

MJD44H11, NJVMJD44H11 (NPN), MJD45H11, NJVMJD45H11 (PNP)



ON Semiconductor®

<http://onsemi.com>

Complementary Power Transistors

DPAK For Surface Mount Applications

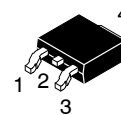
Designed for general purpose power and switching such as output or driver stages in applications such as switching regulators, converters, and power amplifiers.

Features

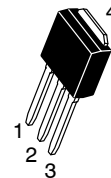
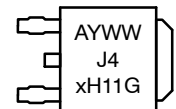
- Lead Formed for Surface Mount Application in Plastic Sleeves (No Suffix)
- Straight Lead Version in Plastic Sleeves (“-1” Suffix)
- Electrically Similar to Popular D44H/D45H Series
- Low Collector Emitter Saturation Voltage –
 $V_{CE(sat)} = 1.0 \text{ Volt Max @ } 8.0 \text{ A}$
- Fast Switching Speeds
- Complementary Pairs Simplifies Designs
- Epoxy Meets UL 94 V-0 @ 0.125 in
- ESD Ratings: Human Body Model, 3B > 8000 V
Machine Model, C > 400 V
- NJV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These are Pb-Free Packages*

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

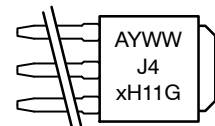
MARKING DIAGRAMS



**DPAK
CASE 369C
STYLE 1**



**IPAK
CASE 369D
STYLE 1**



| | | |
|--------|---|---------------------------|
| 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.

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

MJD44H11, NJVMJD44H11 (NPN), MJD45H11, NJVMJD45H11 (PNP)

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 – Peak | I_C | 8 16 | Adc |
| Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°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°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 | $^\circ\text{C}$ |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

THERMAL CHARACTERISTICS

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

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

MJD44H11, NJVMJD44H11 (NPN), MJD45H11, NJVMJD45H11 (PNP)

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 |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

OFF CHARACTERISTICS

| | | | | | |
|---|---------------|----|--|-----|---------------|
| Collector–Emitter Sustaining Voltage ($I_C = 30\text{ mA}$, $I_B = 0$) | $V_{CE(sus)}$ | 80 | | | Vdc |
| Collector Cutoff Current ($V_{CE} = \text{Rated } V_{CE0}$, $V_{BE} = 0$) | I_{CES} | | | 1.0 | μA |
| Emitter Cutoff Current ($V_{EB} = 5\text{ Vdc}$) | I_{EBO} | | | 1.0 | μA |

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 ($V_{CE} = 1\text{ Vdc}$, $I_C = 2\text{ Adc}$) | h_{FE} | 60 | | | – |
| DC Current Gain ($V_{CE} = 1\text{ Vdc}$, $I_C = 4\text{ Adc}$) | | 40 | | | |

DYNAMIC CHARACTERISTICS

| | | | | | |
|---|---|----------|--|-----------|-----|
| Collector Capacitance ($V_{CB} = 10\text{ Vdc}$, $f_{\text{test}} = 1\text{ MHz}$) | MJD44H11, NJVMJD44H11G,/T4G/RLG MJD45H11, NJVMJD45H11T4G/RLG | C_{cb} | | 45 130 | pF |
| Gain Bandwidth Product ($I_C = 0.5\text{ Adc}$, $V_{CE} = 10\text{ Vdc}$, $f = 20\text{ MHz}$) | MJD44H11, NJVMJD44H11G,/T4G/RLG MJD45H11, NJVMJD45H11T4G/RLG | f_T | | 85 90 | MHz |

SWITCHING TIMES

| | | | | | |
|---|---|-------------|--|------------|----|
| Delay and Rise Times ($I_C = 5\text{ Adc}$, $I_{B1} = 0.5\text{ Adc}$) | MJD44H11, NJVMJD44H11G,/T4G/RLG MJD45H11, NJVMJD45H11T4G/RLG | $t_d + t_r$ | | 300 135 | ns |
| Storage Time ($I_C = 5\text{ Adc}$, $I_{B1} = I_{B2} = 0.5\text{ Adc}$) | MJD44H11, NJVMJD44H11G,/T4G/RLG MJD45H11, NJVMJD45H11T4G/RLG | t_s | | 500 500 | ns |
| Fall Time ($I_C = 5\text{ Adc}$, $I_{B1} = I_{B2} = 0.5\text{ Adc}$) | MJD44H11, NJVMJD44H11G,/T4G/RLG MJD45H11, NJVMJD45H11T4G/RLG | t_f | | 140 100 | ns |

MJD44H11, NJVMJD44H11 (NPN), MJD45H11, NJVMJD45H11 (PNP)

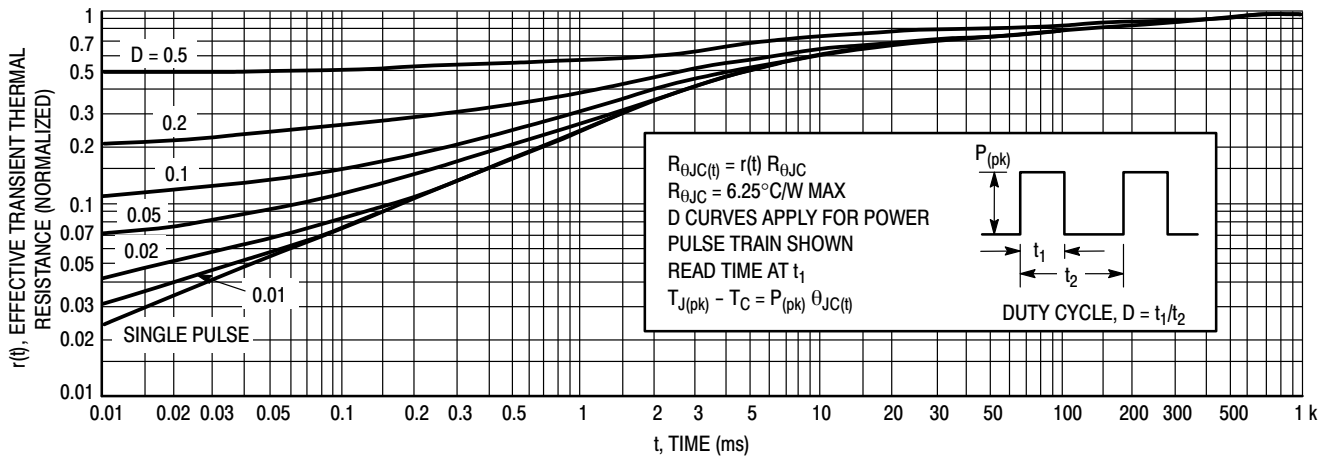


Figure 1. Thermal Response

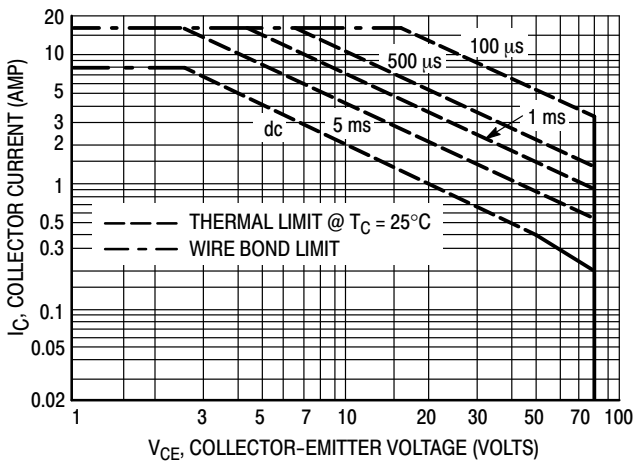


Figure 2. Maximum Forward Bias Safe Operating Area

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.

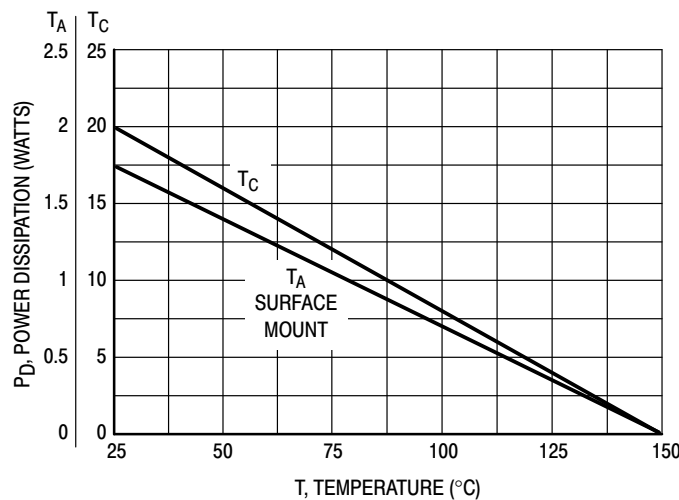


Figure 3. Power Derating

MJD44H11, NJVMJD44H11 (NPN), MJD45H11, NJVMJD45H11 (PNP)

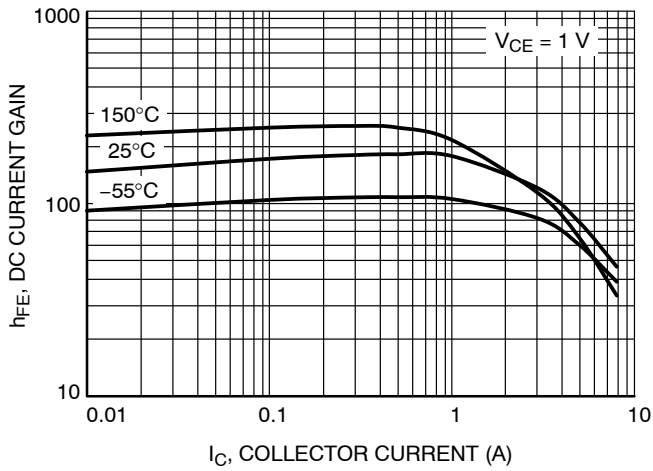


Figure 4. MJD44H11 DC Current Gain

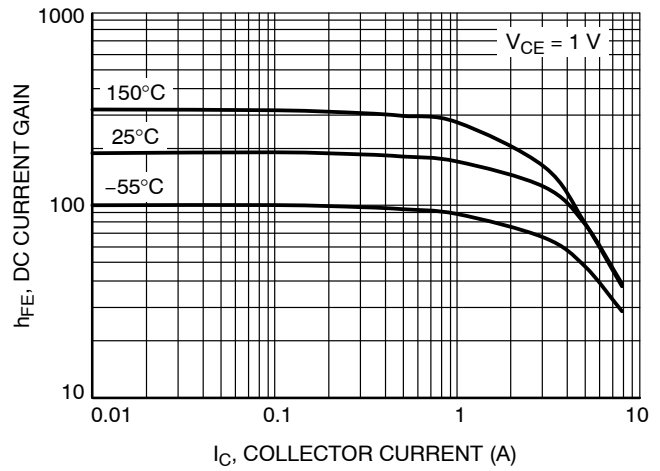


Figure 5. MJD45H11 DC Current Gain

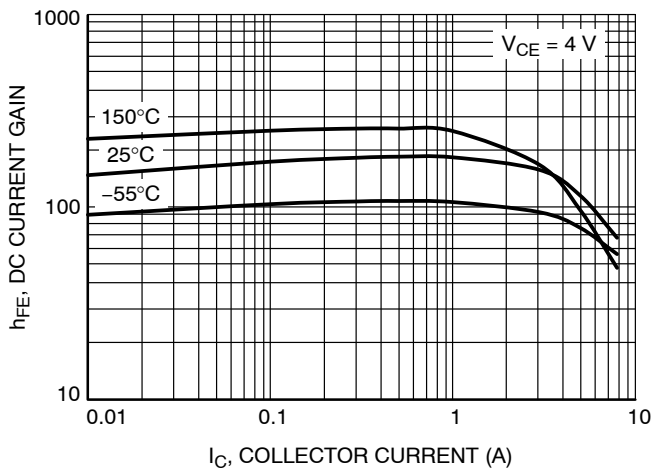


Figure 6. MJD44H11 DC Current Gain

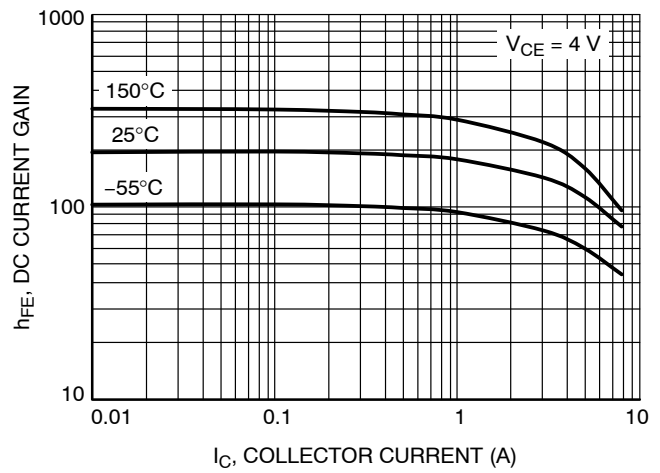


Figure 7. MJD45H11 DC Current Gain

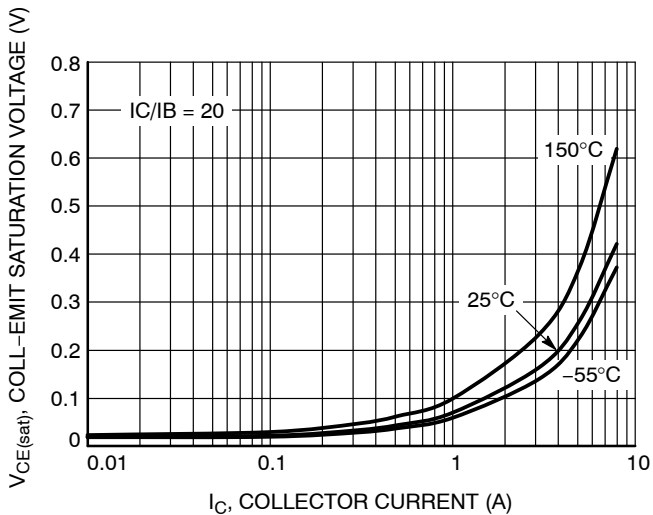


Figure 8. MJD44H11 Saturation Voltage
 $V_{CE(sat)}$

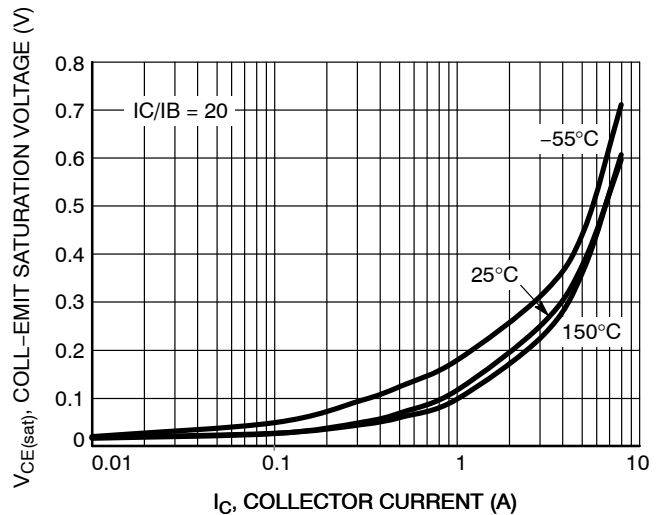


Figure 9. MJD45H11 Saturation Voltage
 $V_{CE(sat)}$

MJD44H11, NJVMJD44H11 (NPN), MJD45H11, NJVMJD45H11 (PNP)

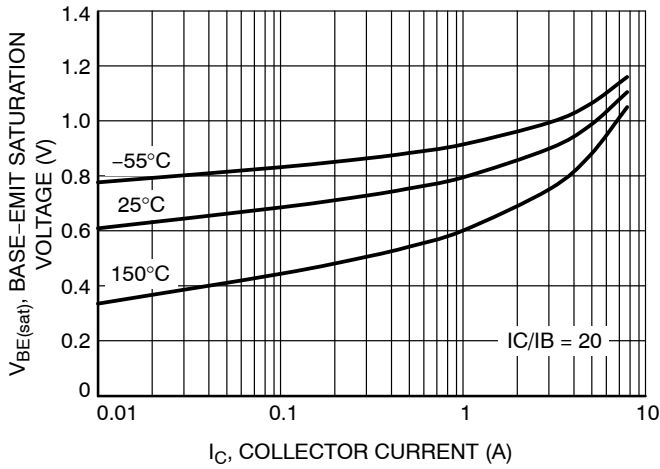


Figure 10. MJD44H11 Saturation Voltage
 $V_{BE(sat)}$

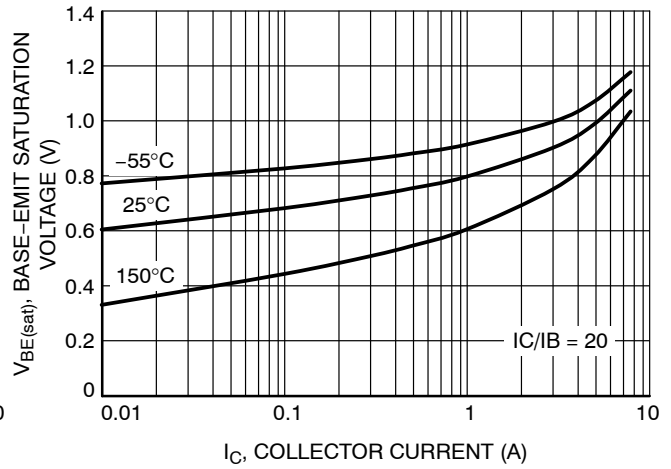


Figure 11. MJD45H11 Saturation Voltage
 $V_{BE(sat)}$

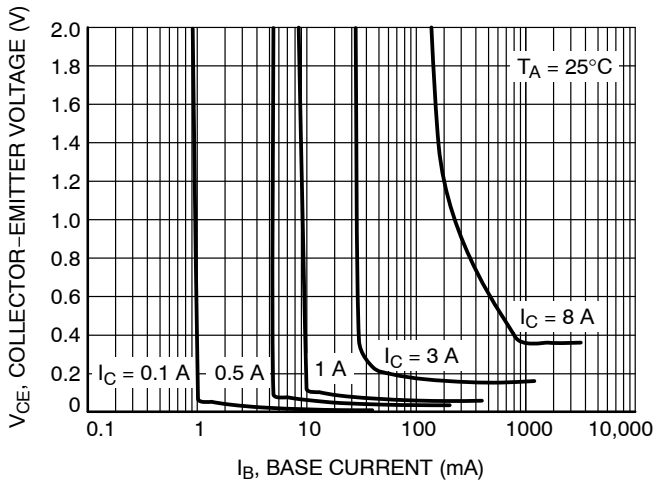


Figure 12. MJD44H11 Collector Saturation Region

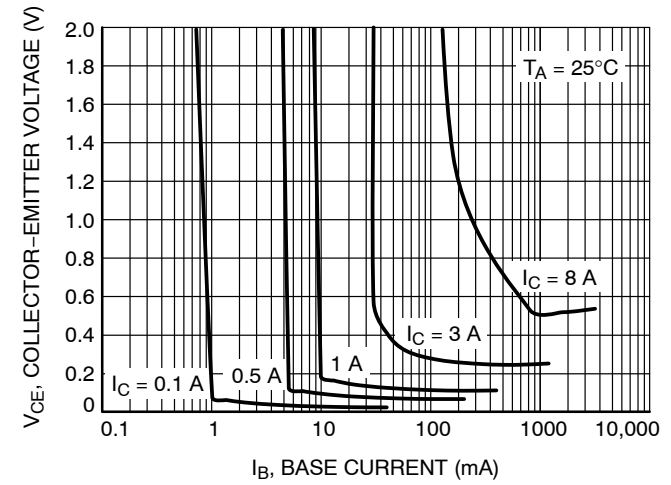


Figure 13. MJD45H11 Collector Saturation Region

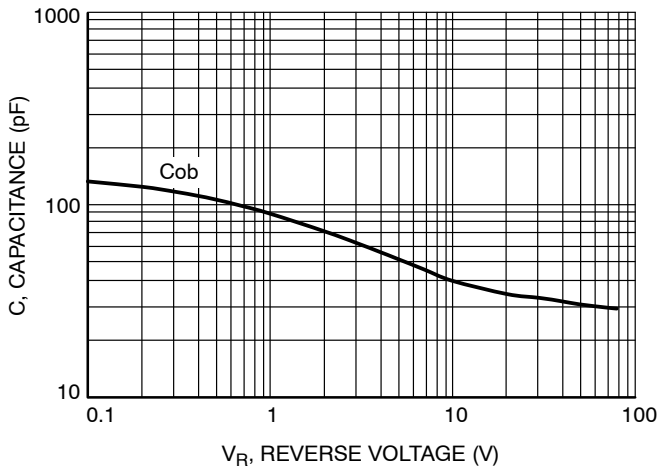


Figure 14. MJD44H11 Capacitance

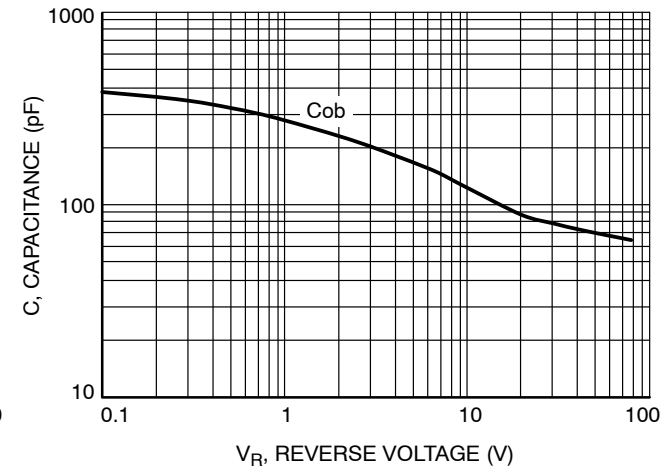
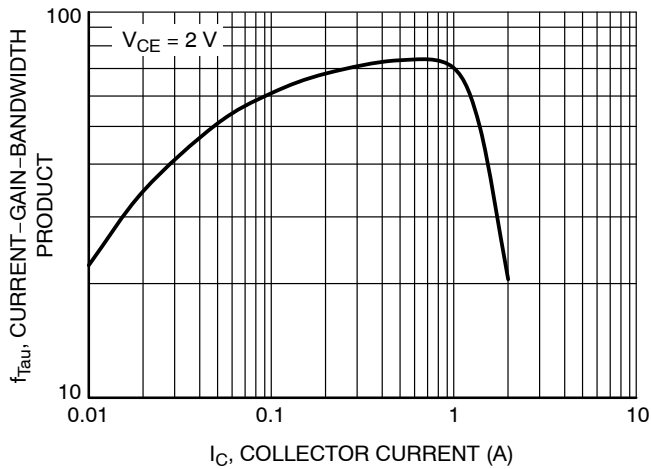
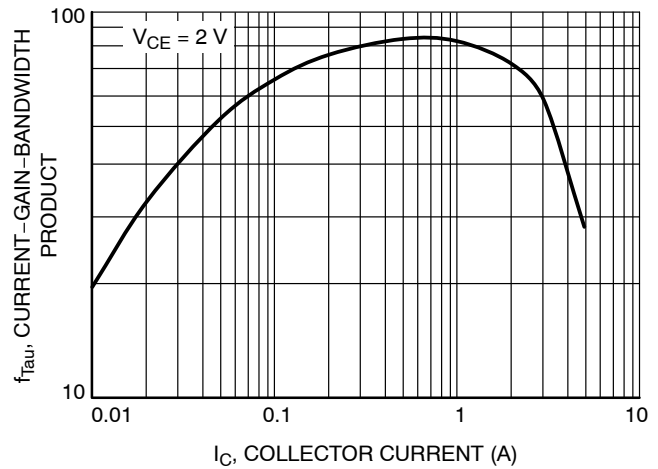


Figure 15. MJD45H11 Capacitance

MJD44H11, NJVMJD44H11 (NPN), MJD45H11, NJVMJD45H11 (PNP)



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



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

ORDERING INFORMATION

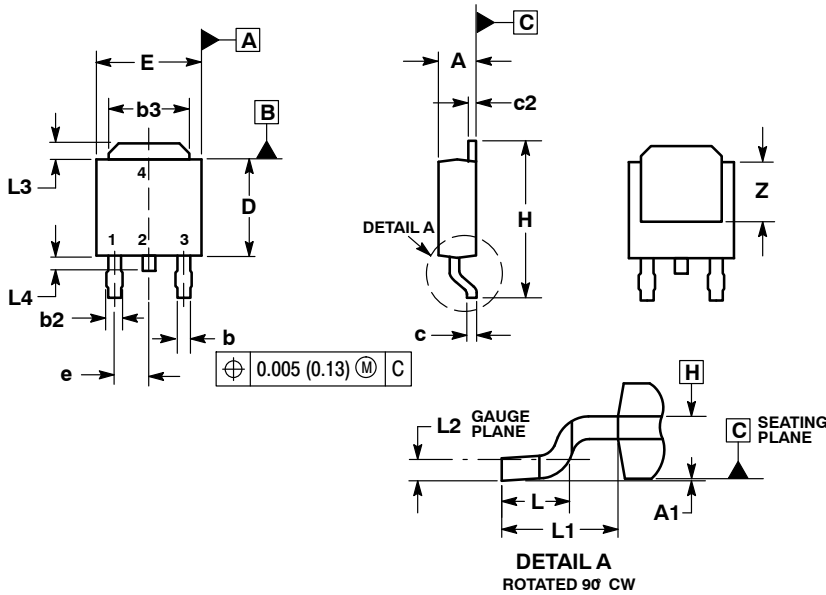
| Device | Package Type | Package | Shipping [†] |
|----------------|---------------------|---------|-----------------------|
| MJD44H11G | DPAK (Pb-Free) | 369C | 75 Units / Rail |
| NJVMJD44H11G | DPAK (Pb-Free) | | |
| MJD44H11-1G | DPAK-3 (Pb-Free) | 369D | |
| MJD44H11RLG | DPAK (Pb-Free) | 369C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

[†]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.

MJD44H11, NJVMJD44H11 (NPN), MJD45H11, NJVMJD45H11 (PNP)

PACKAGE DIMENSIONS

DPAK CASE 369C ISSUE D

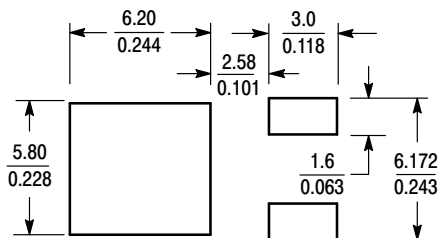


NOTES:

1. DIMENSIONING AND TOLERANCING PER 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.

| 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 | 0.030 | 0.045 | 0.76 | 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 | 0.108 REF | | 2.74 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 | --- |

SOLDERING FOOTPRINT*



SCALE 3:1 ($\frac{\text{mm}}{\text{inches}}$)

STYLE 1:

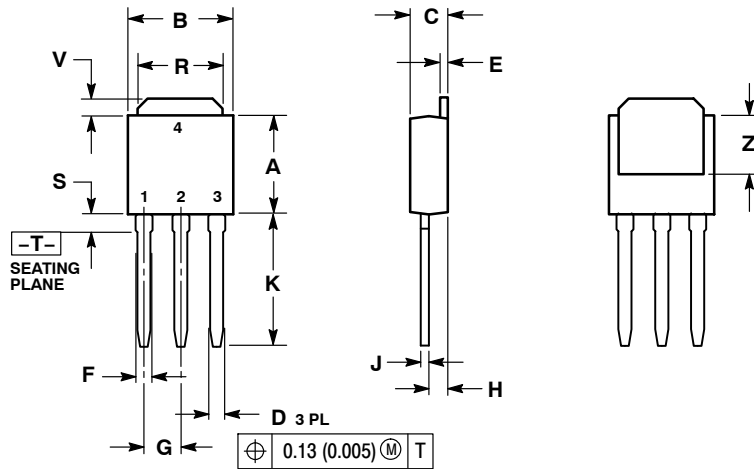
- PIN 1: BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

MJD44H11, NJVMJD44H11 (NPN), MJD45H11, NJVMJD45H11 (PNP)

PACKAGE DIMENSIONS

IPAK CASE 369D ISSUE C



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 | --- |

STYLE 1:

- PIN 1. BASE
- COLLECTOR
- EMITTER
- COLLECTOR

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Осуществляем поставки продукции под контролем ВП МО РФ на предприятия военно-промышленного комплекса России , а также работаем в рамках 275 ФЗ с открытием отдельных счетов в уполномоченном банке. Система менеджмента качества компании соответствует требованиям ГОСТ ISO 9001.

Минимальные сроки поставки, гибкие цены, неограниченный ассортимент и индивидуальный подход к клиентам являются основой для выстраивания долгосрочного и эффективного сотрудничества с предприятиями радиоэлектронной промышленности, предприятиями ВПК и научно-исследовательскими институтами России.

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Наши контакты:

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Электронная почта: sales@st-electron.ru

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Промышленная ул, дом № 19, литера Н,
помещение 100-Н Офис 331