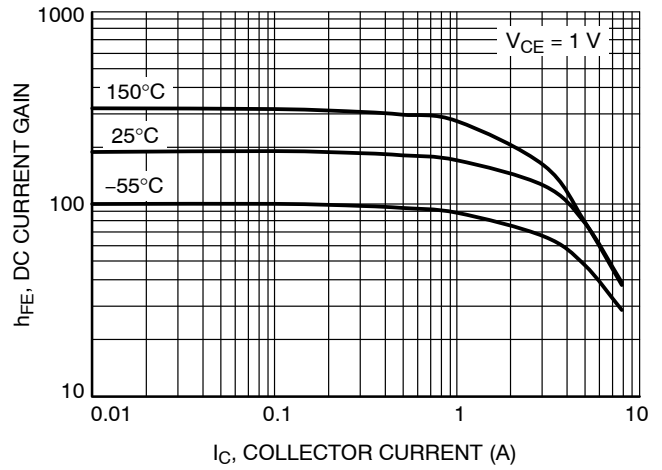


Figure 5. MJD45H11 DC Current Gain

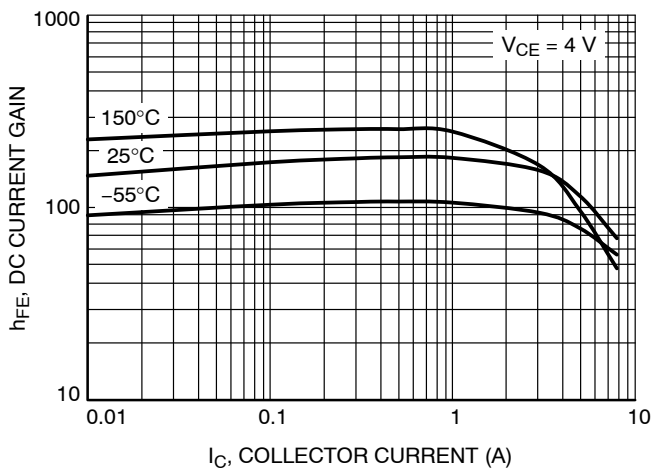


Figure 6. MJD44H11 DC Current Gain

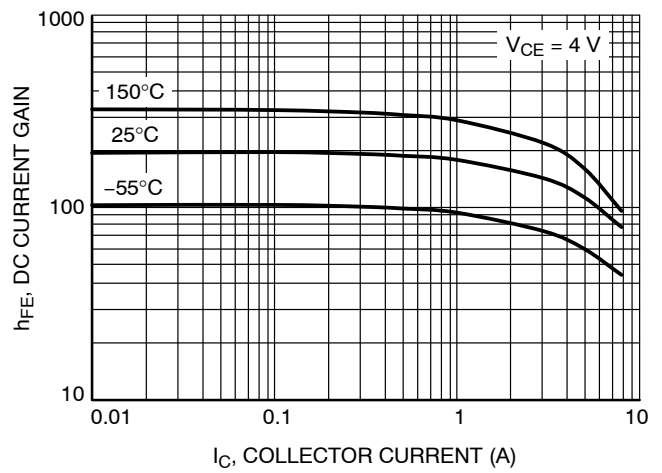


Figure 7. MJD45H11 DC Current Gain

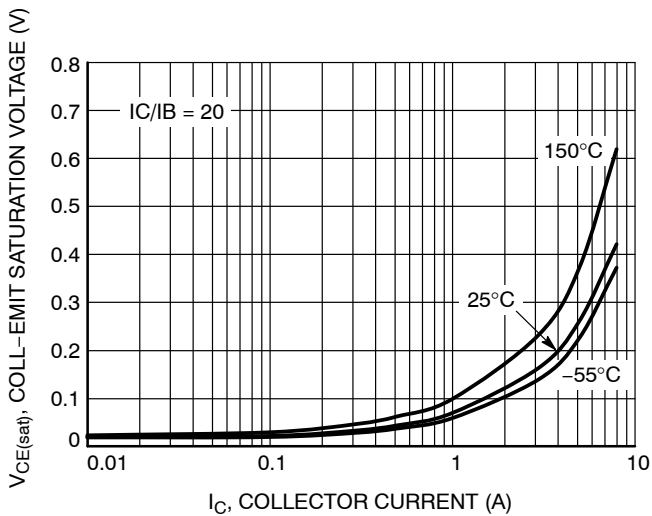


Figure 8. MJD44H11 Saturation Voltage  
 $V_{CE(sat)}$

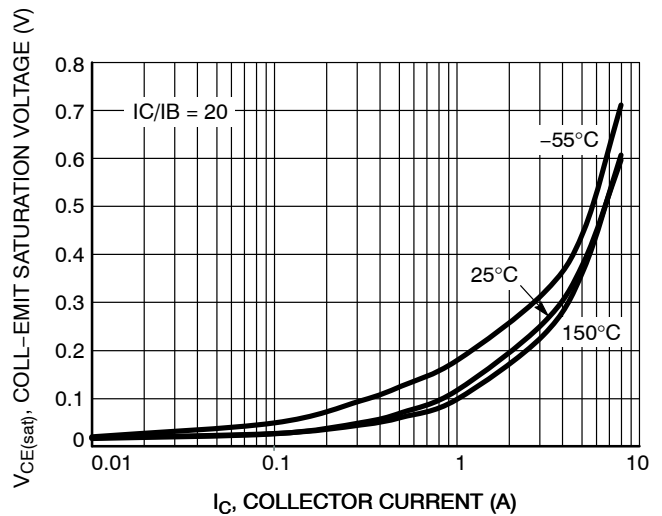
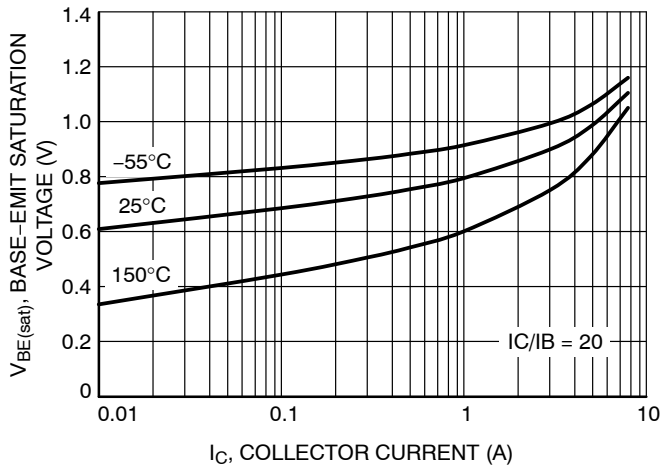
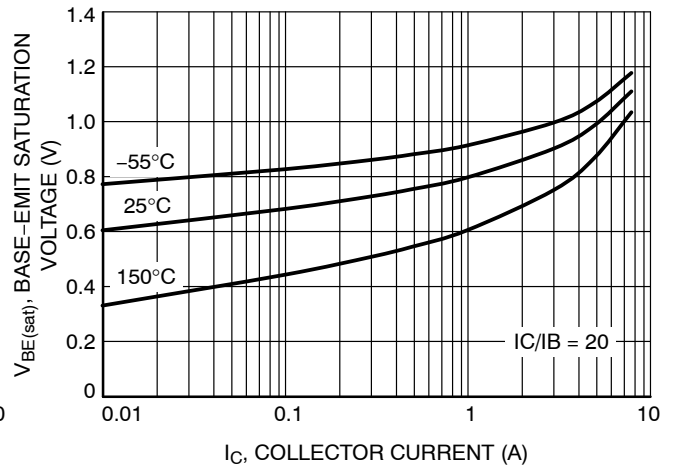


Figure 9. MJD45H11 Saturation Voltage  
 $V_{CE(sat)}$

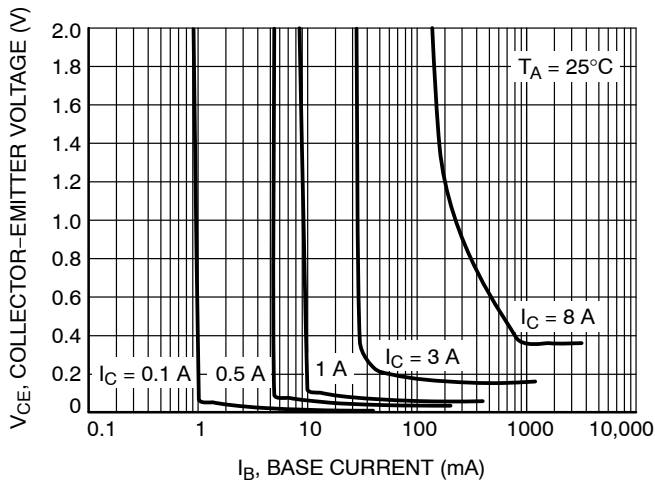
## MJD44H11 (NPN), MJD45H11 (PNP)



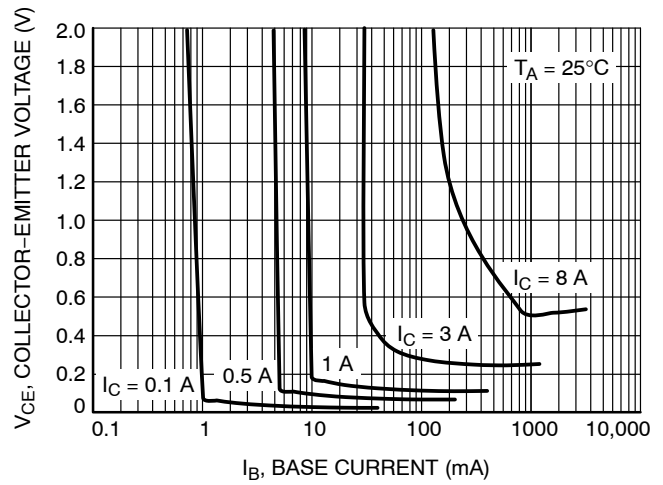
**Figure 10. MJD44H11 Saturation Voltage**  
 $V_{BE(sat)}$



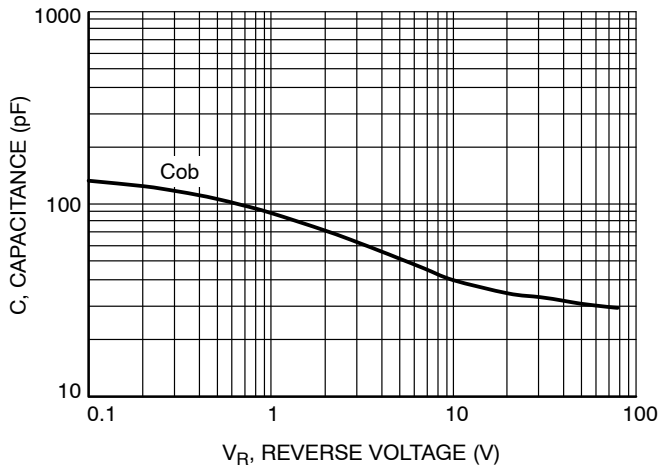
**Figure 11. MJD45H11 Saturation Voltage**  
 $V_{BE(sat)}$



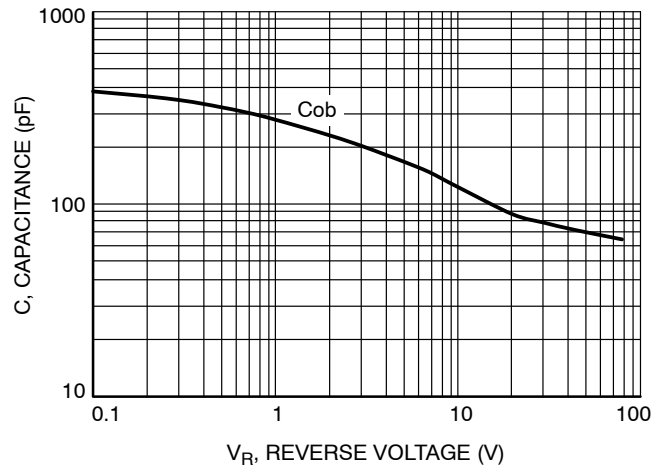
**Figure 12. MJD44H11 Collector Saturation Region**



**Figure 13. MJD45H11 Collector Saturation Region**

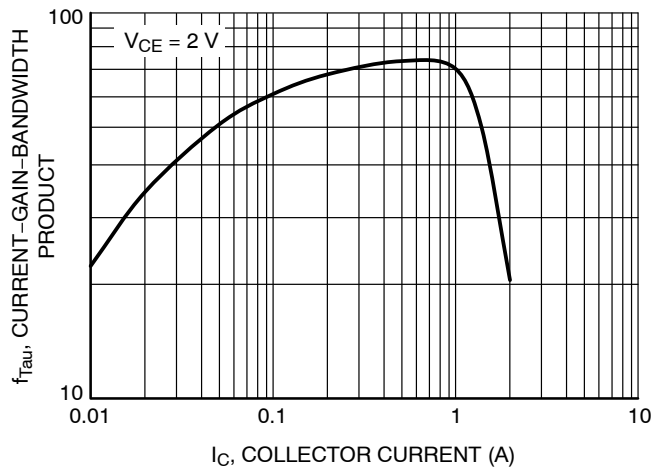


**Figure 14. MJD44H11 Capacitance**

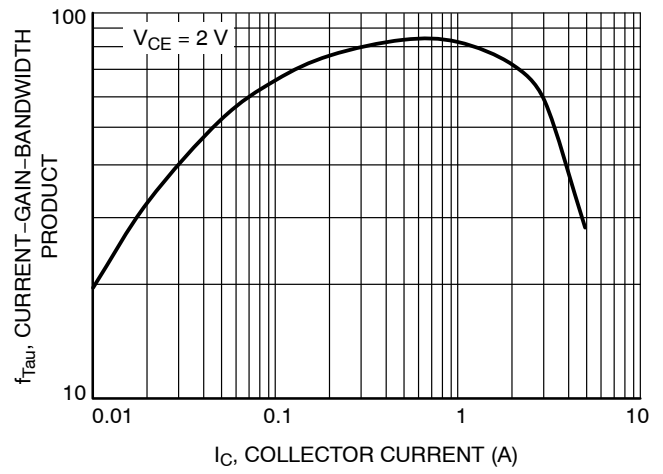


**Figure 15. MJD45H11 Capacitance**

## MJD44H11 (NPN), MJD45H11 (PNP)



**Figure 16. MJD44H11**  
Current-Gain-Bandwidth Product



**Figure 17. MJD45H11**  
Current-Gain-Bandwidth Product

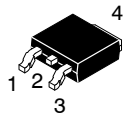
## MJD44H11 (NPN), MJD45H11 (PNP)

### ORDERING INFORMATION

Device	Package Type	Package	Shipping <sup>†</sup>
MJD44H11G	DPAK (Pb-Free)	369C	75 Units / Rail
NJVMJD44H11G	DPAK (Pb-Free)	369C	75 Units / Rail
MJD44H11-1G	DPAK-3 (Pb-Free)	369D	75 Units / Rail
MJD44H11RLG	DPAK (Pb-Free)	369C	1,800 / Tape & Reel
NJVMJD44H11RLG*	DPAK (Pb-Free)	369C	1,800 / Tape & Reel
MJD44H11T4G	DPAK (Pb-Free)	369C	2,500 / Tape & Reel
NJVMJD44H11T4G*	DPAK (Pb-Free)	369C	2,500 / Tape & Reel
MJD44H11T5G	DPAK (Pb-Free)	369C	2,500 / Tape & Reel
MJD45H11G	DPAK (Pb-Free)	369C	75 Units / Rail
NJVMJD45H11G*	DPAK (Pb-Free)	369C	75 Units / Rail
MJD45H11-1G	DPAK-3 (Pb-Free)	369D	75 Units / Rail
MJD45H11RLG	DPAK (Pb-Free)	369C	1,800 / Tape & Reel
NJVMJD45H11RLG*	DPAK (Pb-Free)	369C	1,800 / Tape & Reel
MJD45H11T4G	DPAK (Pb-Free)	369C	2,500 / Tape & Reel
NJVMJD45H11T4G*	DPAK (Pb-Free)	369C	2,500 / Tape & Reel
NJVMJD44H11D3T4G*	DPAK (Pb-Free)	369G	2,500 / Tape & Reel
NJVMJD45H11D3T4G*	DPAK (Pb-Free)	369G	2,500 / Tape & Reel

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

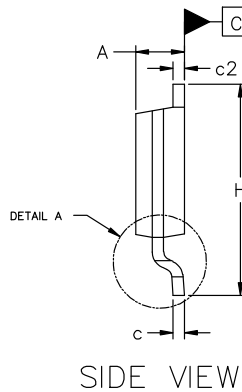
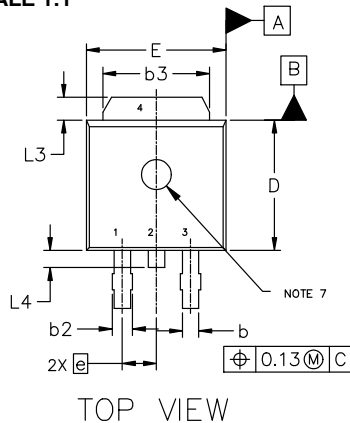
\*NJV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable



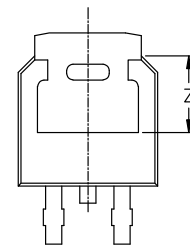
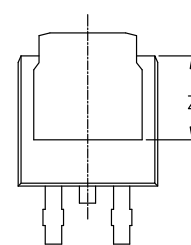
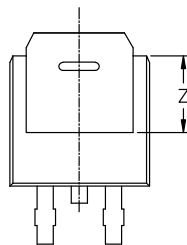
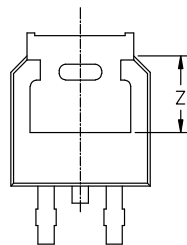
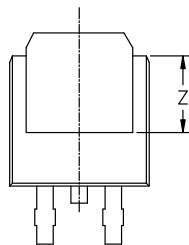
DPAK3 6.10x6.54x2.28, 2.29P  
CASE 369C  
ISSUE J

DATE 12 AUG 2025

SCALE 1:1



MILLIMETERS			
DIM	MIN	NOM	MAX
A	2.18	2.28	2.38
A1	0.00	---	0.13
b	0.63	0.76	0.89
b2	0.72	0.93	1.14
b3	4.57	5.02	5.46
c	0.46	0.54	0.61
c2	0.46	0.54	0.61
D	5.97	6.10	6.22
E	6.35	6.54	6.73
e	2.29 BSC		
H	9.40	9.91	10.41
L	1.40	1.59	1.78
L1	2.90 REF		
L2	0.51 BSC		
L3	0.89	---	1.27
L4	---	---	1.01
Z	3.93	---	---

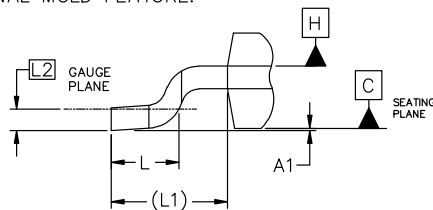


BOTTOM VIEW

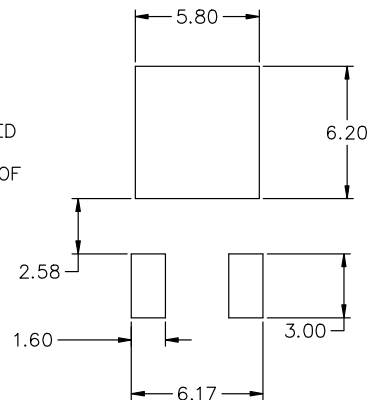
ALTERNATE CONSTRUCTIONS

NOTES:

1. DIMENSIONING AND TOLERANCING ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS b3, L3, AND Z.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.15mm PER SIDE.
5. DIMENSIONS D AND E ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
6. DATUMS A AND B ARE DETERMINED AT DATUM PLANE H.
7. OPTIONAL MOLD FEATURE.



DETAIL A  
ROTATED 90° CW



RECOMMENDED MOUNTING FOOTPRINT\*

\*FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ONSEMI SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

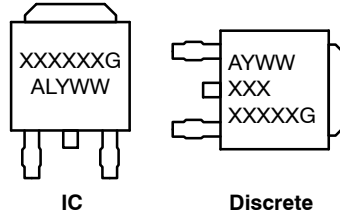
DOCUMENT NUMBER:	98AON10527D	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	DPAK3 6.10x6.54x2.28, 2.29P	PAGE 1 OF 2

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DPAK3 6.10x6.54x2.28, 2.29P  
CASE 369C  
ISSUE J

DATE 12 AUG 2025

GENERIC  
MARKING DIAGRAM\*



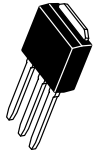
XXXXXX = Device Code  
A = Assembly Location  
L = Wafer Lot  
Y = Year  
WW = Work Week  
G = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

STYLE 1: PIN 1. BASE 2. COLLECTOR 3. EMITTER 4. COLLECTOR	STYLE 2: PIN 1. GATE 2. DRAIN 3. SOURCE 4. DRAIN	STYLE 3: PIN 1. ANODE 2. CATHODE 3. ANODE 4. CATHODE	STYLE 4: PIN 1. CATHODE 2. ANODE 3. GATE 4. ANODE	STYLE 5: PIN 1. GATE 2. ANODE 3. CATHODE 4. ANODE
STYLE 6: PIN 1. MT1 2. MT2 3. GATE 4. MT2	STYLE 7: PIN 1. GATE 2. COLLECTOR 3. EMITTER 4. COLLECTOR	STYLE 8: PIN 1. N/C 2. CATHODE 3. ANODE 4. CATHODE	STYLE 9: PIN 1. ANODE 2. CATHODE 3. RESISTOR ADJUST 4. CATHODE	STYLE 10: PIN 1. CATHODE 2. ANODE 3. CATHODE 4. ANODE

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DESCRIPTION:	DPAK3 6.10x6.54x2.28, 2.29P	PAGE 2 OF 2

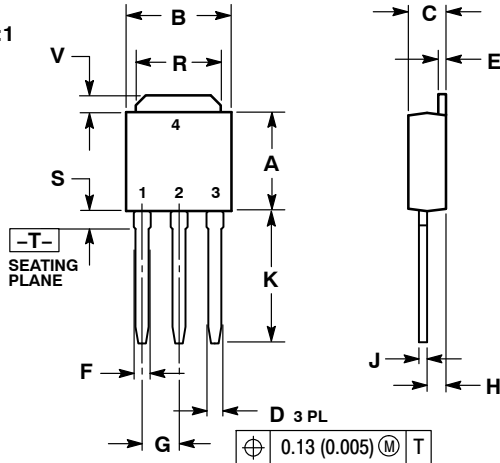
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IPAK  
CASE 369D  
ISSUE C

DATE 15 DEC 2010

SCALE 1:1

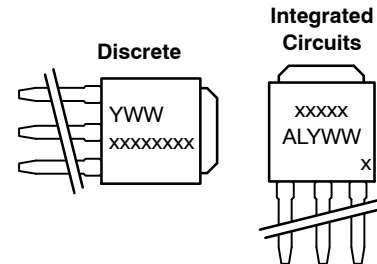


- NOTES:  
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.235	0.245	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	0.018	0.023	0.46	0.58
F	0.037	0.045	0.94	1.14
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	0.180	0.215	4.45	5.45
S	0.025	0.040	0.63	1.01
V	0.035	0.050	0.89	1.27
Z	0.155	---	3.93	---

GENERIC MARKING  
DIAGRAMS

- STYLE 1:  
PIN 1. BASE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR
- STYLE 2:  
PIN 1. GATE  
2. DRAIN  
3. SOURCE  
4. DRAIN
- STYLE 3:  
PIN 1. ANODE  
2. CATHODE  
3. ANODE  
4. CATHODE
- STYLE 4:  
PIN 1. CATHODE  
2. ANODE  
3. GATE  
4. ANODE
- STYLE 5:  
PIN 1. GATE  
2. ANODE  
3. CATHODE  
4. ANODE
- STYLE 6:  
PIN 1. MT1  
2. MT2  
3. GATE  
4. MT2
- STYLE 7:  
PIN 1. GATE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR

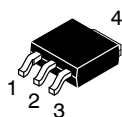


xxxxxxxx = Device Code  
A = Assembly Location  
IL = Wafer Lot  
Y = Year  
WW = Work Week

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.

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DESCRIPTION:	IPAK (DPAK INSERTION MOUNT)	PAGE 1 OF 1

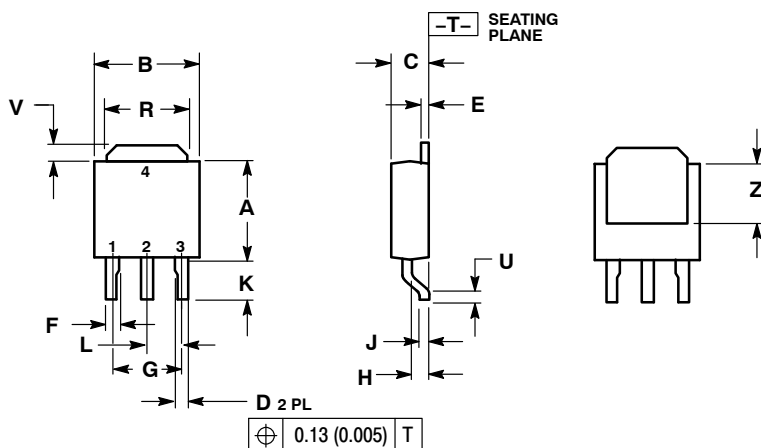
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SCALE 1:1

DPAK-3, SURFACE MOUNT  
CASE 369G  
ISSUE O

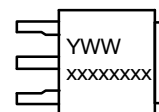
DATE 23 DEC 2003



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

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.235	0.245	5.97	6.22
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	0.018	0.023	0.46	0.58
F	0.037	0.045	0.94	1.14
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	0.180	0.215	4.57	5.45
U	0.020	---	0.51	---
V	0.035	0.050	0.89	1.27
Z	0.155	---	3.93	---

GENERIC  
MARKING DIAGRAM\*



xxxxxxx = Device Code  
Y = Year  
WW = Work Week

- STYLE 1:  
PIN 1. BASE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR
- STYLE 2:  
PIN 1. GATE  
2. DRAIN  
3. SOURCE  
4. DRAIN
- STYLE 3:  
PIN 1. ANODE  
2. CATHODE  
3. ANODE  
4. CATHODE
- STYLE 4:  
PIN 1. CATHODE  
2. ANODE  
3. GATE  
4. ANODE
- STYLE 5:  
PIN 1. GATE  
2. ANODE  
3. CATHODE  
4. ANODE
- STYLE 6:  
PIN 1. MT1  
2. MT2  
3. GATE  
4. MT2
- STYLE 7:  
PIN 1. GATE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR

\*This information is generic. Please refer to device data sheet for actual part marking.

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DESCRIPTION:	DPAK-3, SURFACE MOUNT	PAGE 1 OF 1

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