

# High Voltage Power Transistors

## DPAK For Surface Mount Applications

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

- Lead Formed for Surface Mount Applications in Plastic Sleeves (No Suffix)
- Straight Lead Version in Plastic Sleeves ("–1" Suffix)
- Lead Formed Version in 16 mm Tape and Reel ("T4" Suffix)
- Electrically Similar to Popular MJE340 and MJE350
- 300 V (Min) —  $V_{CEO(sus)}$
- 0.5 A Rated Collector Current

### MAXIMUM RATINGS

| Rating   | Symbol         | Value         | 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<br>— Peak   | $I_C$          | 0.5<br>0.75   | Adc                          |
| Total Power Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$  | $P_D$          | 15<br>0.12    | Watts<br>W/ $^\circ\text{C}$ |
| Total Power Dissipation* @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 1.56<br>0.012 | Watts<br>W/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range                                    | $T_J, T_{stg}$ | –65 to +150   | $^\circ\text{C}$             |

### THERMAL CHARACTERISTICS

| Characteristic                           | Symbol          | Max  | Unit                      |
|--|-----------------|------|---------------------------|
| Thermal Resistance, Junction to Case     | $R_{\theta JC}$ | 8.33 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Ambient* | $R_{\theta JA}$ | 80   | $^\circ\text{C}/\text{W}$ |
| Lead Temperature for Soldering Purpose   | $T_L$           | 260  | $^\circ\text{C}$          |

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

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

### OFF CHARACTERISTICS

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

### ON CHARACTERISTICS (1)

|  |          |    |     |   |
|--|----------|----|-----|---|
| DC Current Gain ( $I_C = 50 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}$ ) | $h_{FE}$ | 30 | 240 | — |
|--|----------|----|-----|---|

\* When surface mounted on minimum pad sizes recommended.

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

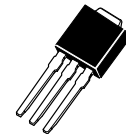
**NPN**  
**MJD340\***  
**PNP**  
**MJD350\***

\*Motorola Preferred Device

**SILICON**  
**POWER TRANSISTORS**  
**0.5 AMPERE**  
**300 VOLTS**  
**15 WATTS**

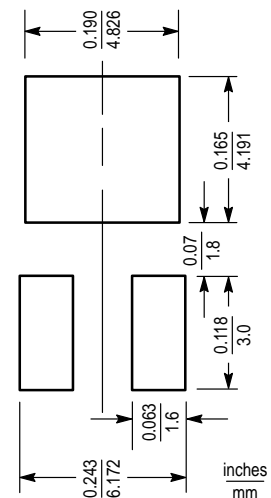


CASE 369A-13



CASE 369-07

### MINIMUM PAD SIZES RECOMMENDED FOR SURFACE MOUNTED APPLICATIONS



Preferred devices are Motorola recommended choices for future use and best overall value.

TYPICAL CHARACTERISTICS

MJD340

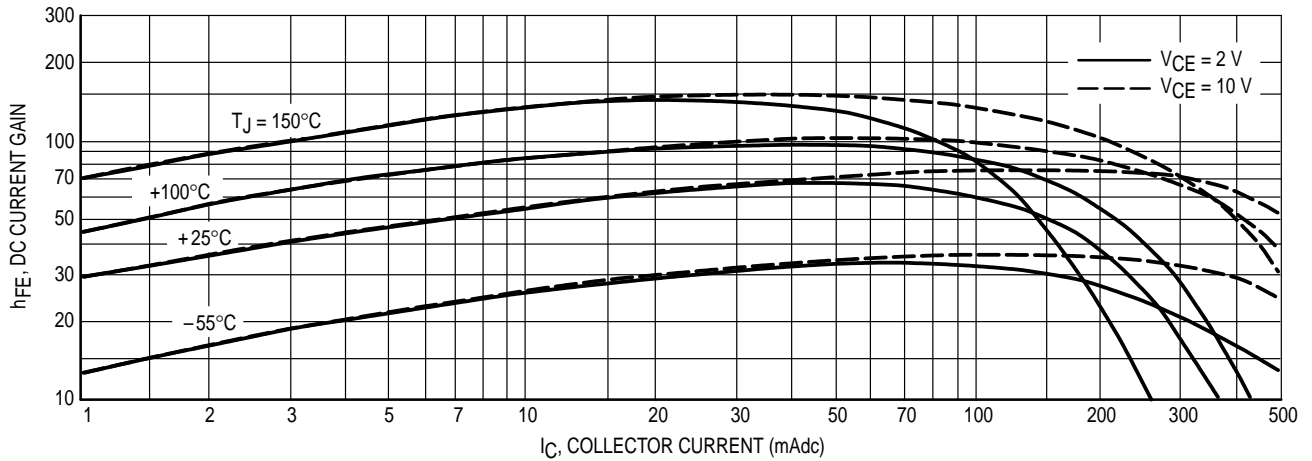


Figure 1. DC Current Gain

MJD340

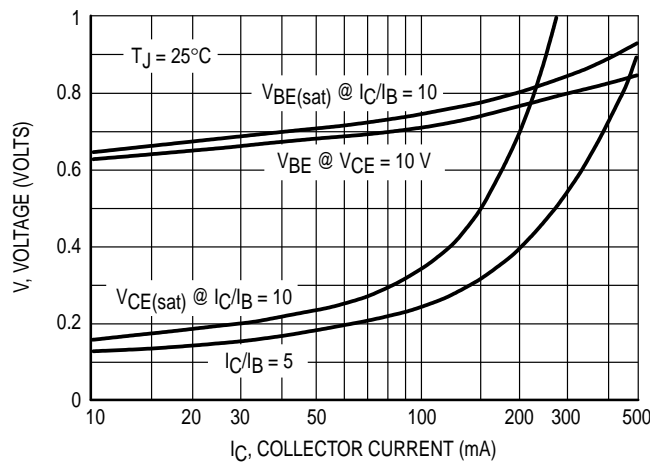


Figure 2. "On" Voltages

MJD350

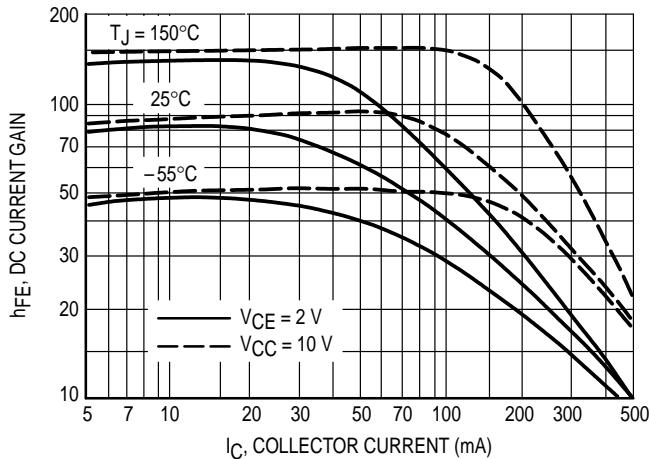


Figure 3. DC Current Gain

MJD350

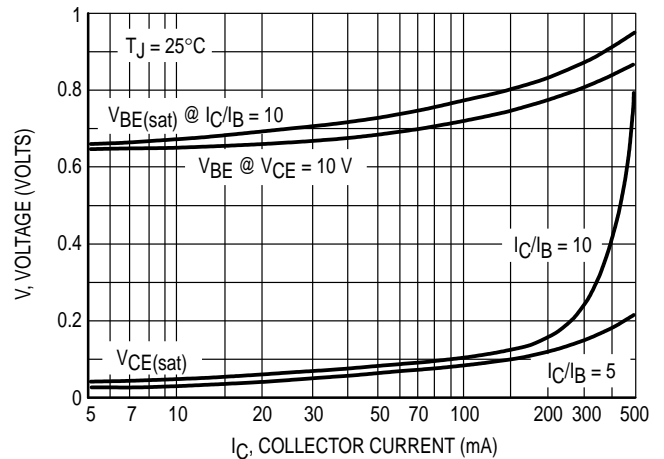


Figure 4. "On" Voltages

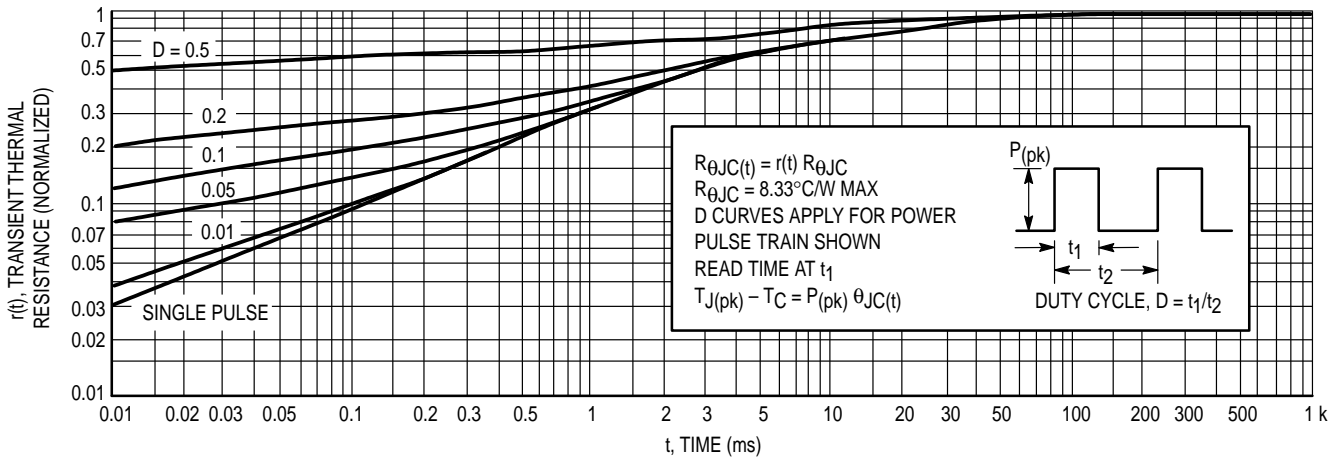


Figure 5. Thermal Response

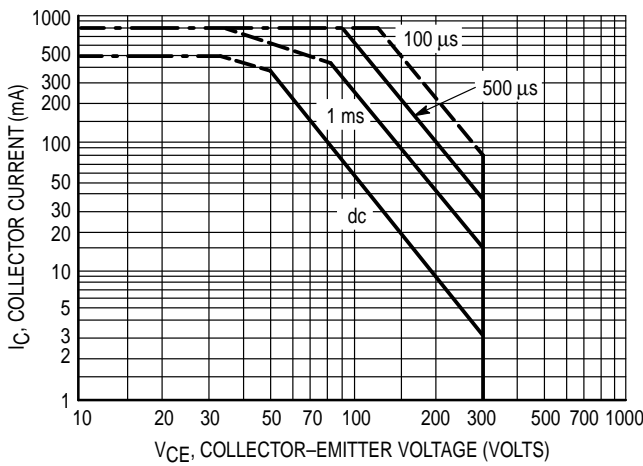


Figure 6. Active Region Safe Operating Area

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  $T_J(pk) = 150^{\circ}C$ ;  $T_C$  is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided  $T_J(pk) \leq 150^{\circ}C$ .  $T_J(pk)$  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.

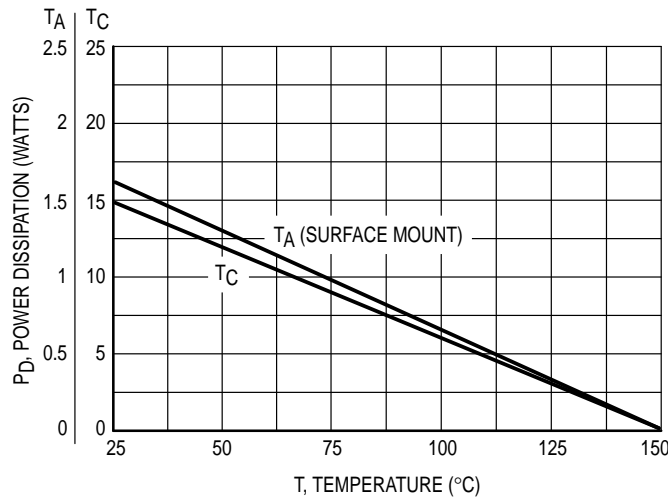
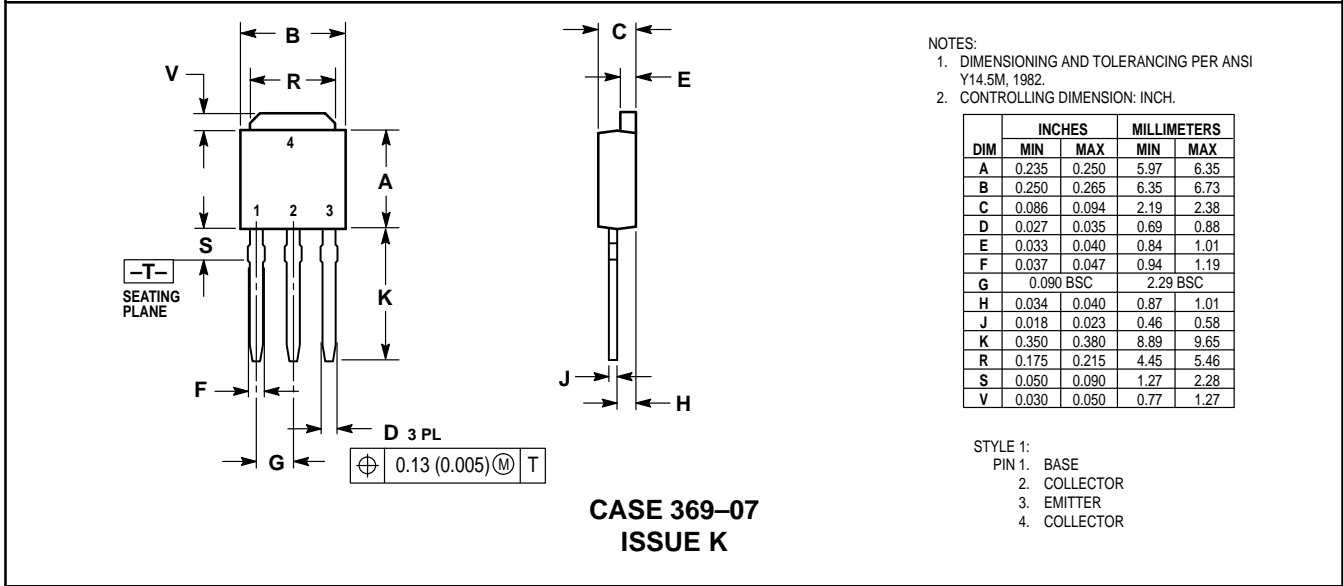
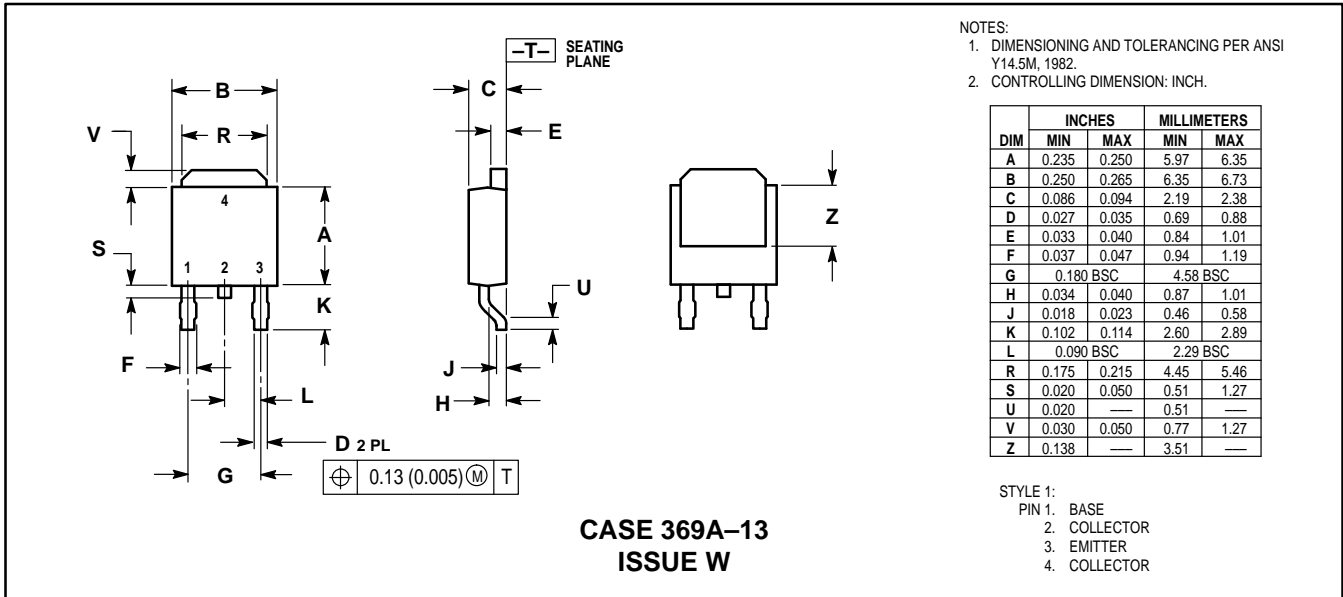


Figure 7. Power Derating

PACKAGE DIMENSIONS



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