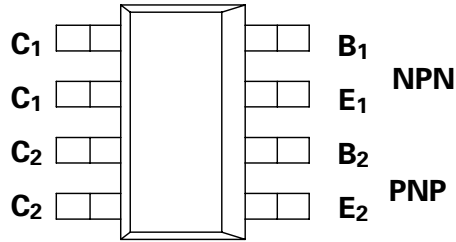


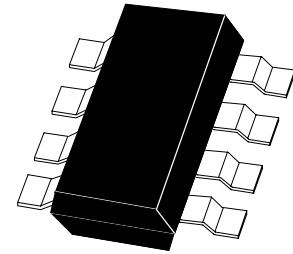
SM-8 COMPLEMENTARY MEDIUM POWER DARLINGTON TRANSISTORS

ZDT6702

ISSUE 2 – February 1997



PARTMARKING DETAIL – T6702



SM-8
(8 LEAD SOT223)

ABSOLUTE MAXIMUM RATINGS.

| PARAMETER | SYMBOL | NPN | PNP | UNIT |
|---|----------------|-------------|-------|------|
| Collector-Base Voltage | V_{CBO} | 80 | -80 | V |
| Collector-Emitter Voltage | V_{CEO} | 60 | -60 | V |
| Emitter-Base Voltage | V_{EBO} | 10 | -10 | V |
| Peak Pulse Current | I_{CM} | 4 | -4 | A |
| Continuous Collector Current | I_C | 1.75 | -1.75 | A |
| Operating and Storage Temperature Range | $T_j; T_{stg}$ | -55 to +150 | | °C |

THERMAL CHARACTERISTICS

| PARAMETER | SYMBOL | VALUE | UNIT |
|---|-----------|--------------|----------------|
| Total Power Dissipation at $T_{amb} = 25^\circ\text{C}^*$ Any single die "on" Both die "on" equally | P_{tot} | 2.25 | W |
| | | 2.75 | W |
| Derate above 25°C^* Any single die "on" Both die "on" equally | | 18 22 | mW/°C mW/°C |
| Thermal Resistance - Junction to Ambient* Any single die "on" Both die "on" equally | | 55.6 45.5 | °C/W °C/W |

* The power which can be dissipated assuming the device is mounted in a typical manner on a PCB with copper equal to 2 inches square.

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NPN TRANSISTOR ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | CONDITIONS. |
|---------------------------------------|---------------|--------------------------|------------------------|--------------|---------------------|---|
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | 80 | 200 | | V | $I_C = 100\mu\text{A}$ |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | 60 | 100 | | V | $I_C = 10\text{mA}^*$ |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | 10 | 15 | | V | $I_E = 100\mu\text{A}$ |
| Collector Cutoff Current | I_{CBO} | | 0.5 | 10 10 | nA μA | $V_{CB} = 60\text{V}$ $V_{CB} = 60\text{V}, T_{amb} = 100^{\circ}\text{C}$ |
| Emitter Cutoff Current | I_{EBO} | | 0.1 | 10 | nA | $V_{EB} = 8\text{V}$ |
| Collector-Emitter Cutoff Current | I_{CES} | | 50 | 500 | nA | $V_{CE} = 60\text{V}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | | 0.83 1.0 | 0.95 1.28 | V V | $I_C = 0.5\text{A}, I_B = 0.5\text{mA}^*$ $I_C = 1.75\text{A}, I_B = 2\text{mA}^*$ |
| Base-Emitter Saturation Voltage | $V_{BE(sat)}$ | | 1.68 | 1.85 | V | $I_C = 1.75\text{A}, I_B = 2\text{mA}^*$ |
| Base-Emitter Turn-On Voltage | $V_{BE(on)}$ | | 1.55 | 1.75 | V | $I_C = 1.75\text{A}, V_{CE} = 5\text{V}^*$ |
| Static Forward Current Transfer Ratio | h_{FE} | 5K 5K 3.5K 0.5K | 13K 13K 9K 2K | | | $I_C = 10\text{mA}, V_{CE} = 5\text{V}$ $I_C = 500\text{mA}, V_{CE} = 5\text{V}$ $I_C = 2\text{A}, V_{CE} = 5\text{V}$ $I_C = 4\text{A}, V_{CE} = 5\text{V}^*$ |
| Transition Frequency | f_T | | 140 | | MHz | $I_C = 100\text{mA}, V_{CE} = 10\text{V}$ $f = 100\text{MHz}$ |
| Input Capacitance | C_{ibo} | | 70 | | pF | $V_{EB} = 500\text{mV}, f = 1\text{MHz}$ |
| Output Capacitance | C_{obo} | | 15 | | pF | $V_{CB} = 10\text{V}, f = 1\text{MHz}$ |
| Switching Times | t_{on} | | 0.5 | | μs | $I_C = 500\text{mA}, V_{CE} = 10\text{V}$ $I_{B1} = I_{B2} = 0.5\text{mA}$ |
| | t_{off} | | 2.1 | | μs | |

*Measured under pulsed conditions. Pulse width=300 μs . Duty cycle $\leq 2\%$

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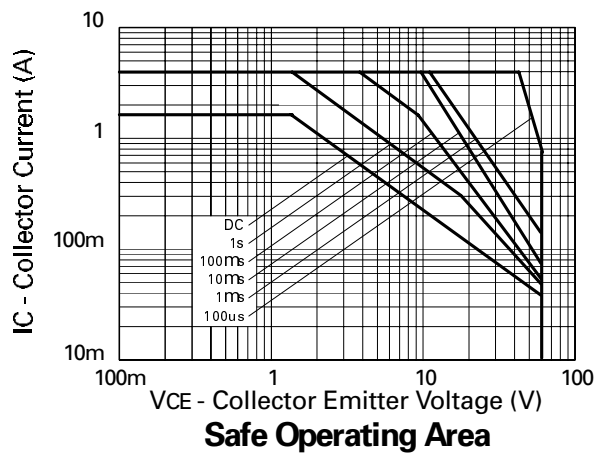
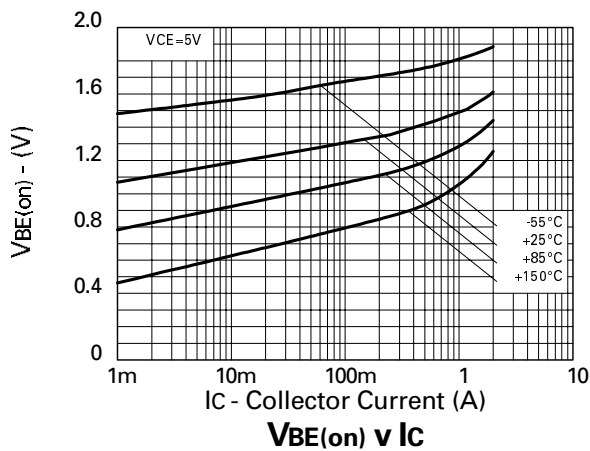
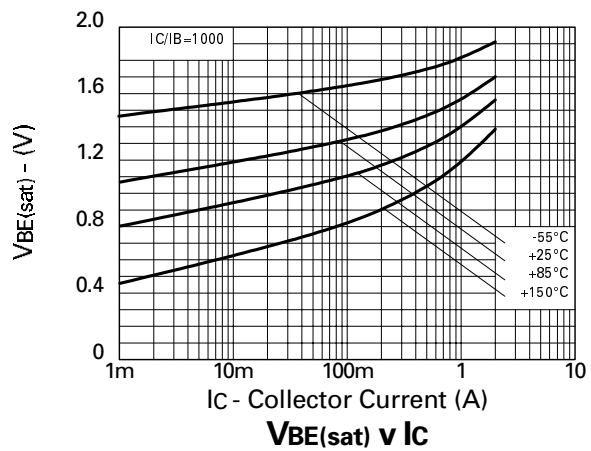
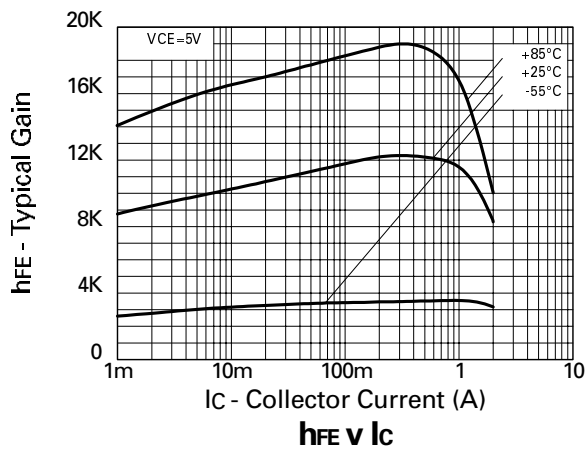
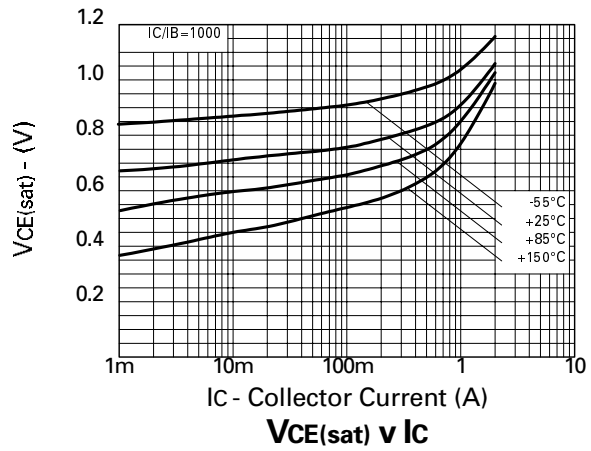
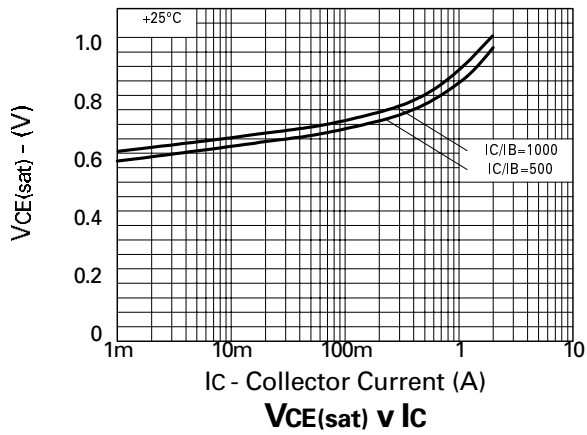
PNP TRANSISTOR ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | CONDITIONS. |
|---------------------------------------|----------------|------------------------|----------------------|---------------|---------------------|---|
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | -80 | -120 | | V | $I_C = -100\mu\text{A}$ |
| Collector-Emitter Breakdown Voltage | $V_{CEO(SUS)}$ | -60 | -90 | | V | $I_C = -10\text{mA}^*$ |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | -10 | -15 | | V | $I_E = -100\mu\text{A}$ |
| Collector Cutoff Current | I_{CBO} | | -0.5 | -10 -10 | nA μA | $V_{CB} = -60\text{V}$ $V_{CB} = -60\text{V}$, $T_{amb} = 100^{\circ}\text{C}$ |
| Emitter Cutoff Current | I_{EBO} | | -0.1 | -10 | nA | $V_{EB} = -8\text{V}$ |
| Collector-Emitter Cutoff Current | I_{CES} | | -50 | -500 | nA | $V_{CE} = -60\text{V}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | | -0.86 -1.05 | -1.0 -1.28 | V V | $I_C = -0.5\text{A}$, $I_B = -0.5\text{mA}^*$ $I_C = -1.75\text{A}$, $I_B = -2\text{mA}^*$ |
| Base-Emitter Saturation Voltage | $V_{BE(sat)}$ | | -1.7 | -1.9 | V | $I_C = -1.75\text{A}$, $I_B = -2\text{mA}^*$ |
| Base-Emitter Turn-On Voltage | $V_{BE(on)}$ | | -1.55 | -1.85 | V | $I_C = -1.75\text{A}$, $V_{CE} = -5\text{V}^*$ |
| Static Forward Current Transfer Ratio | h_{FE} | 2K 2K 1.5K 1K | 8K 8K 7K 4K | | | $I_C = -10\text{mA}$, $V_{CE} = -5\text{V}^*$ $I_C = -500\text{mA}$, $V_{CE} = -5\text{V}^*$ $I_C = -2\text{A}$, $V_{CE} = -5\text{V}^*$ $I_C = -4\text{A}$, $V_{CE} = -5\text{V}^*$ |
| Transition Frequency | f_T | | 140 | | MHz | $I_C = -100\text{mA}$, $V_{CE} = -10\text{V}$ $f = 100\text{MHz}$ |
| Input Capacitance | C_{ibo} | | 90 | | pF | $V_{EB} = -0.5\text{V}$, $f = 1\text{MHz}$ |
| Output Capacitance | C_{obo} | | 25 | | pF | $V_{CE} = -10\text{V}$, $f = 1\text{MHz}$ |
| Switching Times | t_{on} | | 0.75 | | μs | $I_C = -0.5\text{A}$, $V_{CE} = -10\text{V}$ $I_{B1} = I_{B2} = -0.5\text{mA}$ |
| | t_{off} | | 1.2 | | μs | |

*Measured under pulsed conditions. Pulse width=300 μs . Duty cycle $\leq 2\%$

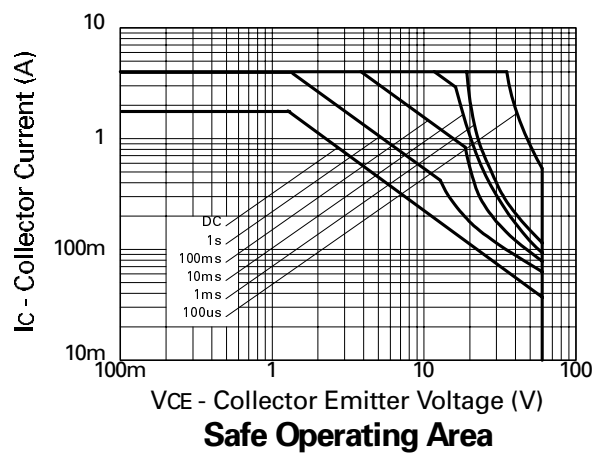
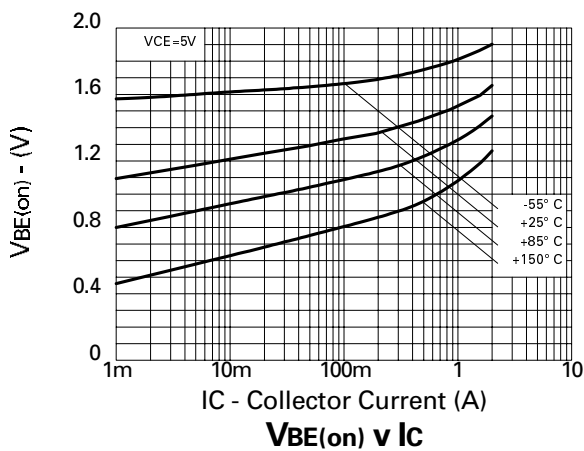
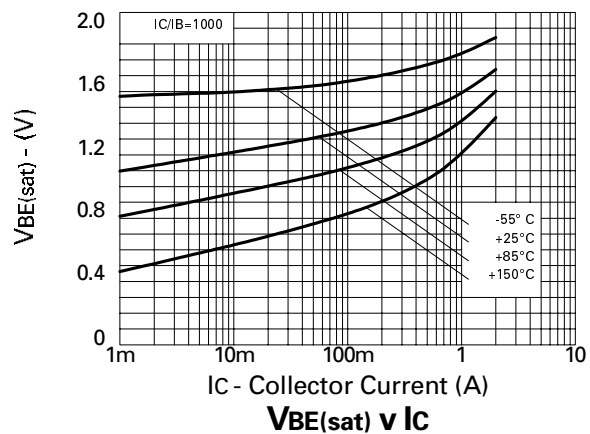
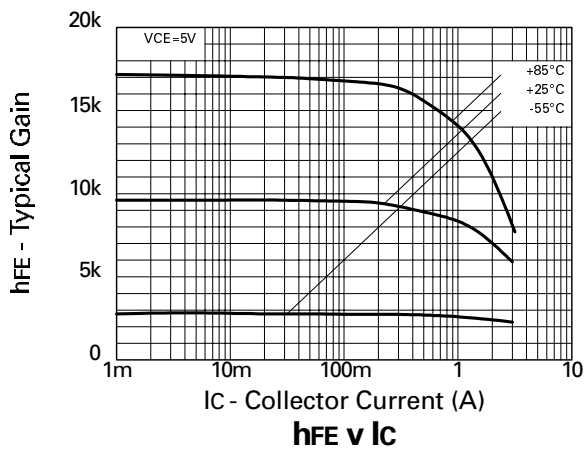
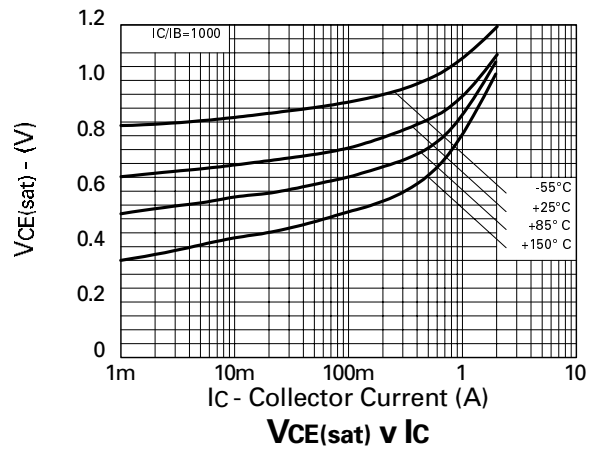
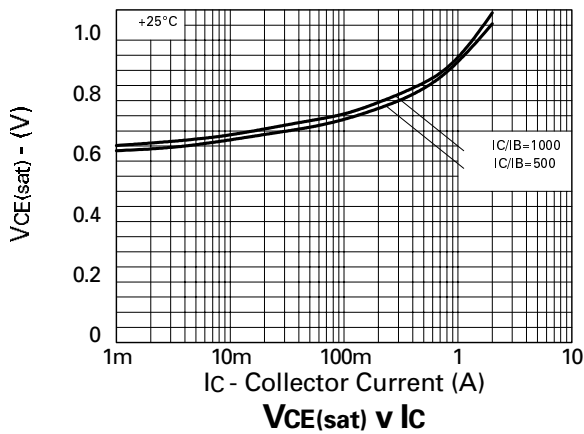
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TYPICAL CHARACTERISTICS (NPN TRANSISTOR)



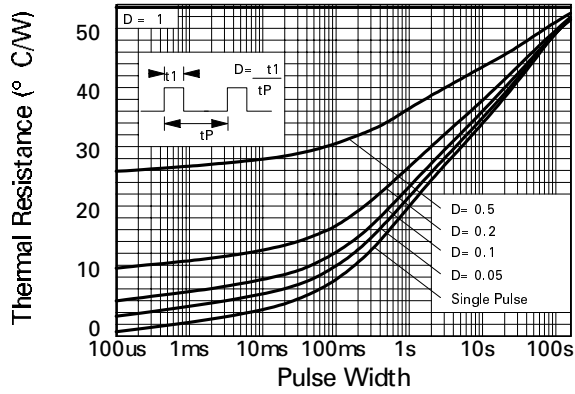
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TYPICAL CHARACTERISTICS (PNP TRANSISTOR)

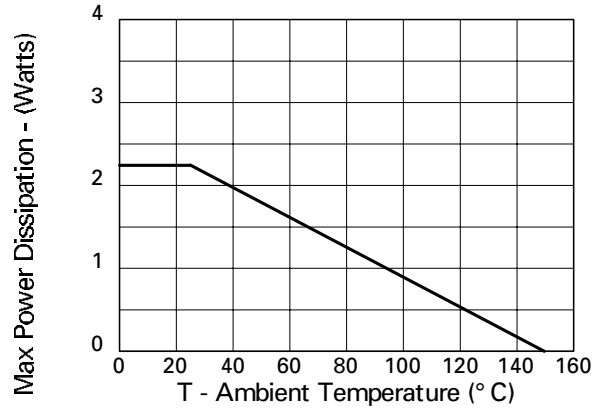


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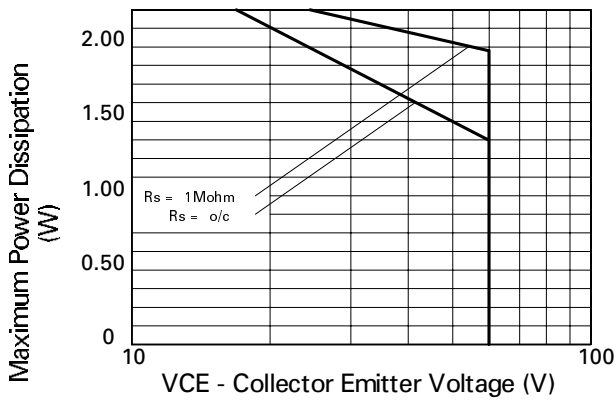
OTHER CHARACTERISTICS



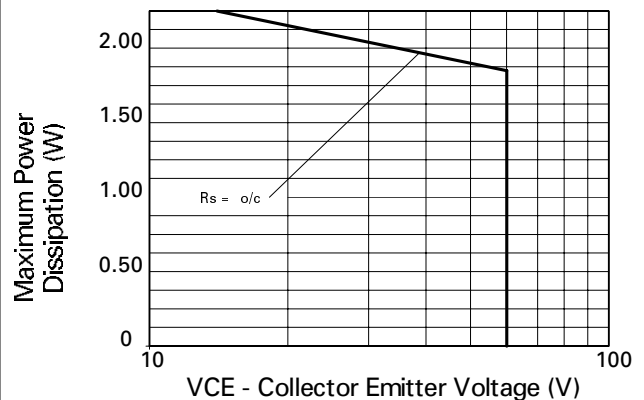
**Transient Thermal Resistance
(single device)**



**Derating curve
(single device)**

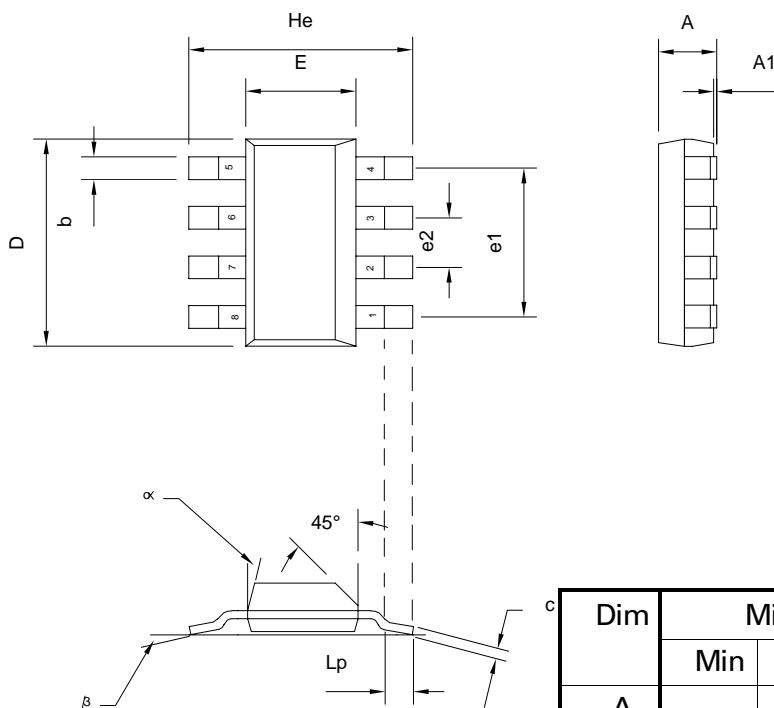


Voltage Derating



Voltage Derating

ZDT6702



| Dim | Millimetres | | | Inches | | |
|----------|-------------|------|------|--------|-------|-------|
| | Min | Typ | Max | Min | Typ | Max |
| A | - | - | 1.7 | - | - | 0.067 |
| A1 | 0.02 | - | 0.1 | 0.0008 | - | 0.004 |
| b | - | 0.7 | - | - | 0.028 | - |
| c | 0.24 | - | 0.32 | 0.009 | - | 0.013 |
| D | 6.3 | - | 6.7 | 0.248 | - | 0.264 |
| E | 3.3 | - | 3.7 | 0.130 | - | 0.145 |
| e1 | - | 4.59 | - | - | 0.180 | - |
| e2 | - | 1.53 | - | - | 0.060 | - |
| He | 6.7 | - | 7.3 | 0.264 | - | 0.287 |
| Lp | 0.9 | - | - | 0.035 | - | - |
| α | - | - | 15° | - | - | 15° |
| β | - | 10° | - | - | 10° | - |

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