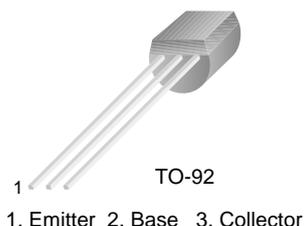


# MPSA13

## NPN Darlington Transistor

- This device is designed for applications requiring extremely high Current gain at collector Currents to 1.0A.
- Sourced from process 05.



### Absolute Maximum Ratings T<sub>a</sub> = 25°C unless otherwise noted

| Symbol                            | Parameter  | Value       | Units |
|-----------------------------------|--|-------------|-------|
| V <sub>CES</sub>                  | Collector-Emitter Voltage                        | 30          | V     |
| V <sub>CBO</sub>                  | Collector-Base Voltage                           | 30          | V     |
| V <sub>EBO</sub>                  | Emitter-Base Voltage                             | 10          | V     |
| I <sub>C</sub>                    | Collector Current - Continuous                   | 1.2         | A     |
| T <sub>J</sub> , T <sub>STG</sub> | Operating and Storage Junction Temperature Range | -55 to +150 | °C    |

### Electrical Characteristics T<sub>a</sub> = 25°C unless otherwise noted

| Symbol                              | Parameter                            | Test Condition   | Min.            | Max. | Units |
|-------------------------------------|--------------------------------------|--|-----------------|------|-------|
| <b>Off Characteristics</b>          |                                      |  |                 |      |       |
| V <sub>(BR)CES</sub>                | Collector-Emitter Breakdown Voltage  | I <sub>C</sub> = 100μA, I <sub>B</sub> = 0   | 30              |      | V     |
| I <sub>CB0</sub>                    | Collector-Cutoff Current             | V <sub>CB</sub> = 30V, I <sub>E</sub> = 0  |                 | 100  | nA    |
| I <sub>EBO</sub>                    | Emitter-Cutoff Current               | V <sub>EB</sub> = 10V, I <sub>C</sub> = 0  |                 | 100  | nA    |
| <b>On Characteristics *</b>         |                                      |  |                 |      |       |
| h <sub>FE</sub>                     | DC Current Gain                      | V <sub>CE</sub> = 5.0V, I <sub>C</sub> = 10mA<br>V <sub>CE</sub> = 5.0, I <sub>C</sub> = 100mA | 5,000<br>10,000 |      |       |
| V <sub>CE(sat)</sub>                | Collector-Emitter Saturation Voltage | I <sub>C</sub> = 100mA, I <sub>B</sub> = 0.1mA   |                 | 1.5  | V     |
| V <sub>BE(on)</sub>                 | Base-Emitter On Voltage              | I <sub>C</sub> = 100mA, V <sub>CE</sub> = 5.0V   |                 | 2.0  | V     |
| <b>Small Signal Characteristics</b> |                                      |  |                 |      |       |
| f <sub>T</sub>                      | Current Gain Bandwidth Product       | I <sub>C</sub> = 10mA, V <sub>CE</sub> = 10V, f = 100MHz                                       | 125             |      | pF    |

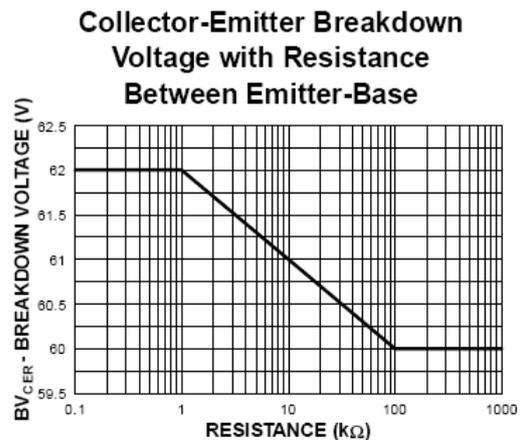
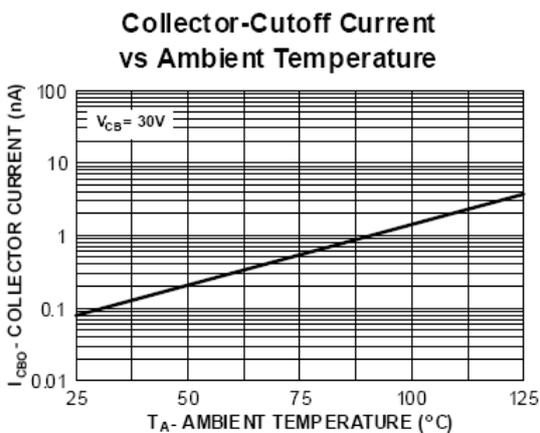
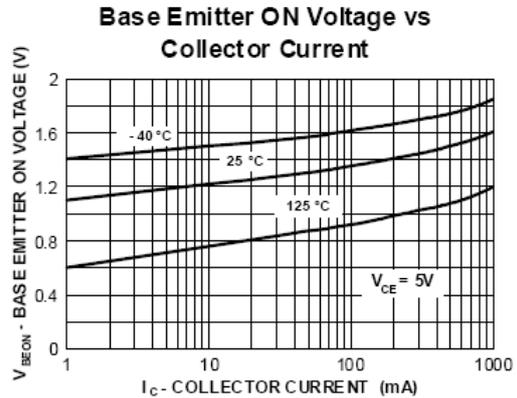
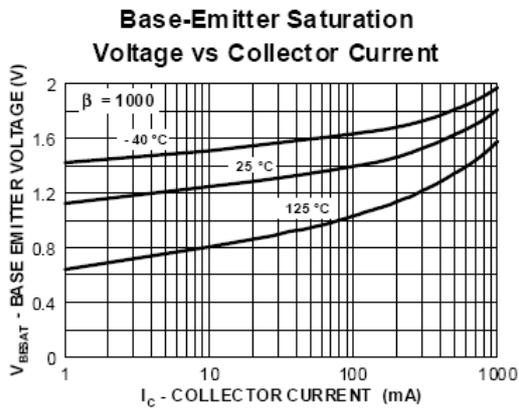
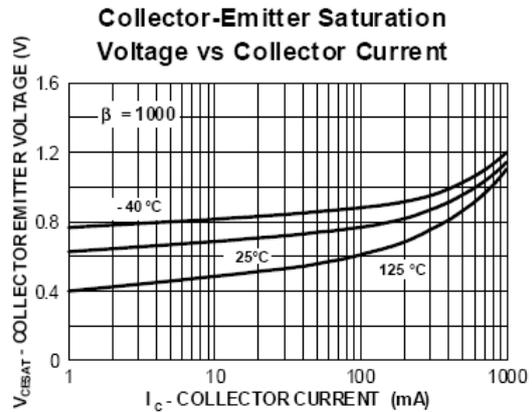
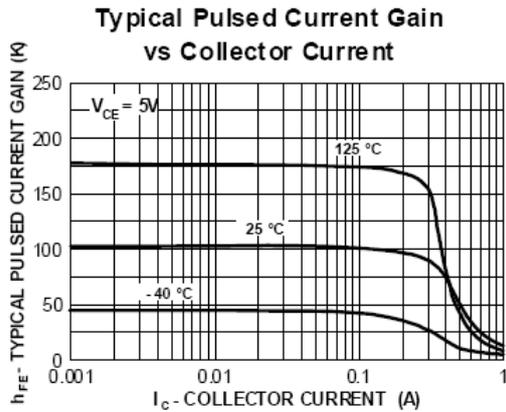
\* Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%

### Thermal Characteristics $T_a=25^\circ\text{C}$ unless otherwise noted

| Symbol          | Parameter   | Max.       | Units                      |
|-----------------|---|------------|----------------------------|
| $P_D$           | Total Device Dissipation<br>Derate above $25^\circ\text{C}$ | 625<br>5.0 | mW<br>mW/ $^\circ\text{C}$ |
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case                        | 83.3       | $^\circ\text{C}/\text{W}$  |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient                     | 200        | $^\circ\text{C}/\text{W}$  |

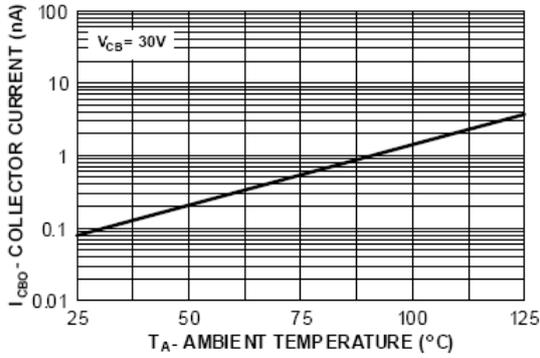
\* Device mounted on FR-4PCB  $1.6" \times 1.6" \times 0.06"$ .

### Typical Characteristics

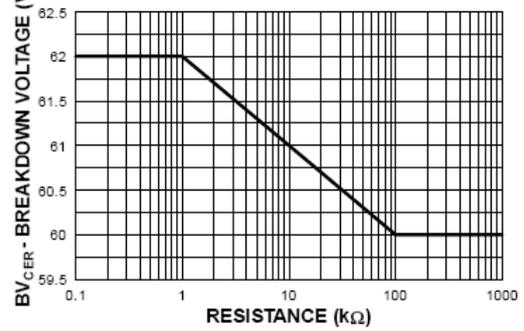


**Typical Characteristics** (continued)

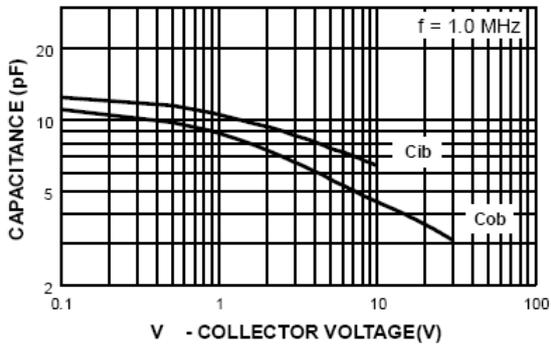
**Collector-Cutoff Current vs Ambient Temperature**



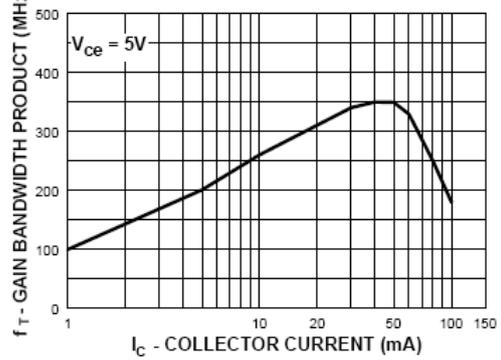
**Collector-Emitter Breakdown Voltage with Resistance Between Emitter-Base**



**Input and Output Capacitance vs Reverse Voltage**

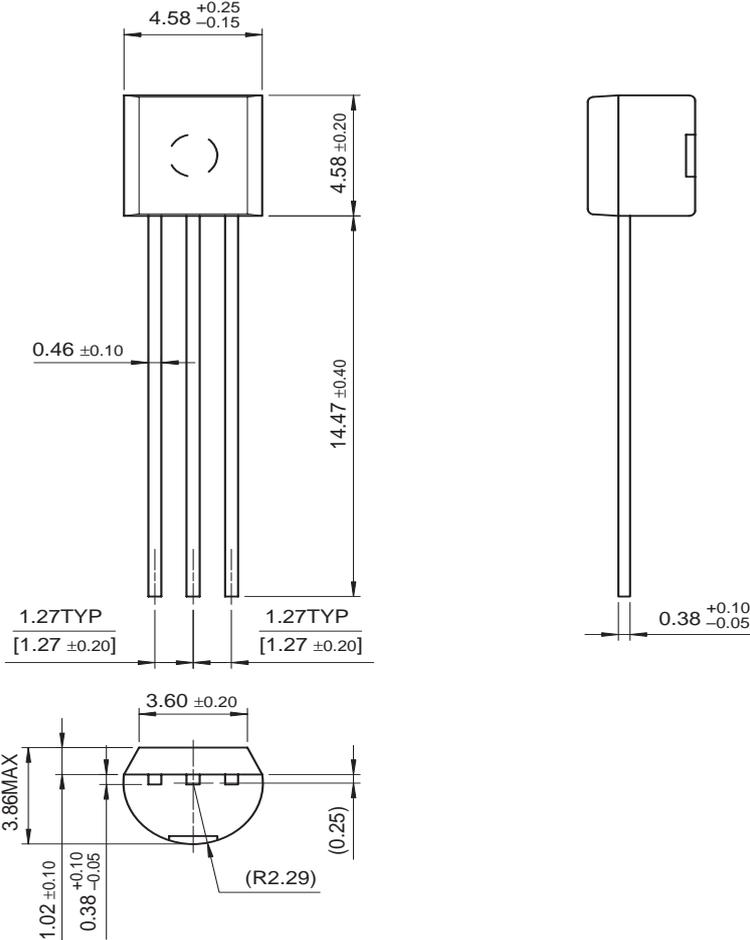


**Gain Bandwidth Product vs Collector Current**



Mechanical Dimensions

TO-92



Dimensions in Millimeters



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| Bottomless™                          | IntelliMAX™        | QFET®   | TINYOPTO™       |
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| CoolFET™                             | MICROCOUPLER™      | QT Optoelectronics™   | TinyWire™       |
| CROSSVOLT™                           | MicroPak™          | Quiet Series™   | TruTranslation™ |
| CTL™                                 | MICROWIRE™         | RapidConfigure™   | µSerDes™        |
| Current Transfer Logic™              | Motion-SPM™        | RapidConnect™   | UHC®            |
| DOME™                                | MSX™               | ScalarPump™   | UniFET™         |
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| EcoSPARK®                            | OCX™               | SPM®  | Wire™           |
| EnSigna™                             | OCXPro™            | STEALTH™  |                 |
| FACT Quiet Series™                   | OPTOLOGIC®         | SuperFET™   |                 |
| FACT®                                | OPTOPLANAR®        | SuperSOT™-3   |                 |
| FAST®                                | PACMAN™            | SuperSOT™-6   |                 |
| FASTr™                               | PDP-SPM™           | SuperSOT™-8   |                 |
| FPS™                                 | POP™               | SyncFET™  |                 |
| FRFET®                               | Power220®          | TCM™  |                 |
| GlobalOptoisolator™                  | Power247®          | The Power Franchise®  |                 |
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