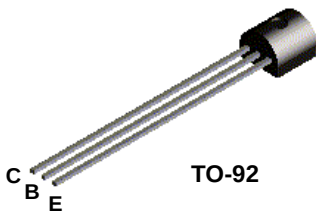


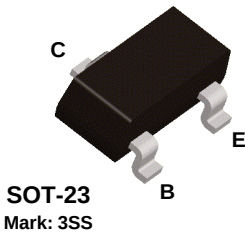


## MPSA28



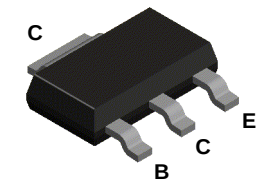
TO-92

## MMBTA28



SOT-23  
Mark: 3SS

## PZTA28



SOT-223

### NPN Darlington Transistor

This device is designed for applications requiring extremely high current gain at collector currents to 500 mA. Sourced from Process 03.

#### Absolute Maximum Ratings\*

TA = 25°C unless otherwise noted

| Symbol                            | Parameter                                        | Value       | Units |
|-----------------------------------|--------------------------------------------------|-------------|-------|
| V <sub>CES</sub>                  | Collector-Emitter Voltage                        | 80          | V     |
| V <sub>CBO</sub>                  | Collector-Base Voltage                           | 80          | V     |
| V <sub>EBO</sub>                  | Emitter-Base Voltage                             | 12          | V     |
| I <sub>C</sub>                    | Collector Current - Continuous                   | 800         | mA    |
| T <sub>J</sub> , T <sub>stg</sub> | Operating and Storage Junction Temperature Range | -55 to +150 | °C    |

\*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

#### NOTES:

- 1) These ratings are based on a maximum junction temperature of 150 degrees C.
- 2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

#### Thermal Characteristics

TA = 25°C unless otherwise noted

| Symbol           | Characteristic                                | Max        |            |              | Units       |
|------------------|-----------------------------------------------|------------|------------|--------------|-------------|
|                  |                                               | MPSA28     | *MMBTA28   | **PZTA28     |             |
| P <sub>D</sub>   | Total Device Dissipation<br>Derate above 25°C | 625<br>5.0 | 350<br>2.8 | 1,000<br>8.0 | mW<br>mW/°C |
| R <sub>θJC</sub> | Thermal Resistance, Junction to Case          | 83.3       |            |              | °C/W        |
| R <sub>θJA</sub> | Thermal Resistance, Junction to Ambient       | 200        | 357        | 125          | °C/W        |

\*Device mounted on FR-4 PCB 1.6" X 1.6" X 0.06."

\*\*Device mounted on FR-4 PCB 36 mm X 18 mm X 1.5 mm; mounting pad for the collector lead min. 6 cm<sup>2</sup>.

Electrical Characteristics

TA = 25°C unless otherwise noted

| Symbol | Parameter | Test Conditions | Min | Max | Units |
|--------|-----------|-----------------|-----|-----|-------|
|--------|-----------|-----------------|-----|-----|-------|

OFF CHARACTERISTICS

|               |                                     |                                               |    |     |    |
|---------------|-------------------------------------|-----------------------------------------------|----|-----|----|
| $V_{(BR)CES}$ | Collector-Emitter Breakdown Voltage | $I_C = 100\text{ }\mu\text{A}$ , $V_{BE} = 0$ | 80 |     | V  |
| $V_{(BR)CBO}$ | Collector-Base Breakdown Voltage    | $I_C = 100\text{ }\mu\text{A}$ , $I_E = 0$    | 80 |     | V  |
| $V_{(BR)EBO}$ | Emitter-Base Breakdown Voltage      | $I_E = 10\text{ }\mu\text{A}$ , $I_C = 0$     | 12 |     | V  |
| $I_{CBO}$     | Collector Cutoff Current            | $V_{CB} = 60\text{ V}$ , $I_E = 0$            |    | 100 | nA |
| $I_{CES}$     | Collector Cutoff Current            | $V_{CE} = 60\text{ V}$ , $V_{BE} = 0$         |    | 500 | nA |
| $I_{EBO}$     | Emitter Cutoff Current              | $V_{EB} = 10\text{ V}$ , $I_C = 0$            |    | 100 | nA |

ON CHARACTERISTICS

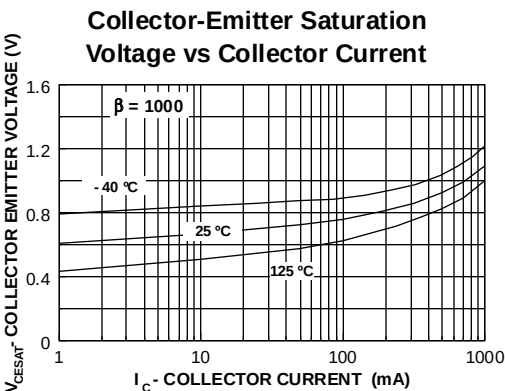
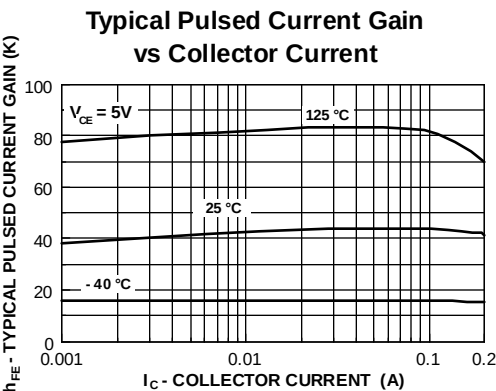
|               |                                      |                                                                                                   |                  |            |   |
|---------------|--------------------------------------|---------------------------------------------------------------------------------------------------|------------------|------------|---|
| $h_{FE}$      | DC Current Gain                      | $I_C = 10\text{ mA}$ , $V_{CE} = 5.0\text{ V}$<br>$I_C = 100\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ | 10,000<br>10,000 |            |   |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C = 10\text{ mA}$ , $I_B = 0.01\text{ mA}$<br>$I_C = 100\text{ mA}$ , $I_B = 0.1\text{ mA}$    |                  | 1.2<br>1.5 | V |
| $V_{BE(on)}$  | Base-Emitter On Voltage              | $I_C = 100\text{ mA}$ , $V_{CE} = 5.0\text{ V}$                                                   |                  | 2.0        | V |

SMALL SIGNAL CHARACTERISTICS

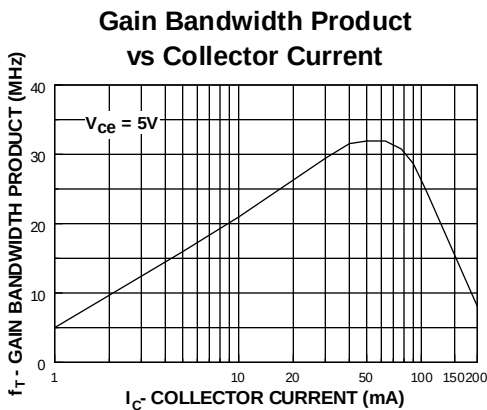
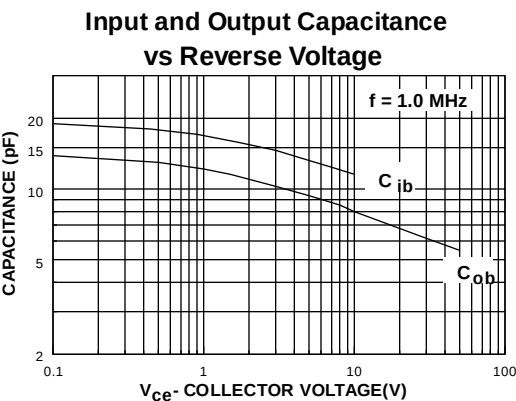
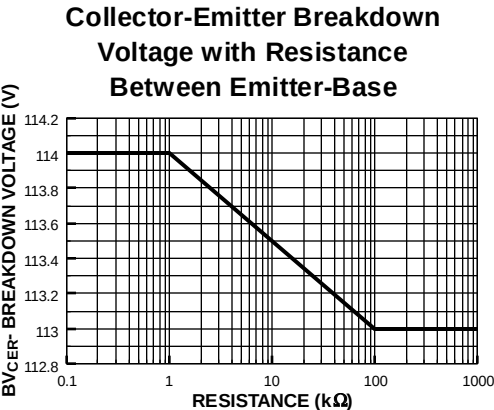
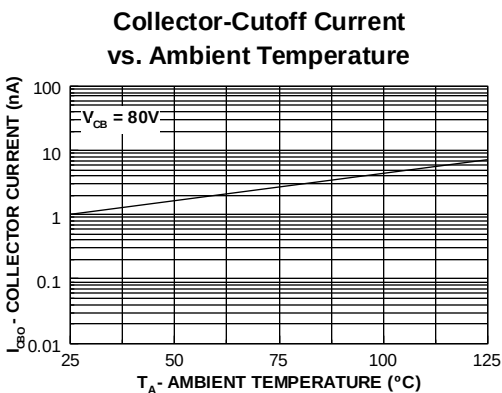
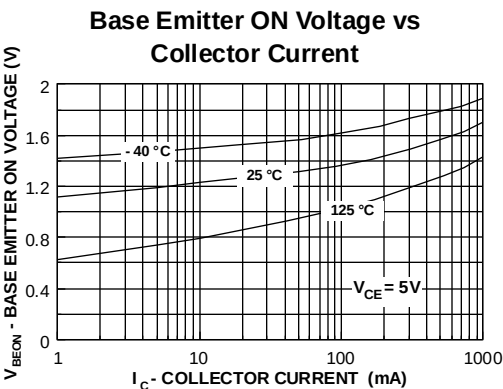
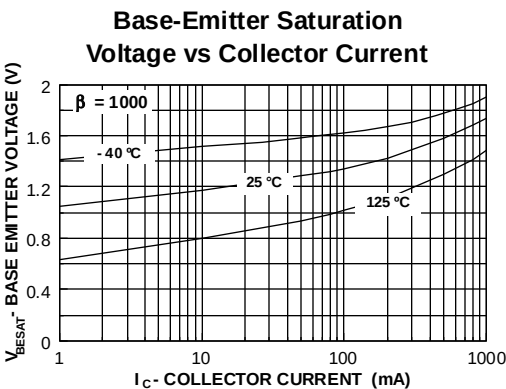
|           |                                  |                                                                 |     |     |     |
|-----------|----------------------------------|-----------------------------------------------------------------|-----|-----|-----|
| $f_T$     | Current Gain - Bandwidth Product | $I_C = 10\text{ mA}$ , $V_{CE} = 5.0$ ,<br>$f = 100\text{ MHz}$ | 125 |     | MHz |
| $C_{obo}$ | Output Capacitance               | $V_{CB} = 1.0\text{ V}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$      |     | 8.0 | pF  |

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

Typical Characteristics



Typical Characteristics (continued)



Typical Characteristics (continued)

