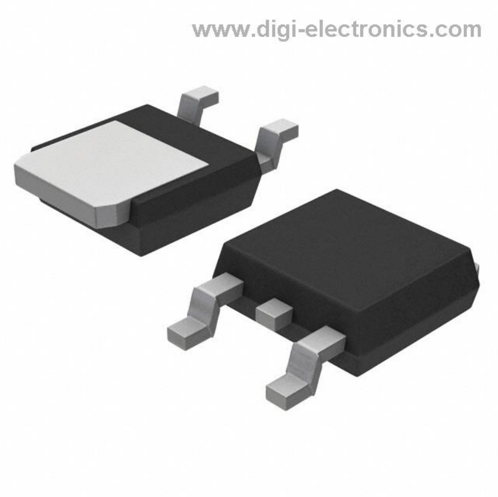
NJVMJD44H11T4G Datasheet



https://www.DiGi-Electronics.com

DiGi Electronics Part Number	NJVMJD44H11T4G-DG
Manufacturer	onsemi
Manufacturer Product Number	NJVMJD44H11T4G
Description	TRANS NPN 80V 8A DPAK
Detailed Description	Bipolar (BJT) Transistor NPN 80 V 8 A 85MHz 1.75 W Surface Mount DPAK

Purchase and inquiry

Manufacturer Product Number:	NJVMJD44H11T4G	Manufacturer:	onsemi
Series:	-	Product Status:	Active
Transistor Type:	NPN	Current - Collector (Ic) (Max):	8 A
Voltage - Collector Emitter Breakdown (Max):	80 V	Vce Saturation (Max) @ Ib, Ic:	1V @ 400mA, 8A
Current - Collector Cutoff (Max):	1µA	DC Current Gain (hFE) (Min) @ Ic, Vce:	60 @ 2A, 1V
Power - Max:	1.75 W	Frequency - Transition:	85MHz
Operating Temperature:	-55°C ~ 150°C (TJ)	Grade:	Automotive
Qualification:	AEC-Q101	Mounting Type:	Surface Mount
Package / Case:	TO-252-3, DPAK (2 Leads + Tab), SC-63	Supplier Device Package:	DPAK
Base Product Number:	NJVMJD44		

Environmental & Export classification

RoHS Status:	ROHS3 Compliant	Moisture Sensitivity Level (MSL):	1 (Unlimited)
REACH Status:	REACH Unaffected	ECCN:	EAR99
HTSUS:	8541.29.0075		

DATA SHEET
www.onsemi.com

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°C, common for NPN and PNP, minus sign, "–", for PNP omitted, unless otherwise noted)

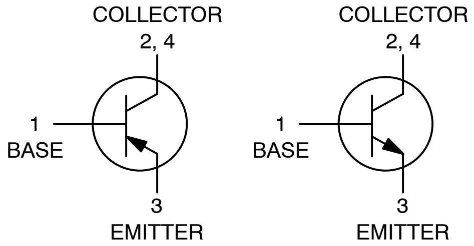
Rating	Symbol	Max	Unit
Collector−Emitter Voltage	V_{CEO}	80	Vdc
Emitter−Base Voltage	V_{EB}	5	Vdc
Collector Current − Continuous	I_C	8	Adc
Collector Current − Peak	I_{CM}	16	Adc
Total Power Dissipation @ T_C = 25°C Derate above 25°C	P_D	20 0.16	W W/°C
Total Power Dissipation (Note 1) @ T_A = 25°C Derate 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

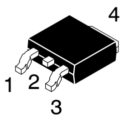
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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

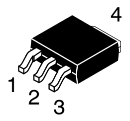
SILICON
POWER TRANSISTORS
8 AMPERES
80 VOLTS, 20 WATTS

COMPLEMENTARY

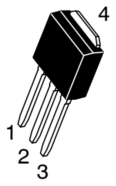




DPAK
CASE 369C
STYLE 1

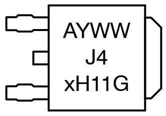


DPAK
CASE 369G
STYLE 1

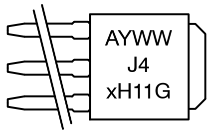


IPAK
CASE 369D
STYLE 1

MARKING DIAGRAMS



DPAK



IPAK

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.

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) MJD44H11 MJD45H11	C_{cb}	 − −	 45 130	 − −	pF
Gain Bandwidth Product (I_C = 0.5 Adc, V_{CE} = 10 Vdc, f = 20 Mhz) MJD44H11 MJD45H11	f_T	 − −	 85 90	 − −	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

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.

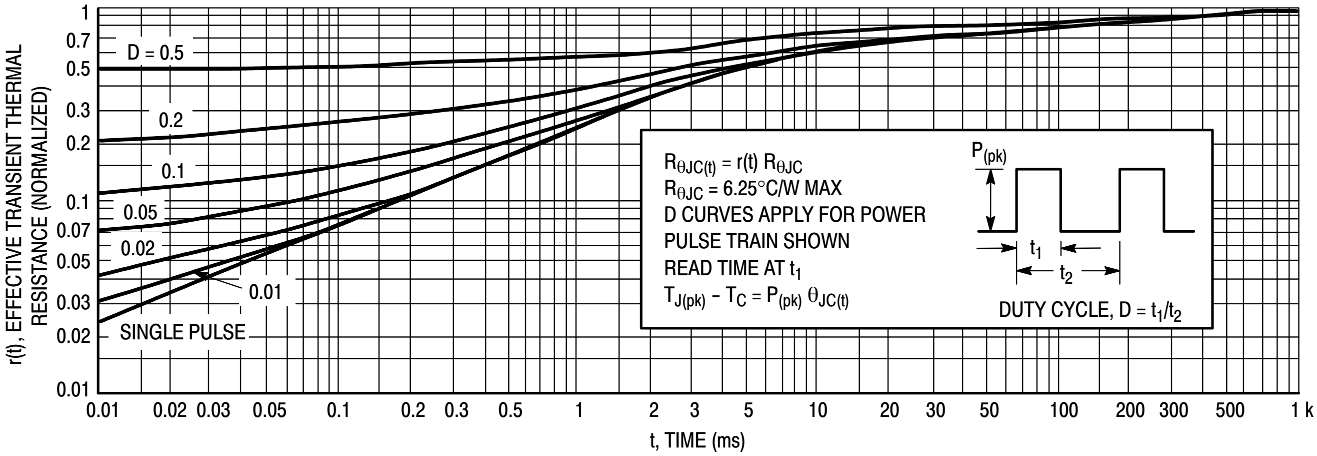


Figure 1. Thermal Response

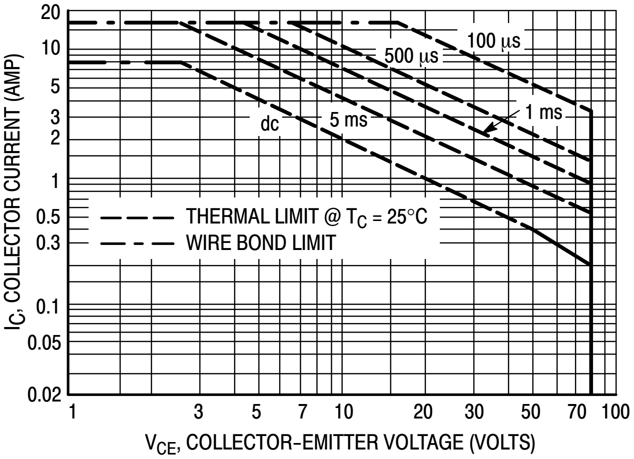


Figure 2. Maximum Forward Bias Safe Operating Area

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 $T_{J(pk)} \le 150°C$. $T_{J(pk)}$ 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.

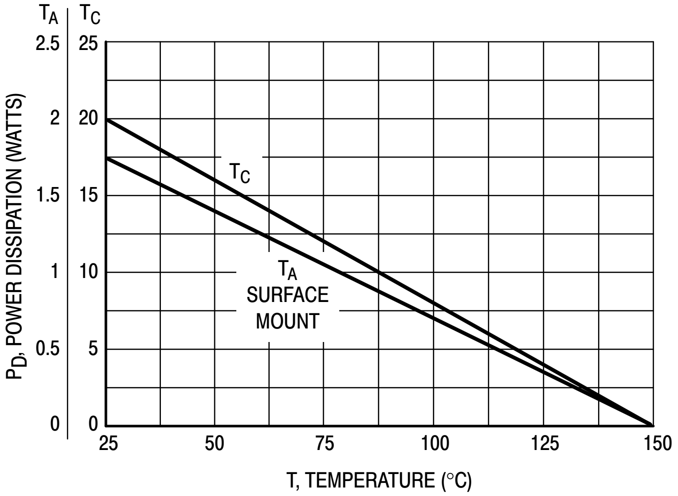


Figure 3. Power Derating

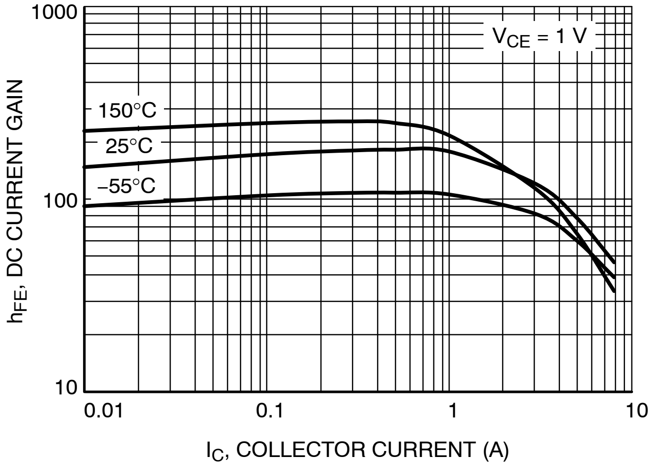


Figure 4. MJD44H11 DC Current Gain

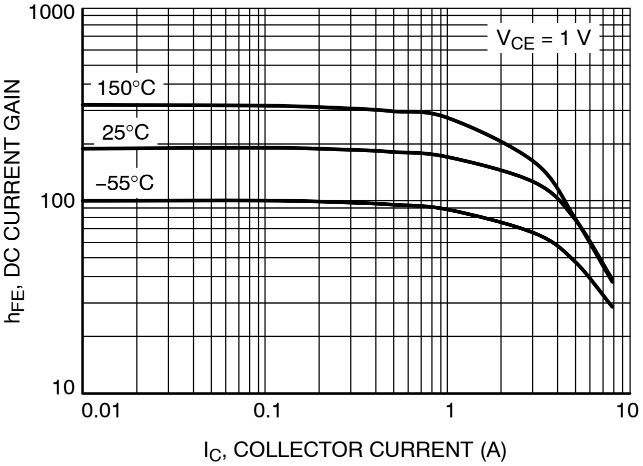


Figure 5. MJD45H11 DC Current Gain

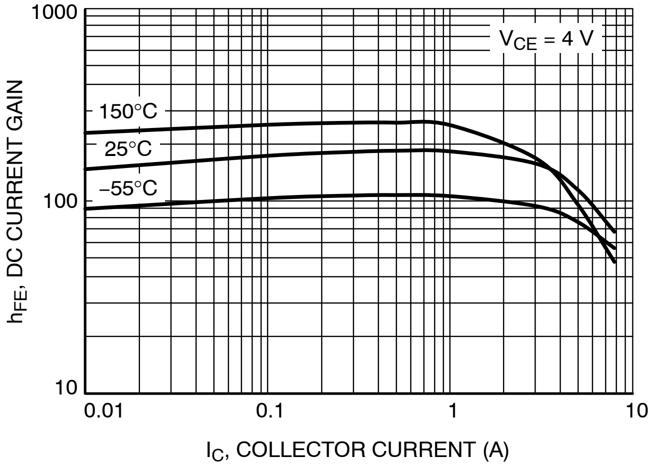


Figure 6. MJD44H11 DC Current Gain

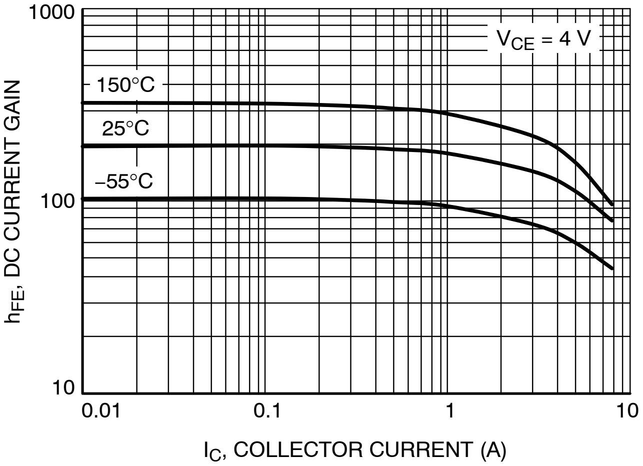


Figure 7. MJD45H11 DC Current Gain

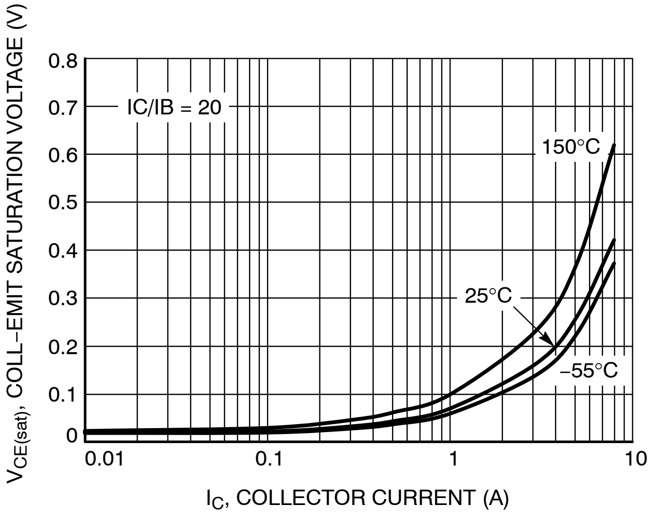


Figure 8. MJD44H11 Saturation Voltage $V_{CE(sat)}$

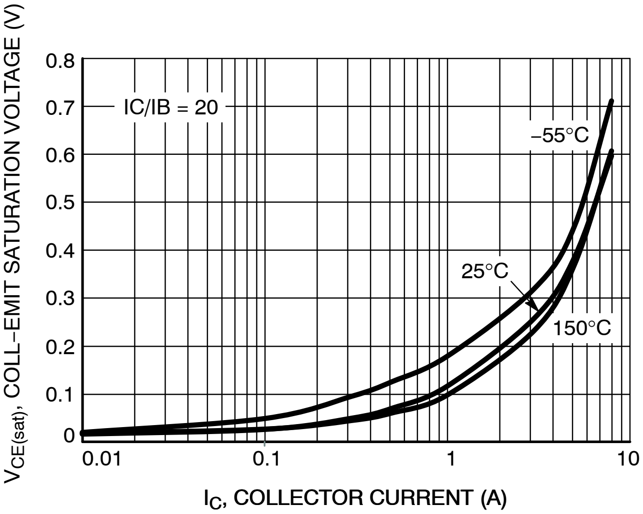


Figure 9. MJD45H11 Saturation Voltage $V_{CE(sat)}$

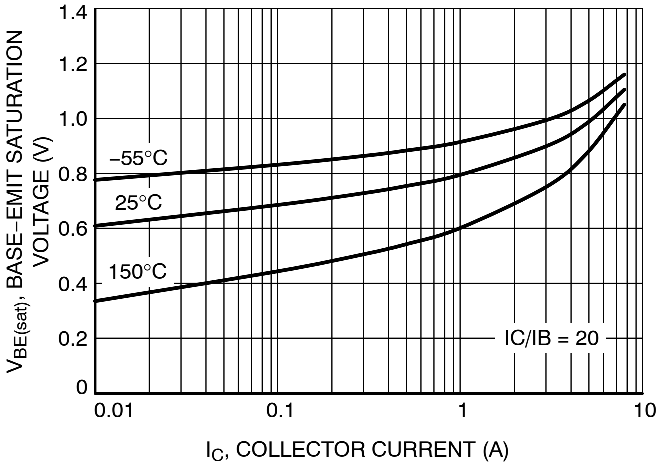


Figure 10. MJD44H11 Saturation Voltage $V_{BE(sat)}$

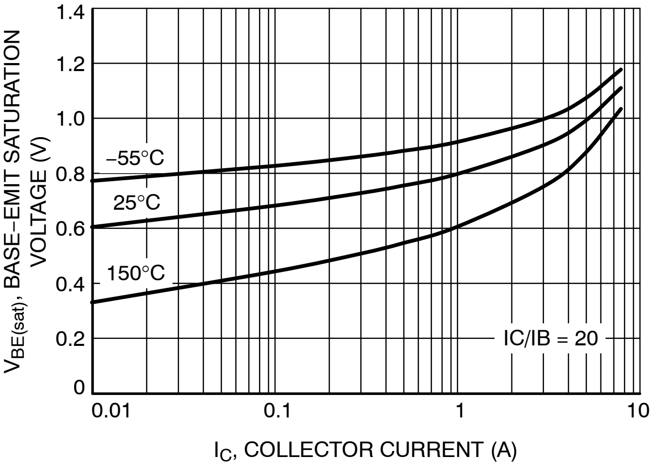


Figure 11. MJD45H11 Saturation Voltage $V_{BE(sat)}$

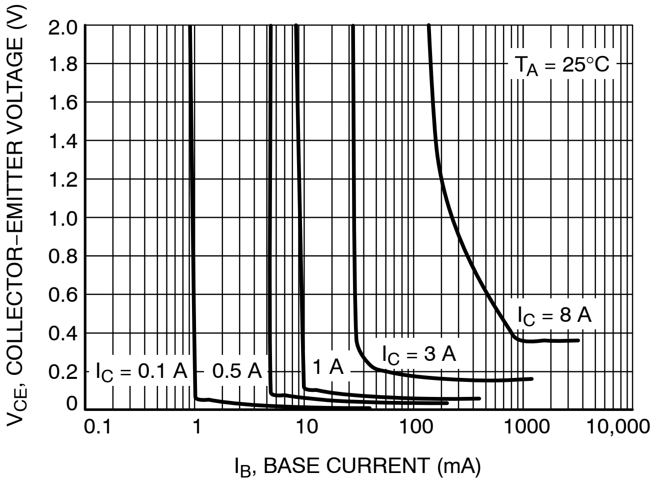


Figure 12. MJD44H11 Collector Saturation Region

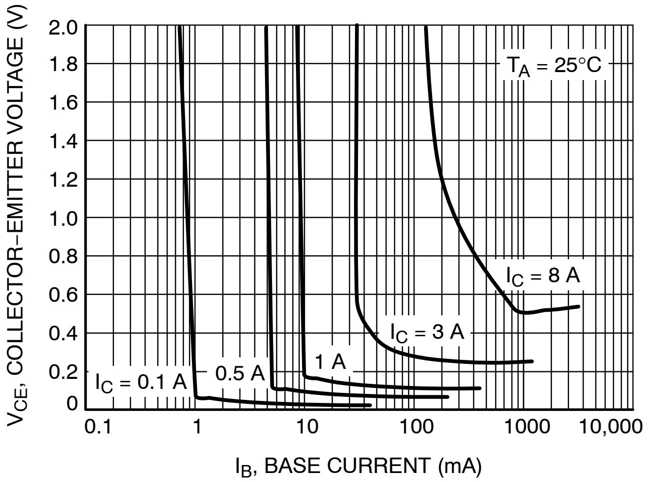


Figure 13. MJD45H11 Collector Saturation Region

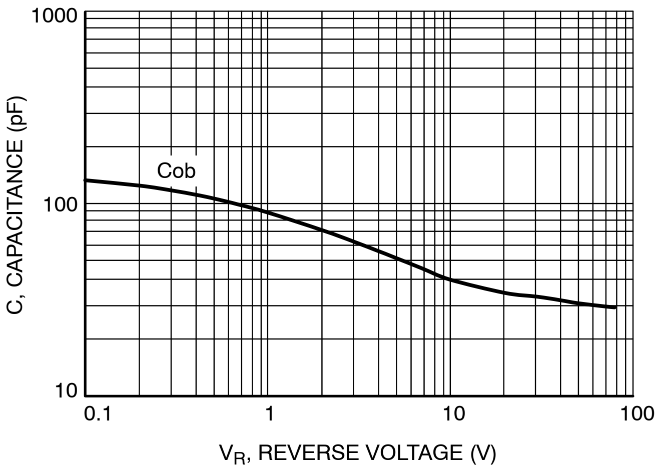


Figure 14. MJD44H11 Capacitance

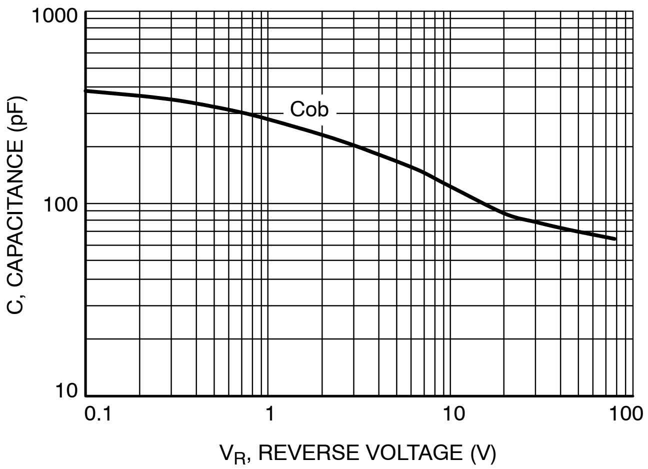


Figure 15. MJD45H11 Capacitance

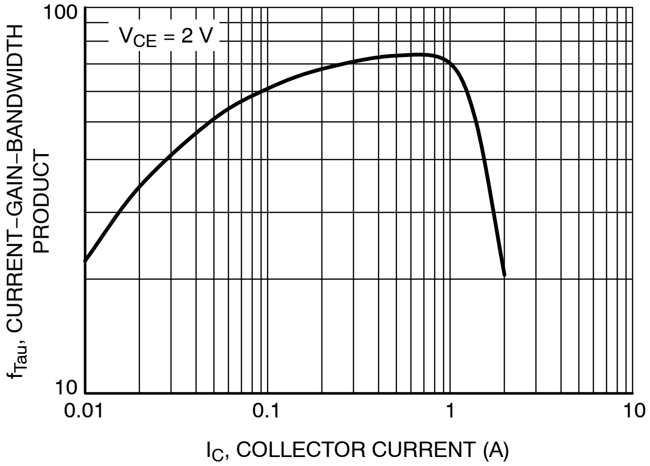


Figure 16. MJD44H11 Current−Gain−Bandwidth Product

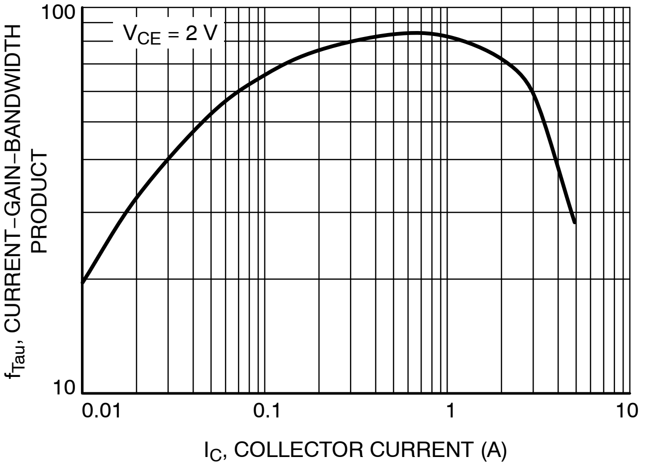


Figure 17. MJD45H11 Current−Gain−Bandwidth Product

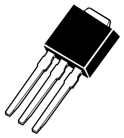
ORDERING INFORMATION

Device	Package Type	Package	Shipping†
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

†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

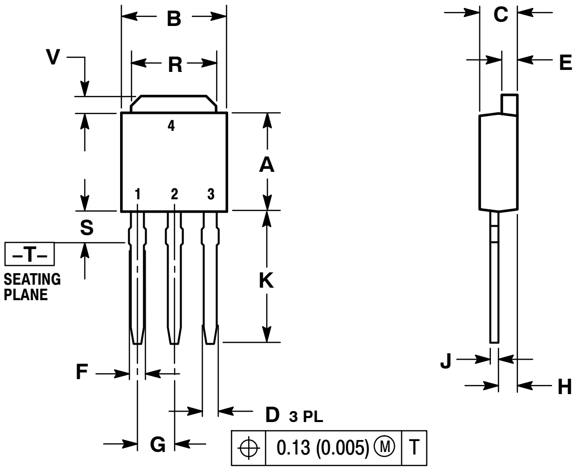
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS



SCALE 1:1

DPAK INSERTION MOUNT
CASE 369
ISSUE O

DATE 02 JAN 2000



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	0.090 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

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

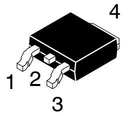
STYLE 4:
PIN 1. CATHODE
2. ANODE
3. GATE
4. ANODE

STYLE 5:
PIN 1. GATE
2. ANODE
3. CATHODE
4. ANODE

STYLE 6:
PIN 1. MT1
2. MT2
3. GATE
4. MT2

DOCUMENT NUMBER:	**98ASB42319B**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	**DPAK INSERTION MOUNT**	**PAGE 1 OF 1**

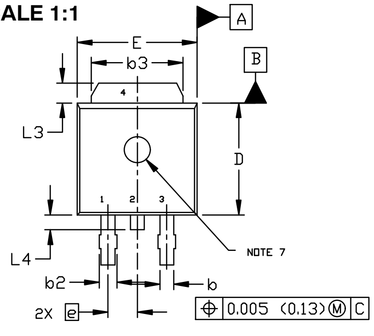
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS



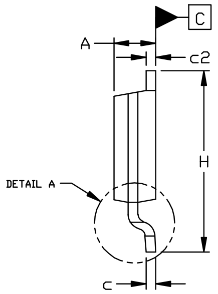
DPAK (SINGLE GAUGE)
CASE 369C
ISSUE G

DATE 31 MAY 2023

SCALE 1:1



TOP VIEW

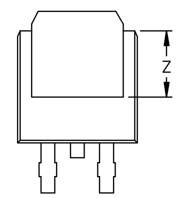


SIDE VIEW

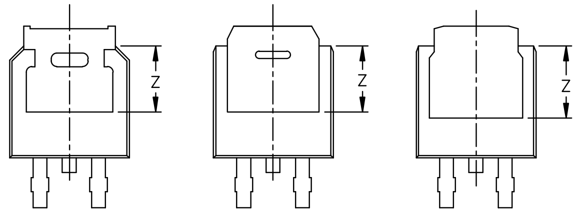
NOTES:

1. DIMENSIONING AND TOLERANCING ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES
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 0.006 INCHES 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.

DIM	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.086	0.094	2.18	2.38
A1	0.000	0.005	0.00	0.13
b	0.025	0.035	0.63	0.89
b2	0.028	0.045	0.72	1.14
b3	0.180	0.215	4.57	5.46
c	0.018	0.024	0.46	0.61
c2	0.018	0.024	0.46	0.61
D	0.235	0.245	5.97	6.22
E	0.250	0.265	6.35	6.73
e	0.090 BSC		2.29 BSC	
H	0.370	0.410	9.40	10.41
L	0.055	0.070	1.40	1.78
L1	0.114 REF		2.90 REF	
L2	0.020 BSC		0.51 BSC	
L3	0.035	0.050	0.89	1.27
L4	----	0.040	---	1.01
Z	0.155	----	3.93	---

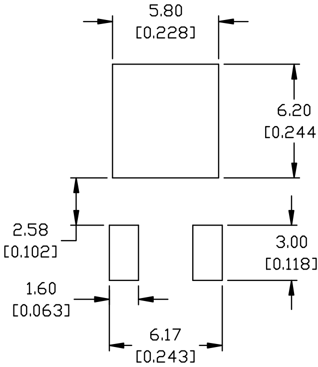


BOTTOM VIEW



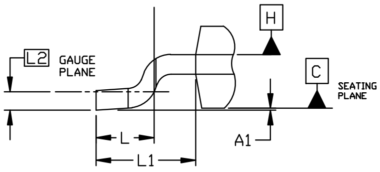
BOTTOM VIEW

ALTERNATE CONSTRUCTIONS



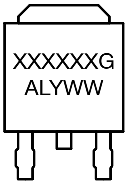
RECOMMENDED MOUNTING FOOTPRINT*

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

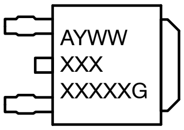


DETAIL A
ROTATED 90° CW

GENERIC MARKING DIAGRAM*



IC



Discrete

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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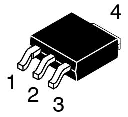
DESCRIPTION:	**DPAK (SINGLE GAUGE)**	**PAGE 1 OF 1**

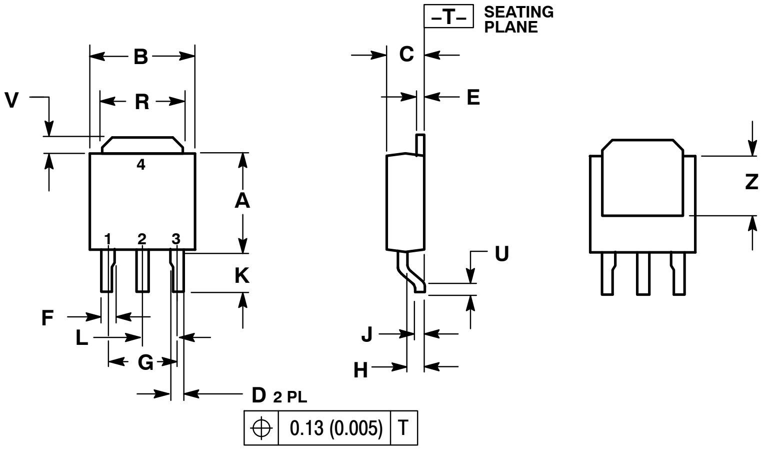
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS



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.

	INCHES		MILLIMETERS	
DIM	**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	---

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

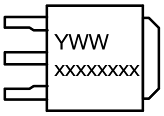
STYLE 4:
PIN 1. CATHODE
2. ANODE
3. GATE
4. ANODE

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

GENERIC MARKING DIAGRAM*



XXXXXXXXX = Device Code
Y = Year
WW = Work Week

*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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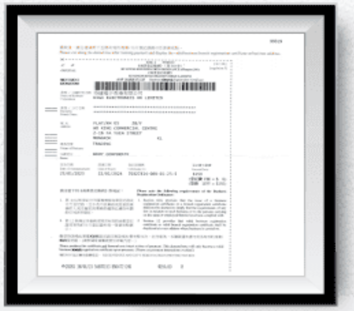

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