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## MPSA13 & MPSA14 Silicon NPN Transistor Darlington, General Purpose Amplifier, Preamp, Driver TO-92 Type Package

### **Absolute Maximum Ratings:** ( $T_A = +25^\circ\text{C}$ unless otherwise specified)

|                                                               |                                     |
|---------------------------------------------------------------|-------------------------------------|
| Collector-Emitter Voltage, $V_{CES}$                          | 30V                                 |
| Collector-Base Voltage, $V_{CBO}$                             | 30V                                 |
| Emitter-Base Voltage, $V_{EBO}$                               | 10V                                 |
| Continuous Collector Current, $I_C$                           | 500mA                               |
| Total Device Dissipation ( $T_A = +25^\circ\text{C}$ ), $P_D$ | 625mW                               |
| Derate Above $25^\circ\text{C}$                               | 5mW/ $^\circ\text{C}$               |
| Total Device Dissipation ( $T_C = +25^\circ\text{C}$ ), $P_D$ | 1.5W                                |
| Derate Above $25^\circ\text{C}$                               | 12mW/ $^\circ\text{C}$              |
| Operating Junction Temperature Range, $T_J$                   | $-55^\circ$ to $+150^\circ\text{C}$ |
| Storage Temperature Range, $T_{stg}$                          | $-55^\circ$ to $+150^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Case, $R_{thJC}$              | 83.3 $^\circ\text{C}$               |
| Thermal Resistance, Junction-to-Ambient, $R_{thJA}$           | 200 $^\circ\text{C/W}$              |

### **Electrical Characteristics:** ( $T_A = +25^\circ\text{C}$ unless otherwise specified)

| Parameter                            | Symbol        | Test Conditions                                                            | Min    | Typ | Max | Unit |
|--------------------------------------|---------------|----------------------------------------------------------------------------|--------|-----|-----|------|
| <b>OFF Characteristics</b>           |               |                                                                            |        |     |     |      |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CES}$ | $I_C = 100\mu\text{A}$ , $V_{BE} = 0$                                      | 30     | —   | —   | V    |
| Collector Cutoff Current             | $I_{CBO}$     | $V_{CB} = 30\text{V}$ , $I_E = 0$                                          | —      | —   | 100 | nA   |
| Emitter Cutoff Current               | $I_{EBO}$     | $V_{BE} = 10\text{V}$ , $I_C = 0$                                          | —      | —   | 100 | nA   |
| <b>ON Characteristics (Note 1)</b>   |               |                                                                            |        |     |     |      |
| DC Current Gain<br>MPSA13            | $h_{FE}$      | $I_C = 10\text{mA}$ , $V_{CE} = 5\text{V}$                                 | 5,000  | —   | —   |      |
| MPSA14                               |               |                                                                            | 10,000 | —   | —   |      |
| MPSA13                               |               | $I_C = 100\text{mA}$ , $V_{CE} = 5\text{V}$                                | 10,000 | —   | —   |      |
| MPSA14                               |               |                                                                            | 20,000 | —   | —   |      |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 100\text{mA}$ , $I_B = 0.1\text{mA}$                                | —      | —   | 1.5 | V    |
| Base-Emitter ON Voltage              | $V_{BE(on)}$  | $I_C = 100\text{mA}$ , $V_{CE} = 5\text{V}$                                | —      | —   | 2.0 | V    |
| <b>Small-Signal Characteristics</b>  |               |                                                                            |        |     |     |      |
| Current Gain-Bandwidth Product       | $f_T$         | $I_C = 10\text{mA}$ , $V_{CE} = 10\text{V}$ , $f = 100\text{MHz}$ , Note 2 | 125    | —   | —   | MHz  |

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

Note 2.  $f_T = |h_{fe}| \cdot f_{test}$

