

ZDT1048

SM-8 Dual NPN medium power high gain transistors

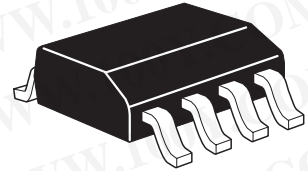
Summary

$BV_{CEO} > 17.5V$

$I_{C(cont)} = 5A$

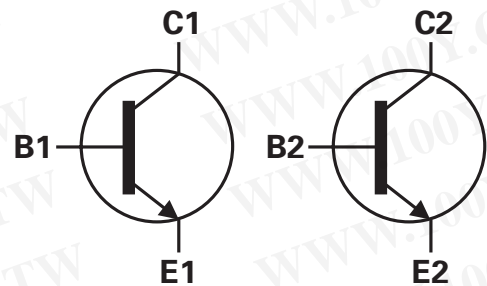
$V_{CE(sat)} < 75mV @ 1A$

$P_D = 2.75W$



Description

Advanced process capability has been used to achieve this high performance device. Combining two NPN transistors in the SM-8 package provides a compact solution for the intended applications.



Features

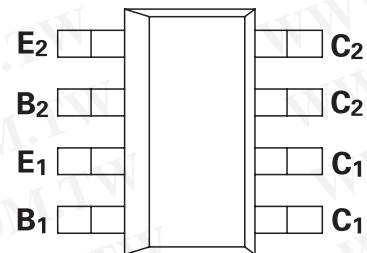
- Dual NPN device
- Very low saturation voltage
- High gain
- SM 8 package

Applications

- CCFL invertors
- Royer circuits

Ordering information

| DEVICE | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-----------|--------------------|-----------------|-------------------|
| ZDT1048TA | 7 | 12 | 1000 |



Device marking

T1048

勝特力材料 886-3-5753170
 勝特力电子(上海) 86-21-34970699
 勝特力电子(深圳) 86-755-83298787
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Absolute maximum ratings

| Parameter | Symbol | Value | Unit |
|---|----------------|-------------|------|
| Collector-base voltage | V_{CBO} | 50 | V |
| Collector-emitter voltage | V_{CEO} | 17.5 | V |
| Emitter-base voltage | V_{EBO} | 5 | V |
| Peak pulse current | I_{CM} | 20 | A |
| Continuous collector current | I_C | 5 | A |
| Base current | I_B | 500 | mA |
| Operating and storage temperature range | $T_j; T_{stg}$ | -55 to +150 | °C |

Thermal Characteristics

| Parameter | Symbol | Value | Unit |
|---|-----------|-------|-------|
| Total power dissipation at $T_{amb} = 25^\circ\text{C}^*$ | P_{tot} | 2.25 | W |
| Any single die "on" | | | |
| Both die "on" equally | | 2.75 | W |
| Derate above 25°C^* | | 18 | V |
| Any single die "on" | | | mW/°C |
| Both die "on" equally | | | 22 |
| Thermal resistance - junction to ambient* | | 55.6 | °C/W |
| Any single die "on" | | | °C/W |
| Both die "on" equally | | | 45.5 |

* 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.

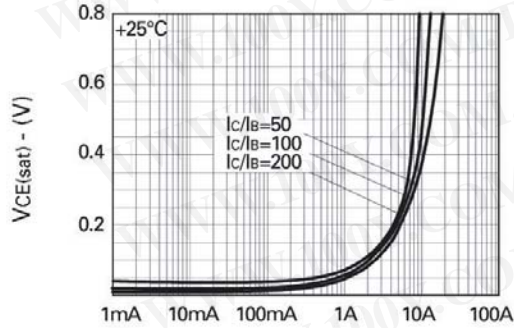
Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---------------------------------------|---------------|------|------|------|------|--|
| Collector-base breakdown voltage | $V_{(BR)CBO}$ | 50 | 85 | | V | $I_C=100\mu\text{A}$ |
| Collector-emitter breakdown voltage | V_{CES} | 50 | 85 | | V | $I_C=100\mu\text{A}$ |
| Collector-emitter breakdown voltage | V_{CEO} | 17.5 | 24 | | V | $I_C=10\text{mA}$ |
| Collector-emitter breakdown voltage | V_{CEV} | 50 | 85 | | V | $I_C=100\mu\text{A}, V_{EB}=1\text{V}$ |
| Emitter-base breakdown voltage | $V_{(BR)EBO}$ | 5 | 8.7 | | V | $I_E=100\mu\text{A}$ |
| Collector cut-off current | I_{CBO} | | 0.3 | 10 | nA | $V_{CB}=35\text{V}$ |
| Emitter cut-off current | I_{EBO} | | 0.3 | 10 | nA | $V_{EB}=4\text{V}$ |
| Collector-emitter cut-off current | I_{CES} | | 0.3 | 10 | nA | $I_{CES}=35\text{V}$ |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | | 27 | 45 | mV | $I_C=0.5\text{A}, I_B=10\text{mA}^{(*)}$ |
| | | | 55 | 75 | mV | $I_C=1\text{A}, I_B=10\text{mA}^{(*)}$ |
| | | | 120 | 160 | mV | $I_C=2\text{A}, I_B=10\text{mA}^{(*)}$ |
| | | | 200 | 240 | mV | $I_C=5\text{A}, I_B=100\text{mA}^{(*)}$ |
| | | | 200 | 300 | mV | $I_C=5\text{A}, I_B=50\text{mA}^{(*)}$ |
| Base-emitter saturation voltage | $V_{BE(sat)}$ | | 1000 | 1100 | mV | $I_C=5\text{A}, I_B=100\text{mA}^{(*)}$ |
| Base-emitter turn on voltage | $V_{BE(on)}$ | | 900 | 1000 | mV | $I_C=5\text{A}, V_{CE}=2\text{V}^{(*)}$ |
| Static forward current transfer ratio | h_{FE} | 280 | 440 | | | $I_C=10\text{mA}, V_{CE}=2\text{V}^{(*)}$ |
| | | 300 | 450 | 1200 | | $I_C=0.5\text{A}, V_{CE}=2\text{V}^{(*)}$ |
| | | 300 | 450 | | | $I_C=1\text{A}, V_{CE}=2\text{V}^{(*)}$ |
| | | 250 | 300 | | | $I_C=5\text{A}, V_{CE}=2\text{V}^{(*)}$ |
| | | 50 | 80 | | | $I_C=20\text{A}, V_{CE}=2\text{V}^{(*)}$ |
| Transition frequency | f_T | | 150 | | MHz | $I_C=50\text{mA}, V_{CE}=10\text{V}$ $f=50\text{MHz}$ |
| Output capacitance | C_{obo} | | 60 | 80 | pF | $V_{CB}=10\text{V}, f=1\text{MHz}$ |
| Switching times | t_{on} | | 120 | | ns | $I_C=4\text{A}, I_B=40\text{mA}, V_{CC}=10\text{V}$ |
| | t_{off} | | 250 | | ns | $I_C=4\text{A}, I_B=\pm 40\text{mA}, V_{CC}=10\text{V}$ |

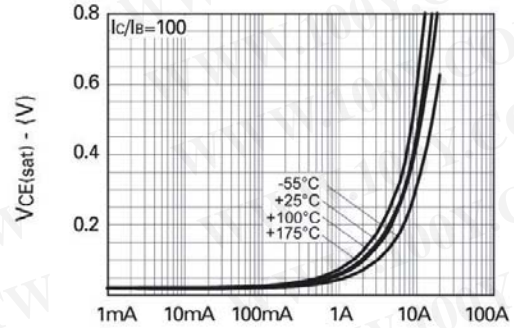
NOTES:

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

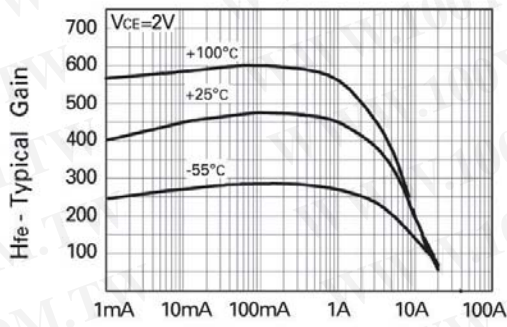
Typical characteristics



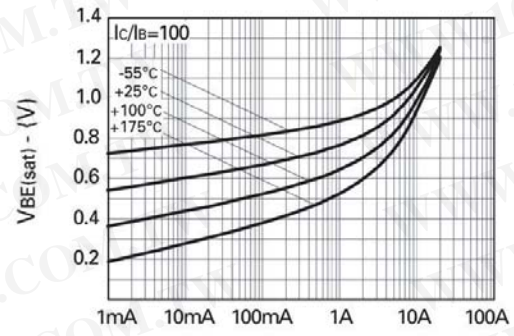
$V_{CE(sat)}$ v I_C



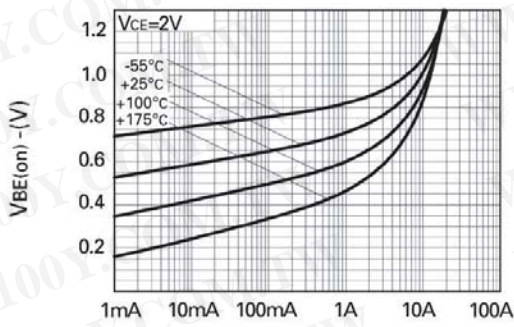
$V_{CE(sat)}$ v I_C



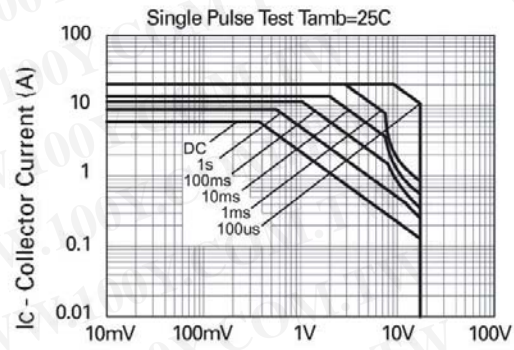
h_{FE} v I_C



$V_{BE(sat)}$ v I_C



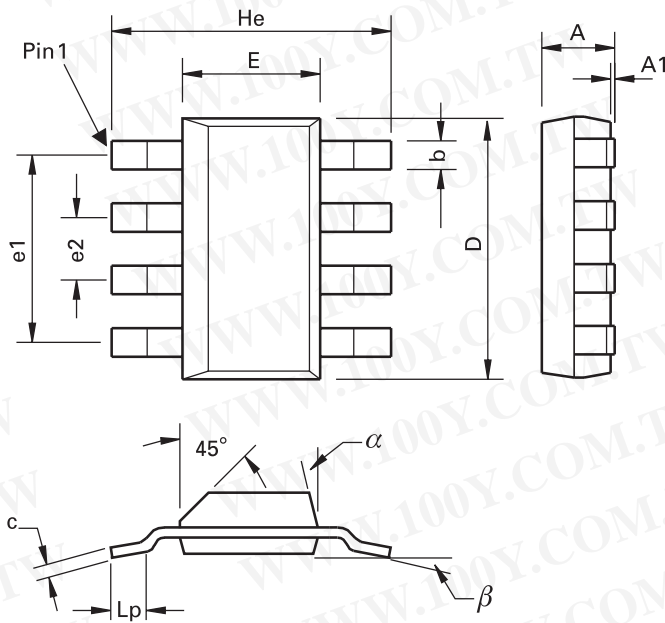
$V_{BE(on)}$ v I_C



Safe Operating Area

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Package outline - SM8



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| DIM | Millimeters | | | Inches | | | DIM | Millimeters | | | Inches | | |
|-----|-------------|------|------|--------|-------|--------|-----|-------------|------|------|--------|-------|--------|
| | Min. | Max. | Typ. | Min. | Max. | Typ. | | Min. | Max. | Typ. | Min. | Max. | Typ. |
| A | - | 1.7 | - | - | 0.067 | - | e1 | - | - | 4.59 | - | - | 0.1807 |
| A1 | 0.02 | 0.1 | - | 0.0008 | 0.004 | - | e2 | - | - | 1.53 | - | - | 0.0602 |
| b | - | - | 0.7 | - | - | 0.0275 | He | 6.7 | 7.3 | - | 0.264 | 0.287 | - |
| c | 0.24 | 0.32 | - | 0.009 | 0.013 | - | Lp | 0.9 | - | - | 0.035 | - | - |
| D | 6.3 | 6.7 | - | 0.248 | 0.264 | - | α | - | 15° | - | - | 15° | - |
| E | 3.3 | 3.7 | - | 0.130 | 0.145 | - | β | - | - | 10° | - | - | 10° |

Note: Controlling dimensions are in millimeters. Approximate dimensions are provided in inches

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