

# Complementary Silicon Plastic Power Transistors

## DPAK-3 for Surface Mount Applications

### MJD243 (NPN), MJD253 (PNP)

Designed for low voltage, low-power, high-gain audio amplifier applications.

#### Features

- High DC Current Gain
- Lead Formed for Surface Mount Applications in Plastic Sleeves (No Suffix)
- Straight Lead Version in Plastic Sleeves ("–1" Suffix)
- Low Collector-Emitter Saturation Voltage
- High Current-Gain – Bandwidth Product
- Annular Construction for Low Leakage
- 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

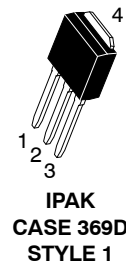
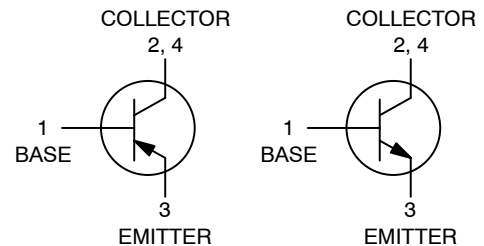
| Rating                                                                                             | Symbol         | Value        | Unit                     |
|----------------------------------------------------------------------------------------------------|----------------|--------------|--------------------------|
| Collector-Base Voltage                                                                             | $V_{CB}$       | 100          | Vdc                      |
| Collector-Emitter Voltage                                                                          | $V_{CEO}$      | 100          | Vdc                      |
| Emitter-Base Voltage                                                                               | $V_{EB}$       | 7.0          | Vdc                      |
| Collector Current – Continuous                                                                     | $I_C$          | 4.0          | Adc                      |
| Collector Current – Peak                                                                           | $I_{CM}$       | 8.0          | Adc                      |
| Base Current                                                                                       | $I_B$          | 1.0          | Adc                      |
| Total Device Dissipation<br>@ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$          | $P_D$          | 12.5<br>0.1  | W<br>W/ $^\circ\text{C}$ |
| Total Device Dissipation<br>@ $T_A = 25^\circ\text{C}$ (Note 1)<br>Derate above $25^\circ\text{C}$ | $P_D$          | 1.4<br>0.011 | W<br>W/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range                                                | $T_J, T_{stg}$ | –65 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.

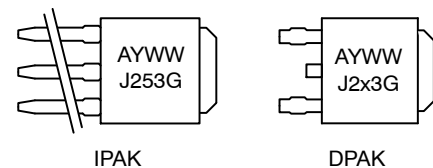
1. FR-4 75 mm<sup>2</sup>, 2oz. Cu

## 4.0 A, 100 V, 12.5 W POWER TRANSISTOR

#### COMPLEMENTARY



#### MARKING DIAGRAM



A = Assembly Location  
Y = Year  
WW = Work Week  
x = 4 or 5  
G = Pb-Free Package

#### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 6 of this data sheet.

NOTE: Some of the device on this data sheet have been **DISCONTINUED**. Please refer to the table on page 6.

## MJD243 (NPN), MJD253 (PNP)

### THERMAL CHARACTERISTICS

| Characteristic                                  | Symbol          | Value | Unit                        |
|-------------------------------------------------|-----------------|-------|-----------------------------|
| Thermal Resistance<br>Junction-to-Case (Note 2) | $R_{\theta JC}$ | 10    | $^{\circ}\text{C}/\text{W}$ |
| Junction-to-Ambient (Note 3)                    | $R_{\theta JA}$ | 89.3  |                             |

2. FR-4 Minimum Pad, 1oz. Cu

3. FR-4 75 mm<sup>2</sup>, 2oz. Cu

### ELECTRICAL CHARACTERISTICS ( $T_C = 25^{\circ}\text{C}$ unless otherwise noted)

| Characteristic | Symbol | Min | Max | Unit |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

#### OFF CHARACTERISTICS

|                                                                                                                                                               |               |          |            |                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------|------------|-------------------------|
| Collector-Emitter Sustaining Voltage (Note 4)<br>( $I_C = 10\text{ mAdc}$ , $I_B = 0$ )                                                                       | $V_{CE(sus)}$ | 100      | –          | Vdc                     |
| Collector Cutoff Current<br>( $V_{CB} = 100\text{ Vdc}$ , $I_E = 0$ )<br>( $V_{CB} = 100\text{ Vdc}$ , $I_E = 0$ , $T_J = 125^{\circ}\text{C}$ )              | $I_{CBO}$     | –<br>–   | 100<br>100 | nAdc<br>$\mu\text{Adc}$ |
| Emitter Cutoff Current<br>( $V_{BE} = 7.0\text{ Vdc}$ , $I_C = 0$ )                                                                                           | $I_{EBO}$     | –        | 100        | nAdc                    |
| DC Current Gain (Note 4)<br>( $I_C = 200\text{ mAdc}$ , $V_{CE} = 1.0\text{ Vdc}$ )<br>( $I_C = 1.0\text{ Adc}$ , $V_{CE} = 1.0\text{ Vdc}$ )                 | $h_{FE}$      | 40<br>15 | 180<br>–   | –                       |
| Collector-Emitter Saturation Voltage (Note 4)<br>( $I_C = 500\text{ mAdc}$ , $I_B = 50\text{ mAdc}$ )<br>( $I_C = 1.0\text{ Adc}$ , $I_B = 100\text{ mAdc}$ ) | $V_{CE(sat)}$ | –<br>–   | 0.3<br>0.6 | Vdc                     |
| Base-Emitter Saturation Voltage (Note 4)<br>( $I_C = 2.0\text{ Adc}$ , $I_B = 200\text{ mAdc}$ )                                                              | $V_{BE(sat)}$ | –        | 1.8        | Vdc                     |
| Base-Emitter On Voltage (Note 4)<br>( $I_C = 500\text{ mAdc}$ , $V_{CE} = 1.0\text{ Vdc}$ )                                                                   | $V_{BE(on)}$  | –        | 1.5        | Vdc                     |

#### DYNAMIC CHARACTERISTICS

|                                                                                                                                  |          |    |    |     |
|----------------------------------------------------------------------------------------------------------------------------------|----------|----|----|-----|
| Current-Gain – Bandwidth Product (Note 5)<br>( $I_C = 100\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ , $f_{test} = 10\text{ MHz}$ ) | $f_T$    | 40 | –  | MHz |
| Output Capacitance<br>( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 0.1\text{ MHz}$ )                                            | $C_{ob}$ | –  | 50 | pF  |

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.

4. Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\approx 2\%$ .

5.  $f_T = |h_{FE}| \cdot f_{test}$ .



## MJD243 (NPN), MJD253 (PNP)

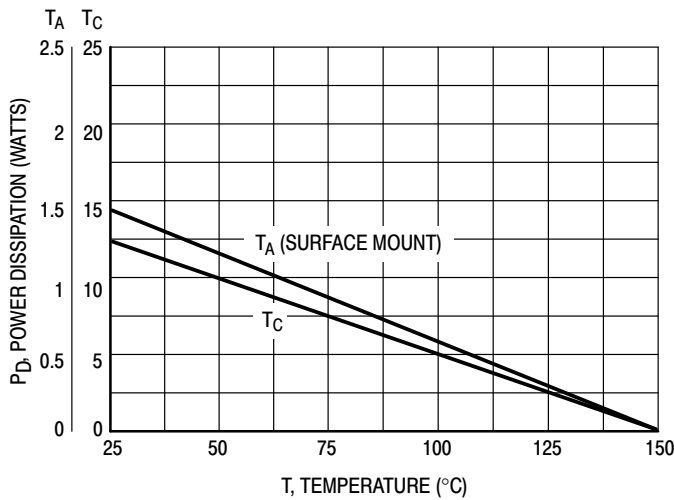


Figure 1. Power Derating

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.

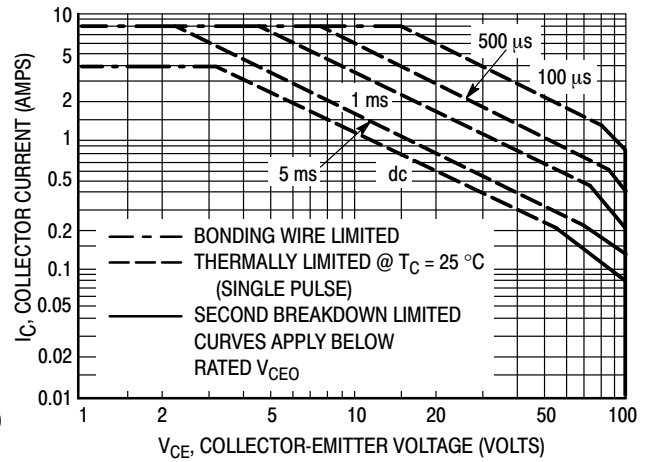


Figure 2. Active Region Maximum Safe Operating Area

The data of Figure 2 is based on  $T_{J(pk)} = 150\text{ °C}$ ;  $T_C$  is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided  $T_{J(pk)} \leq 150\text{ °C}$ .  $T_{J(pk)}$  may be calculated from the data in Figure 3. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

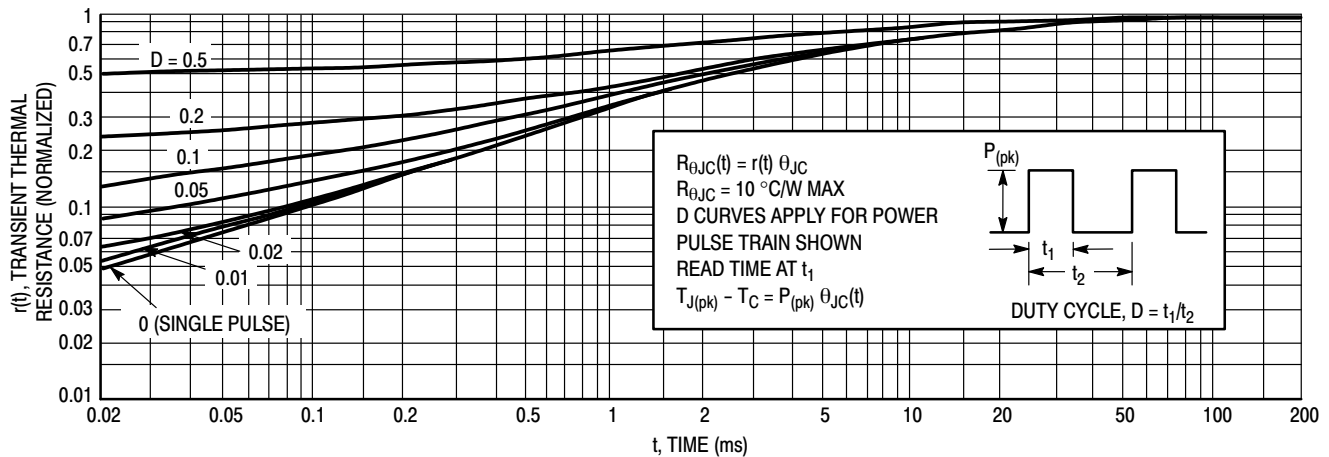
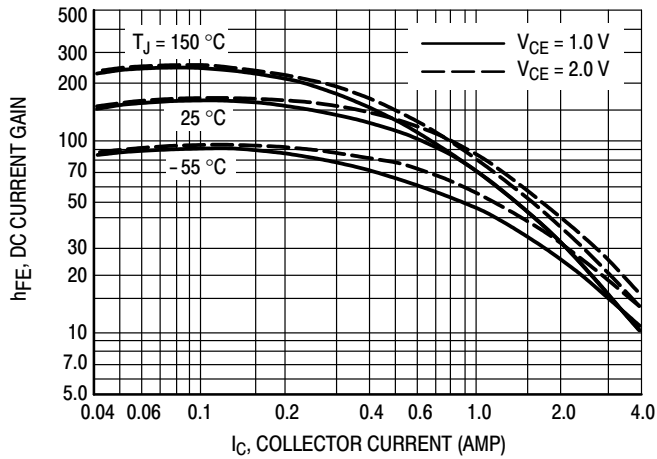


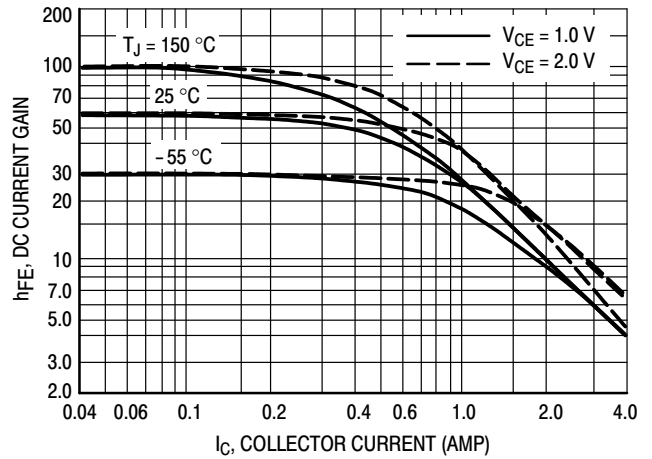
Figure 3. Typical Transient Thermal Response, Junction-to-Ambient

# MJD243 (NPN), MJD253 (PNP)

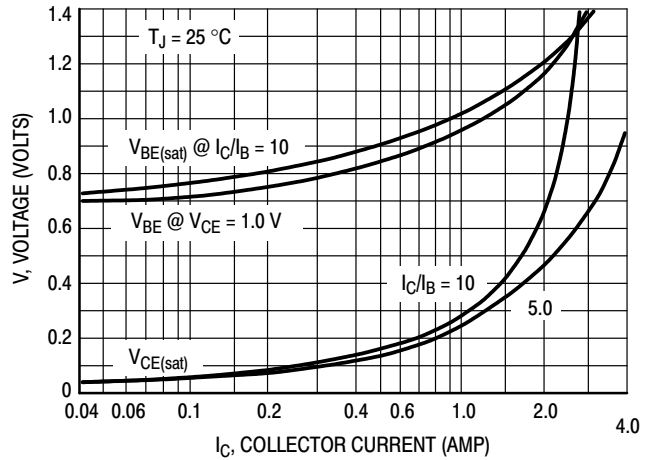
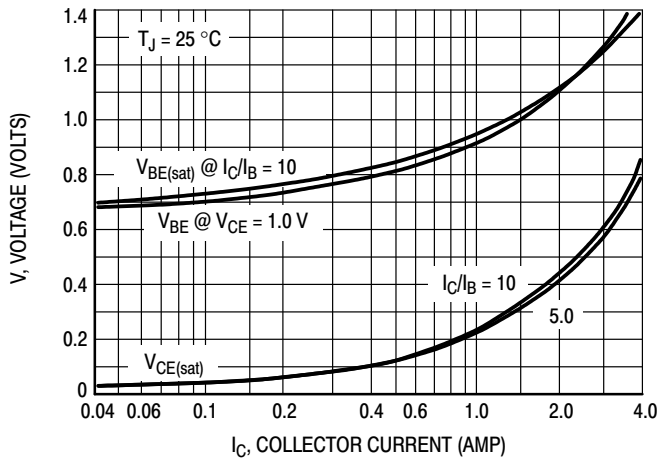
**NPN  
MJD243**



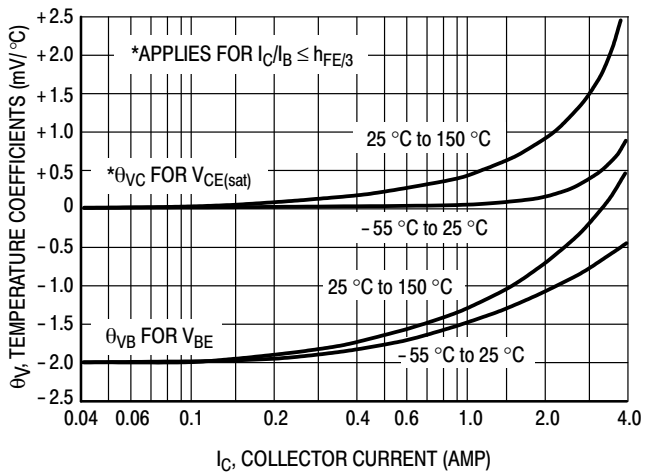
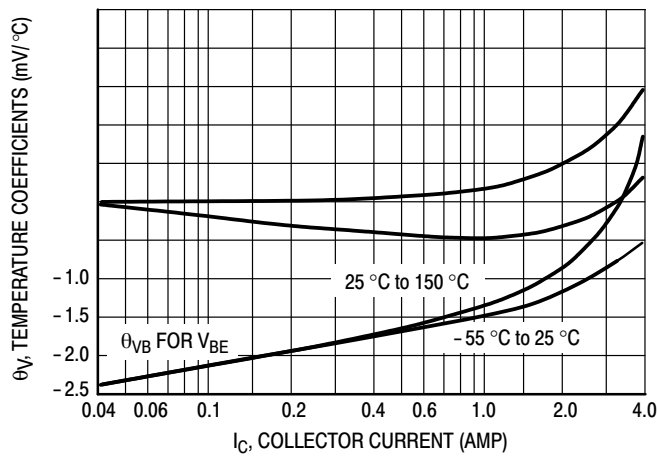
**PNP  
MJD253**



**Figure 4. DC Current Gain**



**Figure 5. "On" Voltages**



**Figure 6. Temperature Coefficients**

## MJD243 (NPN), MJD253 (PNP)

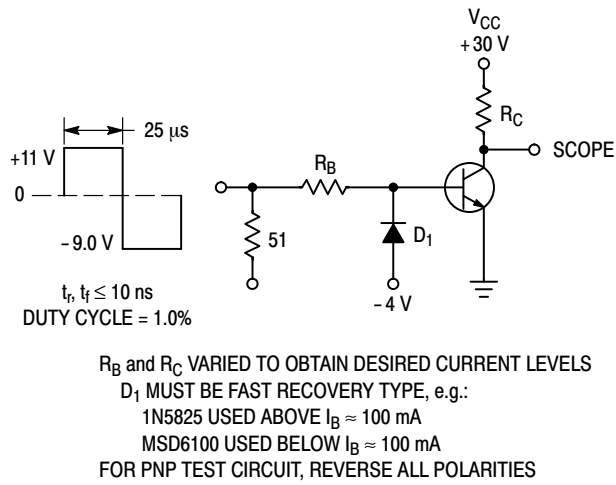


Figure 7. Switching Time Test Circuit

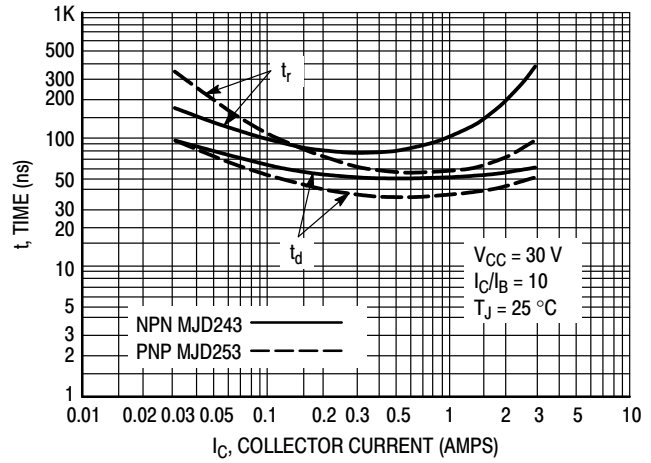


Figure 8. Turn-On Time

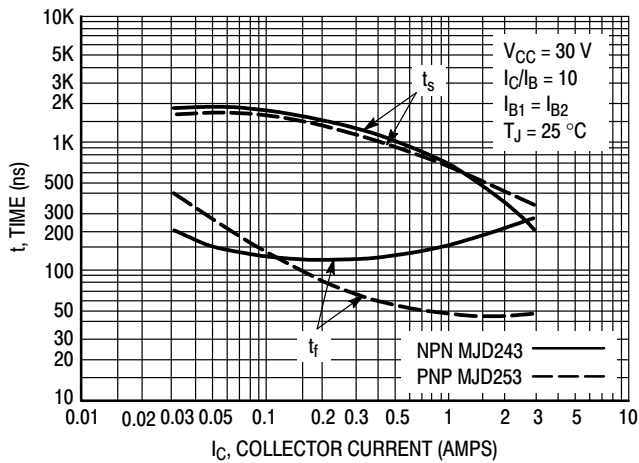


Figure 9. Turn-Off Time

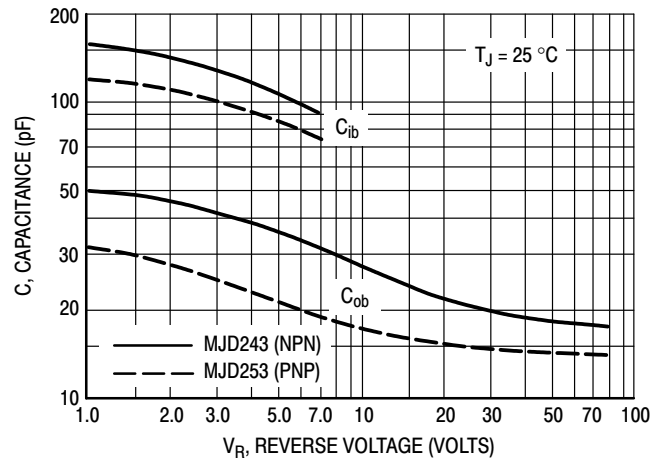


Figure 10. Capacitance

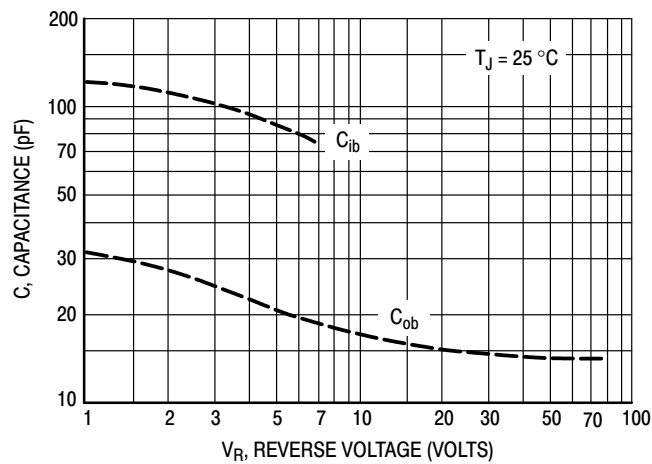


Figure 11. Capacitance

## MJD243 (NPN), MJD253 (PNP)

### ORDERING INFORMATION

| Device        | Package Type        | Package | Shipping <sup>†</sup> |
|---------------|---------------------|---------|-----------------------|
| MJD243G       | DPAK-3<br>(Pb-Free) | 369C    | 75 Units / Rail       |
| MJD243T4G     | DPAK-3<br>(Pb-Free) | 369C    | 2,500 / Tape & Reel   |
| NJVMJD243T4G* | DPAK-3<br>(Pb-Free) | 369C    | 2,500 / Tape & Reel   |
| MJD253T4G     | DPAK-3<br>(Pb-Free) | 369C    | 2,500 / Tape & Reel   |
| NJVMJD253T4G* | DPAK-3<br>(Pb-Free) | 369C    | 2,500 / Tape & Reel   |

### DISCONTINUED (Note 6)

| Device    | Package Type      | Package | Shipping <sup>†</sup> |
|-----------|-------------------|---------|-----------------------|
| MJD253-1G | IPAK<br>(Pb-Free) | 369D    | 75 Units / Rail       |

<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](#).

6. **DISCONTINUED:** This device is not available. Please contact your **onsemi** representative for information. The most current information on this device may be available on [www.onsemi.com](http://www.onsemi.com).

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



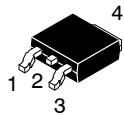
## MJD243 (NPN), MJD253 (PNP)

### REVISION HISTORY

| Revision | Description of Changes                                                                                                                                              | Date      |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 19       | Updated notes and added Note 1 in the Maximum Ratings table. Corrected minor text in the Thermal Characteristics table page 2 and made small editorial adjustments. | 5/14/2026 |

This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.

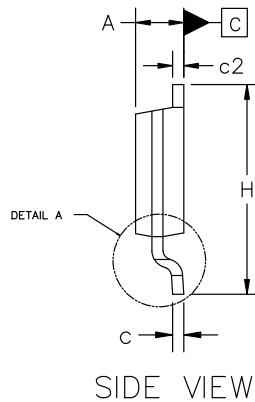
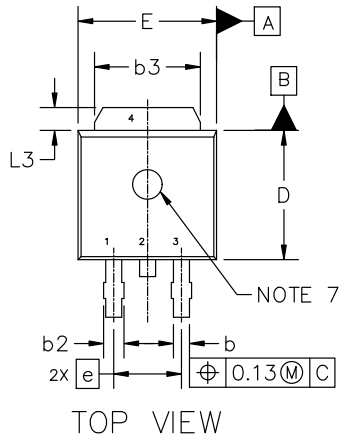




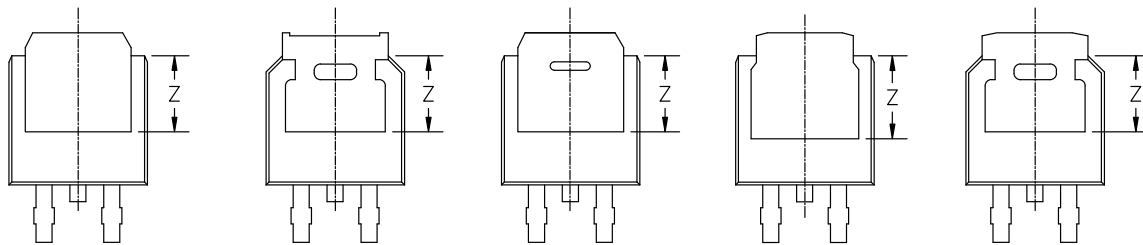
**DPAK-3 6.10x6.54x2.28, 2.29P**  
**CASE 369C**  
**ISSUE K**

DATE 14 MAY 2026

SCALE 1:1

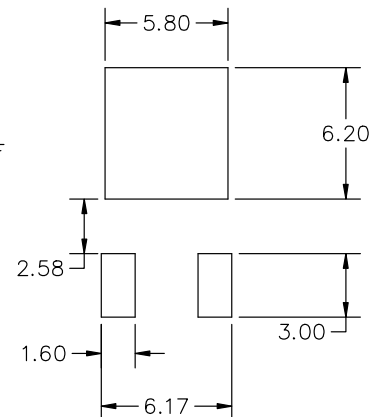
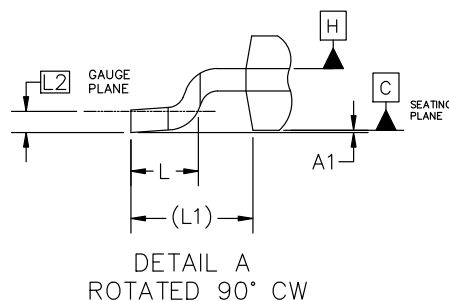


| MILLIMETERS |          |      |       |
|-------------|----------|------|-------|
| DIM         | MIN      | NOM  | MAX   |
| A           | 2.18     | 2.28 | 2.38  |
| A1          | 0.00     | ---  | 0.13  |
| b           | 0.63     | 0.76 | 0.89  |
| b2          | 0.72     | 0.93 | 1.14  |
| b3          | 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     | ---  | ---   |



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.
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.



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

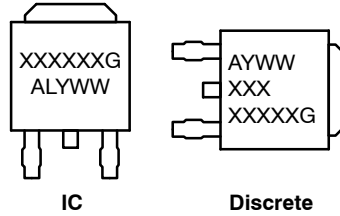
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| <b>DESCRIPTION:</b>     | <b>DPAK-3 6.10x6.54x2.28, 2.29P</b> | <b>PAGE 1 OF 2</b>                                                                                                                                                               |

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**DPAK–3 6.10x6.54x2.28, 2.29P
 CASE 369C
 ISSUE K**

DATE 13 MAY 2026

**GENERIC  
MARKING DIAGRAM\***



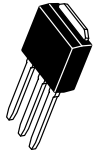
XXXXXX = Device Code  
 A = Assembly Location  
 L = Wafer Lot  
 Y = Year  
 WW = Work Week  
 G = Pb-Free Package

\*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.

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

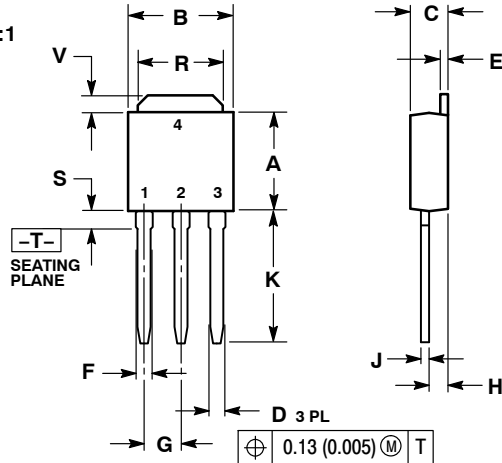
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| <b>DESCRIPTION:</b>     | <b>DPAK–3 6.10x6.54x2.28, 2.29P</b> | <b>PAGE 2 OF 2</b>                                                                                                                                                                  |

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**IPAK**  
**CASE 369D**  
**ISSUE C**

DATE 15 DEC 2010

SCALE 1:1



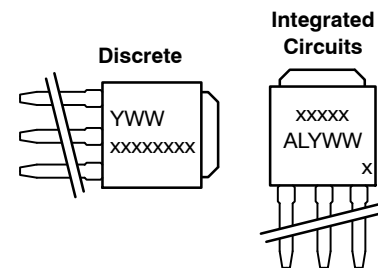
## NOTES:

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



xxxxxxx = 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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| <b>DESCRIPTION:</b>     | <b>IPAK (DPAK INSERTION MOUNT)</b> | <b>PAGE 1 OF 1</b>                                                                                                                                                                  |

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