

# MJD340 (NPN), MJD350 (PNP)

## High Voltage Power Transistors

### DPAK for Surface Mount Applications

Designed for line operated audio output amplifier, switchmode power supply drivers and other switching applications.

#### Features

- Lead Formed for Surface Mount Applications in Plastic Sleeves (No Suffix)
- Electrically Similar to Popular MJE340 and MJE350
- 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         | Max           | Unit                     |
|---------------------------------------------------------------------------------------------------|----------------|---------------|--------------------------|
| Collector-Emitter Voltage                                                                         | $V_{CEO}$      | 300           | Vdc                      |
| Collector-Base Voltage                                                                            | $V_{CB}$       | 300           | Vdc                      |
| Emitter-Base Voltage                                                                              | $V_{EB}$       | 3             | Vdc                      |
| Collector Current – Continuous                                                                    | $I_C$          | 0.5           | Adc                      |
| Collector Current – Peak                                                                          | $I_{CM}$       | 0.75          | Adc                      |
| Total Power Dissipation<br>@ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$          | $P_D$          | 15<br>0.12    | W<br>W/ $^\circ\text{C}$ |
| Total Power Dissipation (Note 1)<br>@ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 1.56<br>0.012 | 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<br>MJD340 (NPN)<br>MJD350 (PNP)                                            | HBM            | 3B<br>2       | V                        |
| ESD – Machine Model<br>MJD340 (NPN)<br>MJD350 (PNP)                                               | MM             | M4<br>M4      | 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.

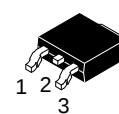
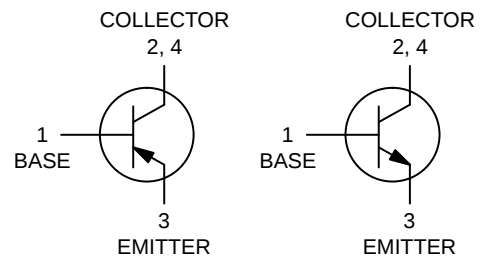
1. These ratings are applicable when surface mounted on the minimum pad sizes recommended.



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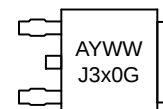
[www.onsemi.com](http://www.onsemi.com)

### SILICON POWER TRANSISTORS 0.5 AMPERE 300 VOLTS, 15 WATTS



DPAK  
CASE 369C  
STYLE 1

#### MARKING DIAGRAM



A = Assembly Location  
Y = Year  
WW = Work Week  
J3x0 = 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 5 of this data sheet.

## MJD340 (NPN), MJD350 (PNP)

### THERMAL CHARACTERISTICS

| Characteristic                                   | Symbol          | Max  | Unit |
|--------------------------------------------------|-----------------|------|------|
| Thermal Resistance, Junction-to-Case             | $R_{\theta JC}$ | 8.33 | °C/W |
| Thermal Resistance, Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 80   | °C/W |
| Leading Temperature for Soldering Purpose        | $T_L$           | 260  | °C   |

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

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

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

#### OFF CHARACTERISTICS

|                                                                                      |                |     |     |    |
|--------------------------------------------------------------------------------------|----------------|-----|-----|----|
| Collector-Emitter Sustaining Voltage (Note 3)<br>( $I_C = 1\text{ mA}$ , $I_B = 0$ ) | $V_{CEO(sus)}$ | 300 | –   | V  |
| Collector Cutoff Current<br>( $V_{CB} = 300\text{ V}$ , $I_E = 0$ )                  | $I_{CEO}$      | –   | 0.1 | mA |
| Emitter Cutoff Current<br>( $V_{BE} = 3\text{ V}$ , $I_C = 0$ )                      | $I_{EBO}$      | –   | 0.1 | mA |

#### ON CHARACTERISTICS (Note 3)

|                                                                                          |               |    |     |   |
|------------------------------------------------------------------------------------------|---------------|----|-----|---|
| DC Current Gain<br>( $I_C = 50\text{ mA}$ , $V_{CE} = 10\text{ V}$ )                     | $h_{FE}$      | 30 | 240 | – |
| Collector-Emitter Saturation Voltage<br>( $I_C = 100\text{ mA}$ , $I_B = 10\text{ mA}$ ) | $V_{CE(sat)}$ | –  | 1   | V |
| Base-Emitter On Voltage<br>( $I_C = 1\text{ A}$ , $V_{CE} = 10\text{ V}$ )               | $V_{BE(on)}$  | –  | 1.5 | V |

#### DYNAMIC CHARACTERISTICS

|                                                                                                             |       |    |   |     |
|-------------------------------------------------------------------------------------------------------------|-------|----|---|-----|
| Current Gain – Bandwidth Product<br>( $I_C = 50\text{ mA}$ , $V_{CE} = 10\text{ V}$ , $f = 10\text{ MHz}$ ) | $f_T$ | 10 | – | MHz |
|-------------------------------------------------------------------------------------------------------------|-------|----|---|-----|

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.

3. Pulse Test: Pulse Width  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

# MJD340 (NPN), MJD350 (PNP)

## TYPICAL CHARACTERISTICS

### MJD340

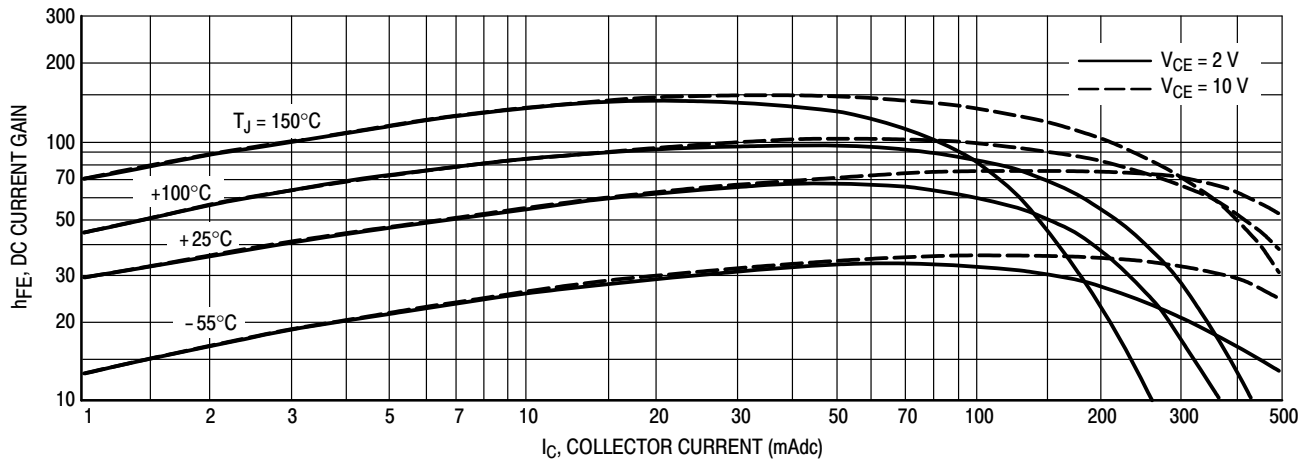


Figure 1. DC Current Gain

### MJD340

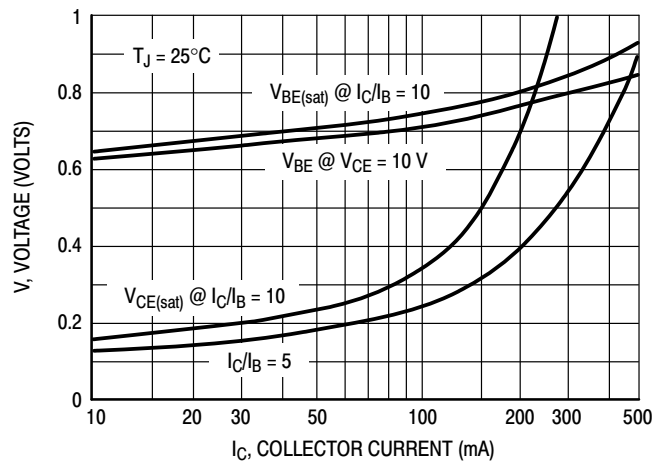


Figure 2. "On" Voltages

### MJD350

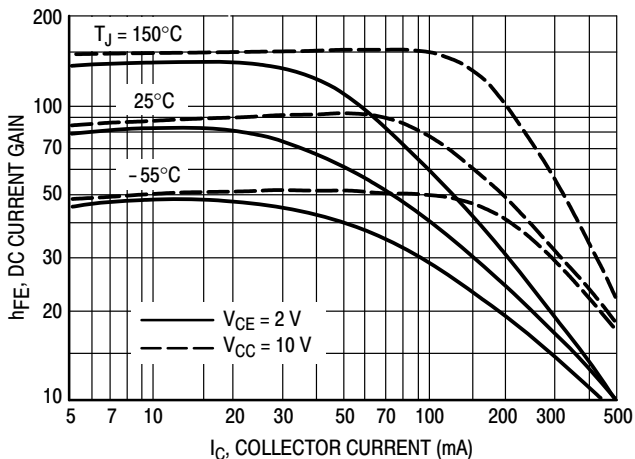


Figure 3. DC Current Gain

### MJD350

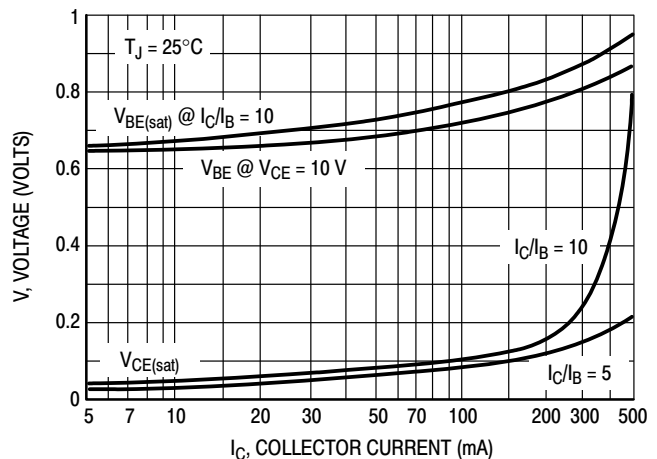


Figure 4. "On" Voltages

## MJD340 (NPN), MJD350 (PNP)

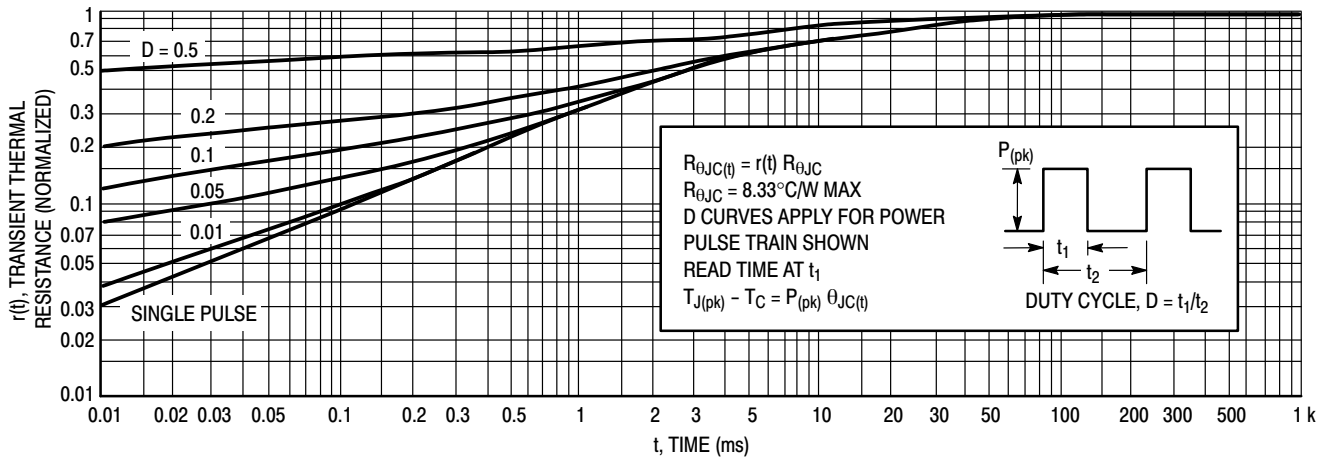


Figure 5. Thermal Response

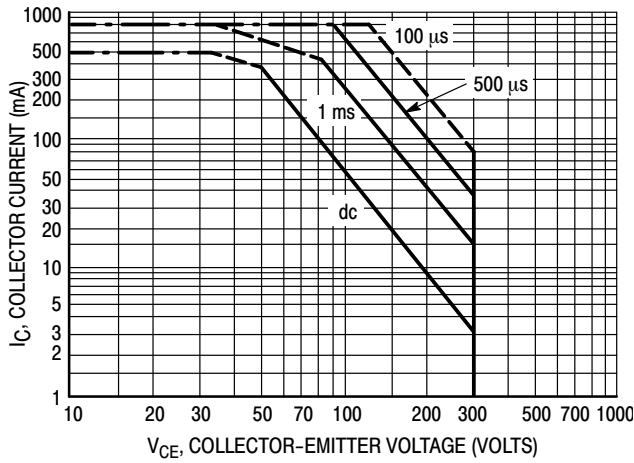


Figure 6. Active Region Safe Operating Area

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 6 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 5. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

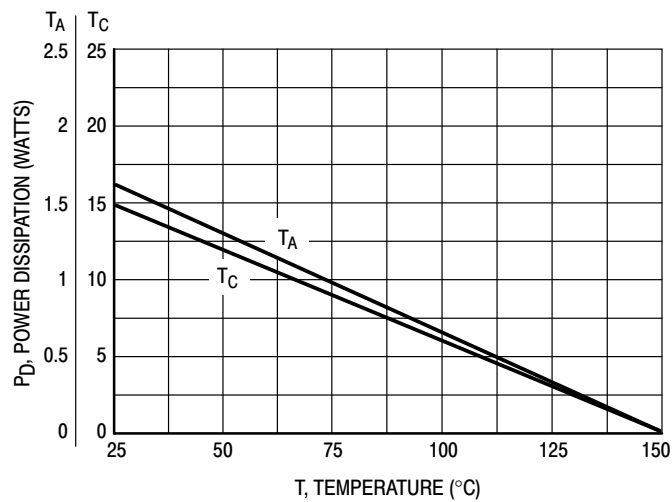


Figure 7. Power Derating

## MJD340 (NPN), MJD350 (PNP)

### ORDERING INFORMATION

| Device       | Package           | Shipping <sup>†</sup> |
|--------------|-------------------|-----------------------|
| MJD340G      | DPAK<br>(Pb-Free) | 75 Units / Rail       |
| MJD340RLG    | DPAK<br>(Pb-Free) | 1,800 / Tape & Reel   |
| MJD340T4G    | DPAK<br>(Pb-Free) | 2,500 / Tape & Reel   |
| NJVMJD340T4G | DPAK<br>(Pb-Free) | 2,500 / Tape & Reel   |
| MJD350G      | DPAK<br>(Pb-Free) | 75 Units / Rail       |
| MJD350T4G    | DPAK<br>(Pb-Free) | 2,500 / Tape & Reel   |
| NJVMJD350T4G | DPAK<br>(Pb-Free) | 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.

# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



## DPAK (SINGLE GAUGE) CASE 369C ISSUE G

DATE 31 MAY 2023

SCALE 1:1



TOP VIEW



SIDE VIEW



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.

#### 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

### NOTES:

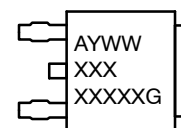
1. DIMENSIONING AND TOLERANCING ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES
3. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS b3, L3, AND Z.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.006 INCHES PER SIDE.
5. 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        | ---   |

### 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.

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