

# MPSA44

Preferred Device

## High Voltage Transistor

### NPN Silicon

#### Features

- Pb-Free Packages are Available\*

#### MAXIMUM RATINGS

| Rating                                                                                 | Symbol         | Value          | Unit                       |
|----------------------------------------------------------------------------------------|----------------|----------------|----------------------------|
| Collector – Emitter Voltage                                                            | $V_{CEO}$      | 400            | Vdc                        |
| Collector – Base Voltage                                                               | $V_{CBO}$      | 500            | Vdc                        |
| Emitter – Base Voltage                                                                 | $V_{EBO}$      | 6.0            | Vdc                        |
| Collector Current – Continuous                                                         | $I_C$          | 300            | mAdc                       |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 625<br>5.0     | mW<br>mW/ $^\circ\text{C}$ |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 1.5<br>12      | W<br>mW/ $^\circ\text{C}$  |
| Operating and Storage Junction<br>Temperature Range                                    | $T_J, T_{stg}$ | -55 to<br>+150 | $^\circ\text{C}$           |

#### THERMAL CHARACTERISTICS

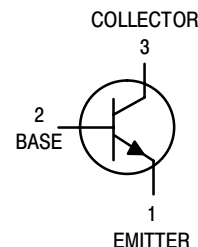
| Characteristic                             | Symbol          | Max  | Unit               |
|--------------------------------------------|-----------------|------|--------------------|
| Thermal Resistance,<br>Junction-to-Ambient | $R_{\theta JA}$ | 200  | $^\circ\text{C/W}$ |
| Thermal Resistance,<br>Junction-to-Case    | $R_{\theta JC}$ | 83.3 | $^\circ\text{C/W}$ |

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.

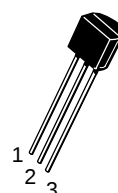


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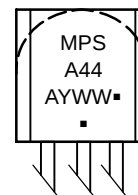
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#### MARKING DIAGRAM



TO-92  
(TO-226AA)  
CASE 29-11  
STYLE 1



A = Assembly Location  
Y = Year  
WW = Work Week  
▪ = Pb-Free Package  
(Note: Microdot may be in either location)

#### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

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

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

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

| Characteristic                                                                             | Symbol        | Min | Max | Unit          |
|--------------------------------------------------------------------------------------------|---------------|-----|-----|---------------|
| <b>OFF CHARACTERISTICS</b>                                                                 |               |     |     |               |
| Collector – Emitter Breakdown Voltage (Note 1)<br>( $I_C = 1.0\text{ mA}$ , $I_B = 0$ )    | $V_{(BR)CEO}$ | 400 | –   | Vdc           |
| Collector – Emitter Breakdown Voltage<br>( $I_C = 100\text{ }\mu\text{A}$ , $V_{BE} = 0$ ) | $V_{(BR)CES}$ | 500 | –   | Vdc           |
| Collector – Base Breakdown Voltage<br>( $I_C = 100\text{ }\mu\text{A}$ , $I_E = 0$ )       | $V_{(BR)CBO}$ | 500 | –   | Vdc           |
| Emitter – Base Breakdown Voltage<br>( $I_E = 10\text{ }\mu\text{A}$ , $I_C = 0$ )          | $V_{(BR)EBO}$ | 6.0 | –   | Vdc           |
| Collector Cutoff Current<br>( $V_{CB} = 400\text{ Vdc}$ , $I_E = 0$ )                      | $I_{CBO}$     | –   | 0.1 | $\mu\text{A}$ |
| Collector Cutoff Current<br>( $V_{CE} = 400\text{ Vdc}$ , $V_{BE} = 0$ )                   | $I_{CES}$     | –   | 500 | nA            |
| Emitter Cutoff Current<br>( $V_{EB} = 4.0\text{ Vdc}$ , $I_C = 0$ )                        | $I_{EBO}$     | –   | 0.1 | $\mu\text{A}$ |

## ON CHARACTERISTICS (Note 1)

|                                                                                                                                                                                                                                                        |               |                      |                    |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------|--------------------|-----|
| DC Current Gain (Note 1)<br>( $I_C = 1.0\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ )<br>( $I_C = 10\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ )<br>( $I_C = 50\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ )<br>( $I_C = 100\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ ) | $h_{FE}$      | 40<br>50<br>45<br>40 | –<br>200<br>–<br>– | –   |
| Collector – Emitter Saturation Voltage (Note 1)<br>( $I_C = 1.0\text{ mA}$ , $I_B = 0.1\text{ mA}$ )<br>( $I_C = 10\text{ mA}$ , $I_B = 1.0\text{ mA}$ )<br>( $I_C = 50\text{ mA}$ , $I_B = 5.0\text{ mA}$ )                                           | $V_{CE(sat)}$ | –<br>–<br>–          | 0.4<br>0.5<br>0.75 | Vdc |
| Base – Emitter Saturation Voltage<br>( $I_C = 10\text{ mA}$ , $I_B = 1.0\text{ mA}$ )                                                                                                                                                                  | $V_{BE(sat)}$ | –                    | 0.75               | Vdc |

## SMALL-SIGNAL CHARACTERISTICS

|                                                                                                        |           |     |     |    |
|--------------------------------------------------------------------------------------------------------|-----------|-----|-----|----|
| Output Capacitance<br>( $V_{CB} = 20\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )                  | $C_{obo}$ | –   | 7.0 | pF |
| Input Capacitance<br>( $V_{EB} = 0.5\text{ Vdc}$ , $I_C = 0$ , $f = 1.0\text{ MHz}$ )                  | $C_{ibo}$ | –   | 130 | pF |
| Small-Signal Current Gain<br>( $I_C = 10\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 20\text{ MHz}$ ) | $h_{fe}$  | 1.0 | –   | –  |

1. Pulse Test: Pulse Width  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

## ORDERING INFORMATION

| Device      | Package            | Shipping <sup>†</sup> |
|-------------|--------------------|-----------------------|
| MPSA44      | TO-92              | 5000 Units / Box      |
| MPSA44G     | TO-92<br>(Pb-Free) | 5000 Units / Box      |
| MPSA44RL1   | TO-92              | 2000 / Tape & Reel    |
| MPSA44RL1G  | TO-92<br>(Pb-Free) | 2000 / Tape & Reel    |
| MPSA44RLRA  | TO-92              | 2000 / Tape & Reel    |
| MPSA44RLRAG | TO-92<br>(Pb-Free) | 2000 / 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.

# MPSA44

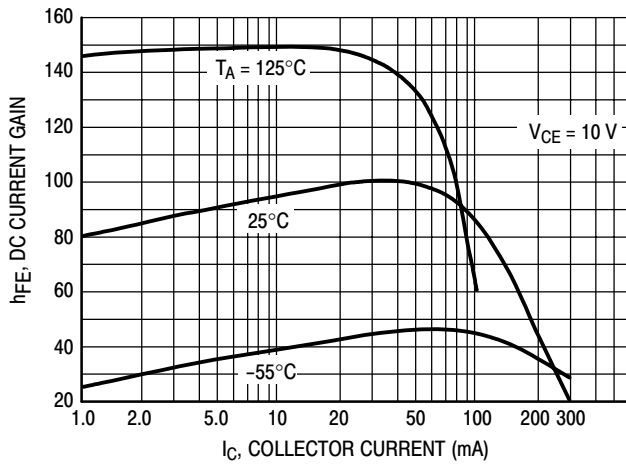


Figure 1. DC Current Gain

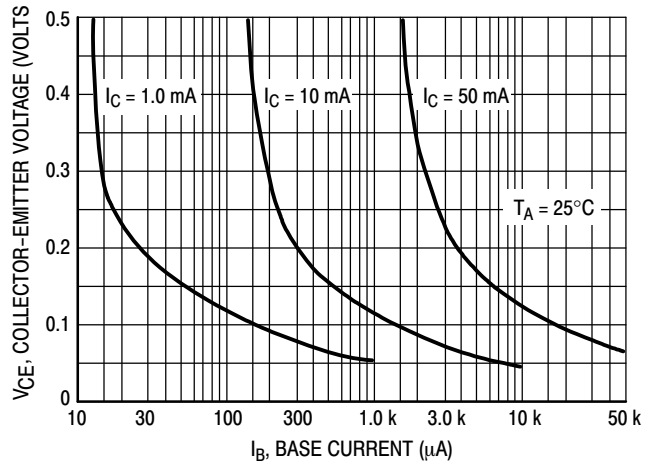


Figure 2. Collector Saturation Region

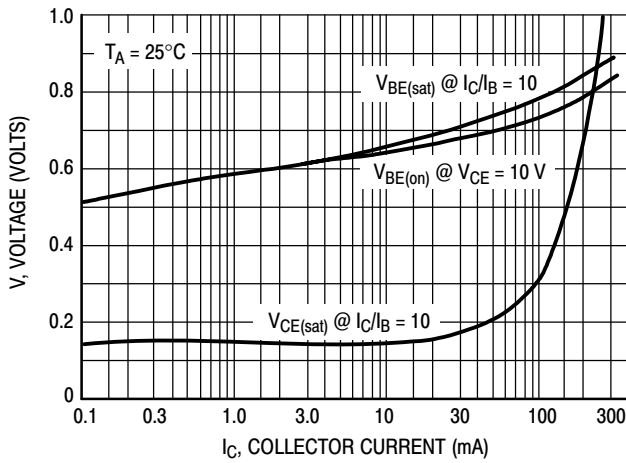


Figure 3. "On" Voltages

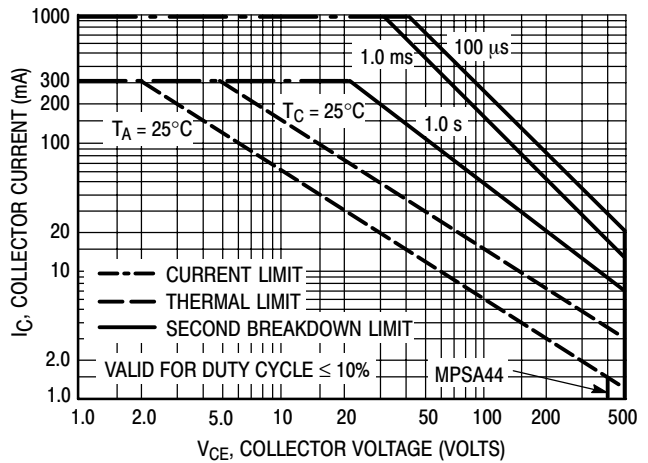


Figure 4. Active Region - Safe Operating Area

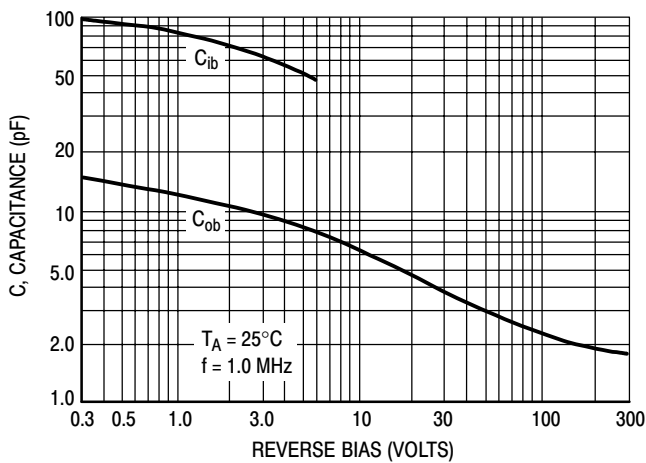


Figure 5. Capacitance

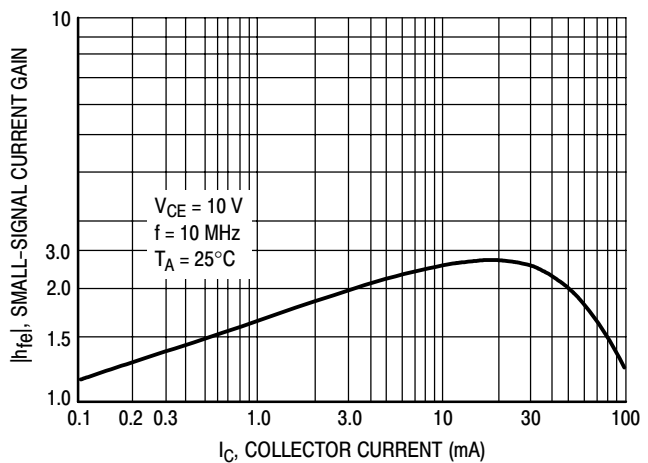


Figure 6. High Frequency Current Gain

# MPSA44

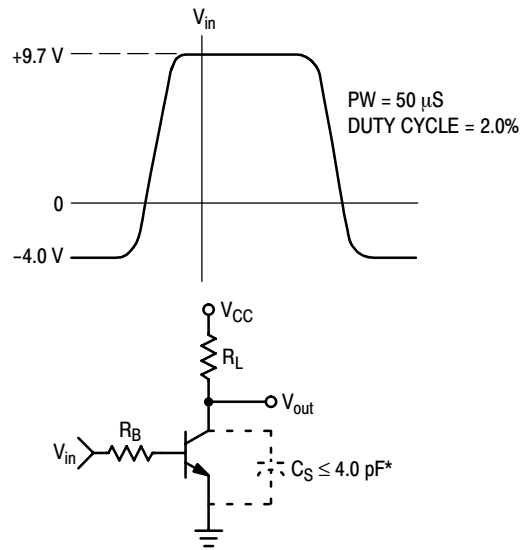
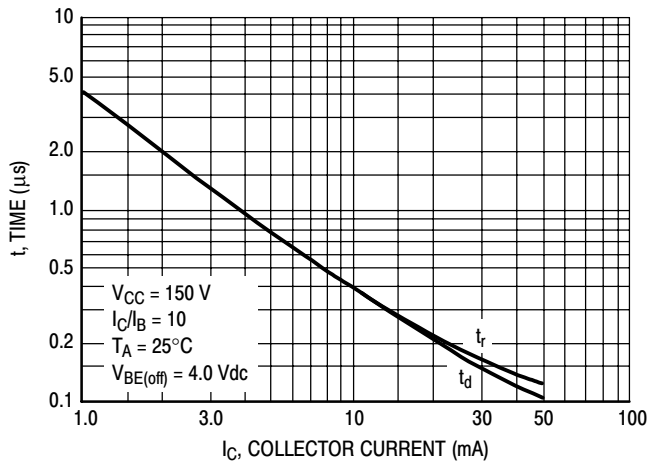


Figure 7. Turn-On Switching Times and Test Circuit

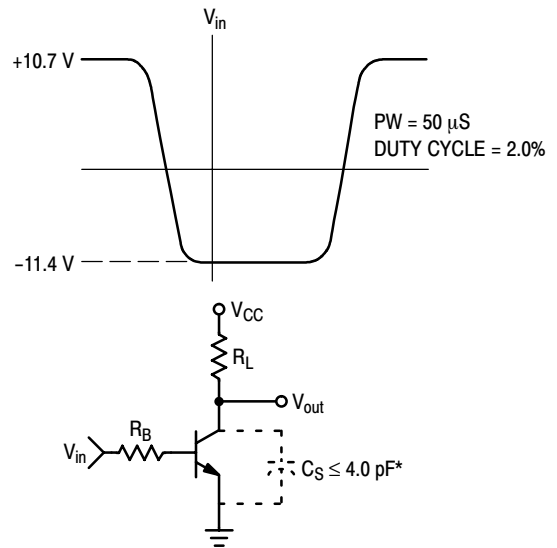
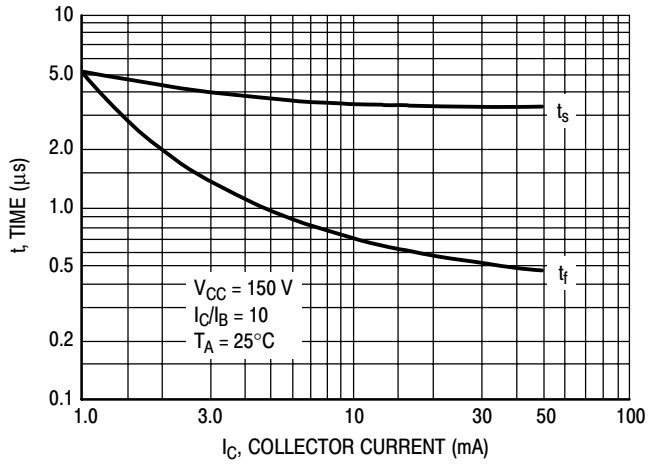


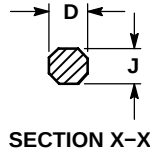
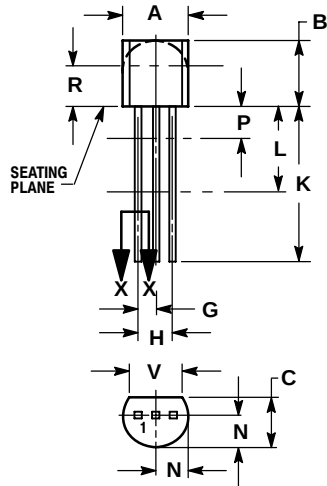
Figure 8. Turn-Off Switching Times and Test Circuit

\*Total Shunt Capacitance or Test Jig and Connectors.

# MPSA44

## PACKAGE DIMENSIONS

TO-92 (TO-226)  
CASE 29-11  
ISSUE AL



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

| DIM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN    | MAX   | MIN         | MAX   |
| A   | 0.175  | 0.205 | 4.45        | 5.20  |
| B   | 0.170  | 0.210 | 4.32        | 5.33  |
| C   | 0.125  | 0.165 | 3.18        | 4.19  |
| D   | 0.016  | 0.021 | 0.407       | 0.533 |
| G   | 0.045  | 0.055 | 1.15        | 1.39  |
| H   | 0.095  | 0.105 | 2.42        | 2.66  |
| J   | 0.015  | 0.020 | 0.39        | 0.50  |
| K   | 0.500  | ---   | 12.70       | ---   |
| L   | 0.250  | ---   | 6.35        | ---   |
| N   | 0.080  | 0.105 | 2.04        | 2.66  |
| P   | ---    | 0.100 | ---         | 2.54  |
| R   | 0.115  | ---   | 2.93        | ---   |
| V   | 0.135  | ---   | 3.43        | ---   |

### STYLE 1:

1. PIN 1. EMITTER
2. BASE
3. COLLECTOR

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