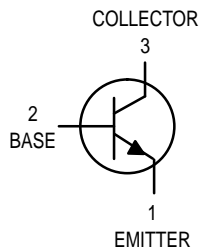
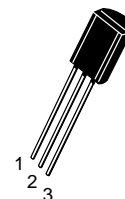


# One Watt Amplifier Transistors

## NPN Silicon



**MPS6714**  
**MPS6715**



CASE 29-05, STYLE 1  
TO-92 (TO-226AE)

### MAXIMUM RATINGS

| Rating   | Symbol         | Value       | Unit                          |
|--|----------------|-------------|-------------------------------|
| Collector–Emitter Voltage<br>MPS6714<br>MPS6715  | $V_{CEO}$      | 30<br>40    | Vdc                           |
| Collector–Base Voltage<br>MPS6714<br>MPS6715   | $V_{CBO}$      | 40<br>50    | Vdc                           |
| Emitter–Base Voltage   | $V_{EBO}$      | 5.0         | Vdc                           |
| Collector Current — Continuous   | $I_C$          | 1.0         | Adc                           |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 1.0<br>8.0  | Watts<br>mW/ $^\circ\text{C}$ |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 2.5<br>20   | Watts<br>mW/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range                                    | $T_J, T_{stg}$ | -55 to +150 | $^\circ\text{C}$              |

### THERMAL CHARACTERISTICS

| Characteristic                          | Symbol          | Max | Unit                      |
|---|-----------------|-----|---------------------------|
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 125 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Case    | $R_{\theta JC}$ | 50  | $^\circ\text{C}/\text{W}$ |

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

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

### OFF CHARACTERISTICS

|  |                    |               |          |            |                 |
|--|--------------------|---------------|----------|------------|-----------------|
| Collector–Emitter Breakdown Voltage <sup>(1)</sup><br>( $I_C = 10 \text{ mAdc}, I_B = 0$ )                   | MPS6714<br>MPS6715 | $V_{(BR)CEO}$ | 30<br>40 | —<br>—     | Vdc             |
| Collector–Base Breakdown Voltage<br>( $I_C = 100 \mu\text{Adc}, I_E = 0$ )                                   | MPS6714<br>MPS6715 | $V_{(BR)CBO}$ | 40<br>50 | —<br>—     | Vdc             |
| Emitter–Base Breakdown Voltage<br>( $I_E = 100 \mu\text{Adc}, I_C = 0$ )                                     |                    | $V_{(BR)EBO}$ | 5.0      | —          | Vdc             |
| Collector Cutoff Current<br>( $V_{CB} = 40 \text{ Vdc}, I_E = 0$ )<br>( $V_{CB} = 50 \text{ Vdc}, I_E = 0$ ) | MPS6714<br>MPS6715 | $I_{CBO}$     | —<br>—   | 0.1<br>0.1 | $\mu\text{Adc}$ |
| Emitter Cutoff Current<br>( $V_{EB} = 5.0 \text{ Vdc}, I_C = 0$ )  |                    | $I_{EBO}$     | —        | 0.1        | $\mu\text{Adc}$ |

1. Pulse Test: Pulse Width  $\leq 30 \mu\text{s}$ ; Duty Cycle  $\leq 2.0\%$ .

# MPS6714 MPS6715

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

| Characteristic   | Symbol        | Min      | Max      | Unit |
|--|---------------|----------|----------|------|
| <b>ON CHARACTERISTICS(1)</b>   |               |          |          |      |
| DC Current Gain<br>( $I_C = 100\text{ mAdc}$ , $V_{CE} = 1.0\text{ Vdc}$ )<br>( $I_C = 1000\text{ mAdc}$ , $V_{CE} = 1.0\text{ Vdc}$ ) | $h_{FE}$      | 60<br>50 | —<br>250 | —    |
| Collector–Emitter Saturation Voltage<br>( $I_C = 1000\text{ mAdc}$ , $I_B = 100\text{ mAdc}$ )   | $V_{CE(sat)}$ | —        | 0.5      | Vdc  |
| Base–Emitter On Voltage<br>( $I_C = 1000\text{ mAdc}$ , $V_{CE} = 1.0\text{ Vdc}$ )  | $V_{BE(on)}$  | —        | 1.2      | Vdc  |

## SMALL–SIGNAL CHARACTERISTICS

|  |          |     |    |    |
|--|----------|-----|----|----|
| Collector–Base Capacitance<br>( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )            | $C_{cb}$ | —   | 30 | pF |
| Small–Signal Current Gain<br>( $I_C = 50\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 20\text{ MHz}$ ) | $h_{fe}$ | 2.5 | 25 | —  |

1. Pulse Test: Pulse Width  $\leq 30\ \mu\text{s}$ ; Duty Cycle  $\leq 2.0\%$ .

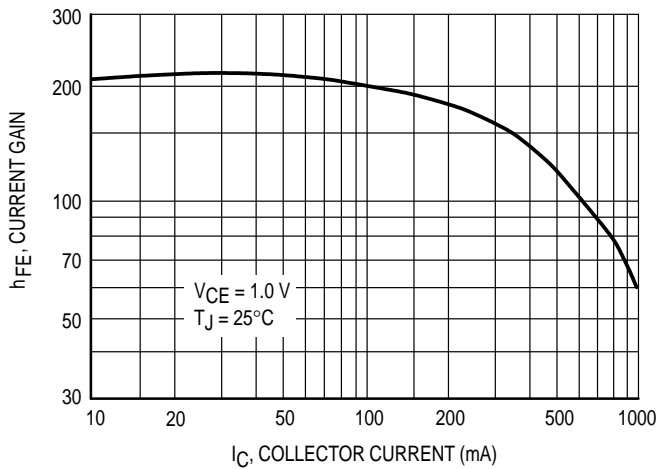


Figure 1. DC Current Gain

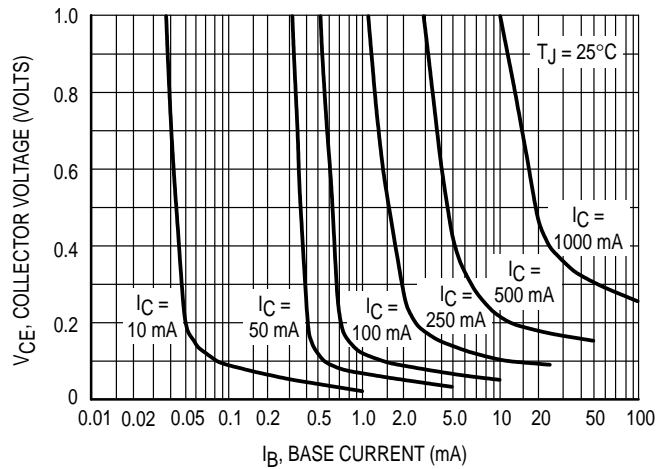


Figure 2. Collector Saturation Region

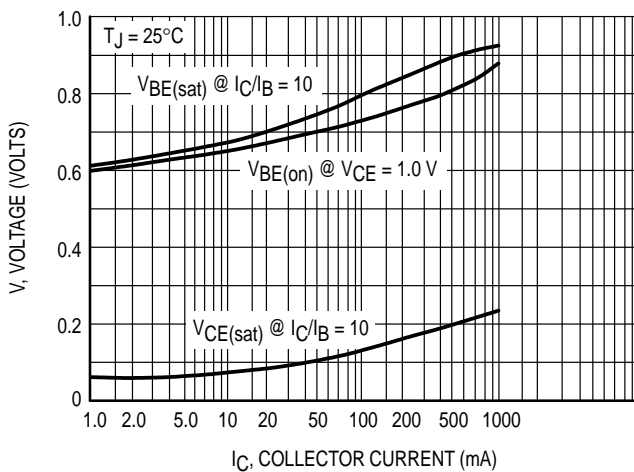


Figure 3. "ON" Voltages

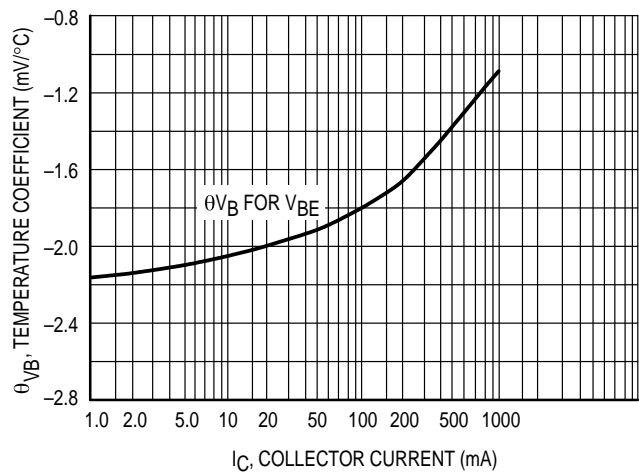


Figure 4. Temperature Coefficient

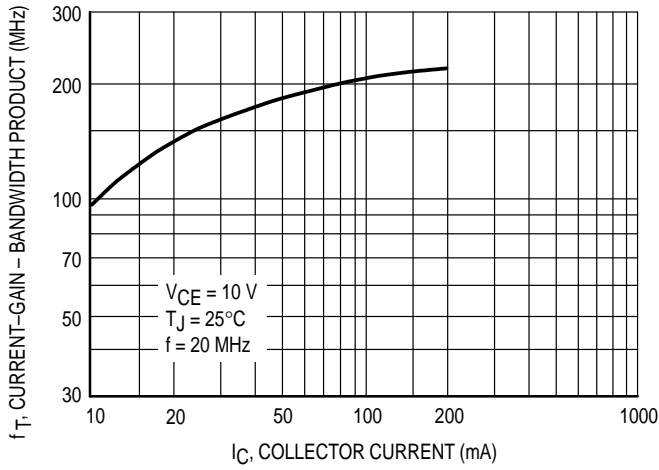


Figure 5. Current Gain — Bandwidth Product

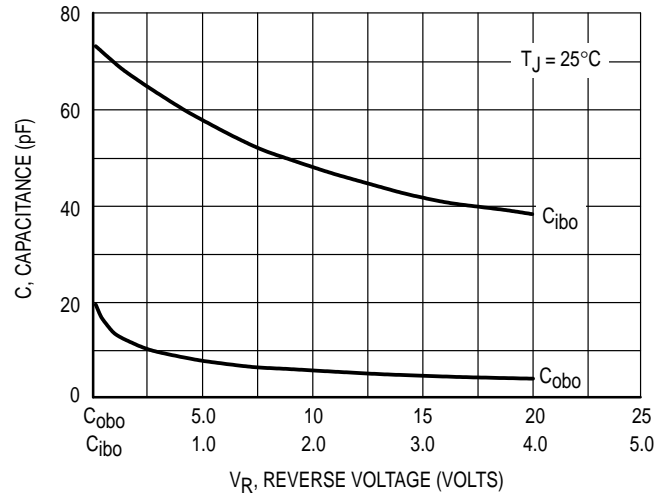


Figure 6. Capacitance

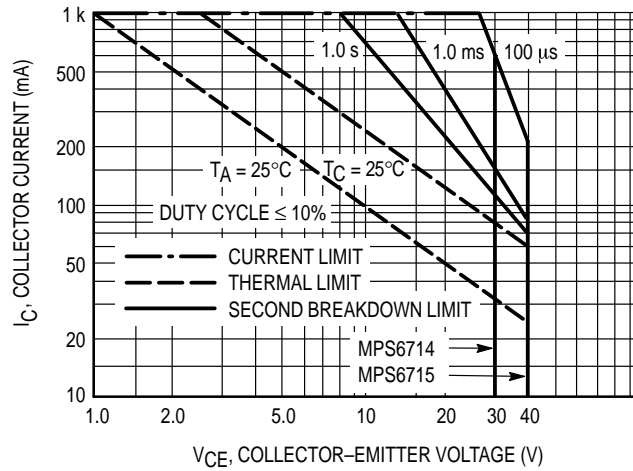
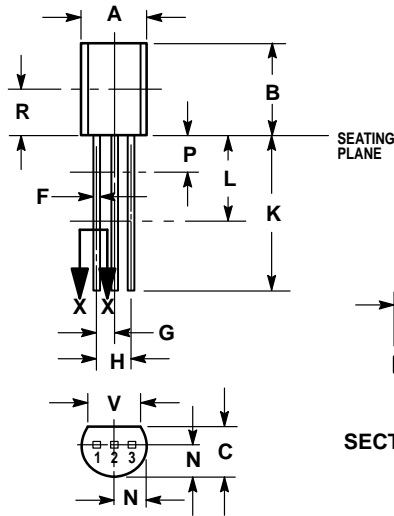


Figure 7. Active Region — Safe Operating Area

PACKAGE DIMENSIONS



SECTION X-X

CASE 029-05  
(TO-226AE)  
ISSUE AD


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. DIMENSION F APPLIES BETWEEN P AND L. DIMENSIONS D AND J APPLY BETWEEN L AND K MINIMUM. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

| DIM | INCHES |       | MILLIMETERS |      |
|-----|--------|-------|-------------|------|
|     | MIN    | MAX   | MIN         | MAX  |
| A   | 0.175  | 0.205 | 4.44        | 5.21 |
| B   | 0.290  | 0.310 | 7.37        | 7.87 |
| C   | 0.125  | 0.165 | 3.18        | 4.19 |
| D   | 0.018  | 0.022 | 0.46        | 0.56 |
| F   | 0.016  | 0.019 | 0.41        | 0.48 |
| G   | 0.045  | 0.055 | 1.15        | 1.39 |
| H   | 0.095  | 0.105 | 2.42        | 2.66 |
| J   | 0.018  | 0.024 | 0.46        | 0.61 |
| 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   | 0.135  | —     | 3.43        | —    |
| V   | 0.135  | —     | 3.43        | —    |

STYLE 1:

- PIN 1. EMITTER
2. BASE
3. COLLECTOR

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