



YOUSHANG SEMICONDUCTOR

设计研发新型功率器件

各类小信号开关

中低压及高压大电流等场效应管

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企业微信二维码




企业QQ二维码

Features

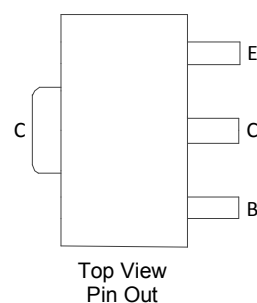
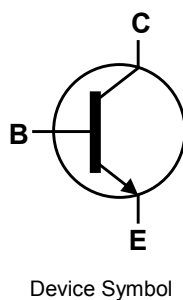
- $BV_{CEO} > 40V$
- $I_C = 5.0A$ Continuous Current
- Low Saturation Voltage $V_{CE(sat)} < 60mV @ 1A$
- $R_{sat} = 38m\Omega$ for a Low Equivalent On-Resistance
- $P_D = 2.4W$ Power Dissipation
- Complementary part number NK-ZXTP25040DZ

Mechanical Data

- Case: SOT89
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 
- Weight: 0.05 grams (Approximate)

Application

- Emergency lighting circuits
- Motor driving (including DC fans)
- Solenoid, relay and actuator drivers
- DC-DC modules
- Backlight inverters
- Power switches
- MOSFET gate drivers



Absolute Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

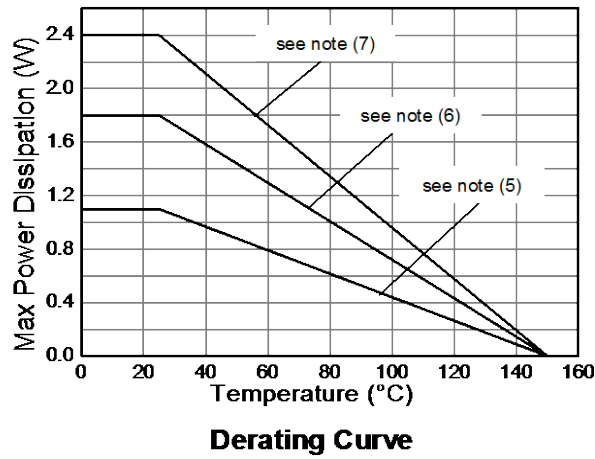
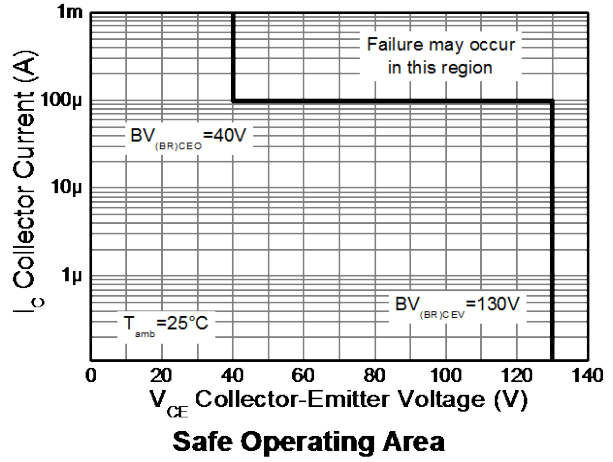
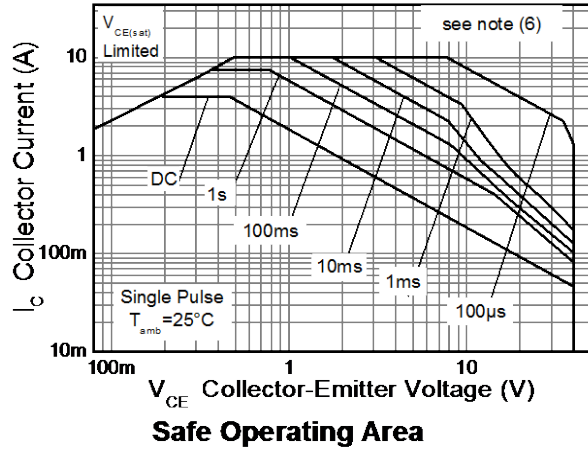
| Characteristic | Symbol | Value | Unit |
|--|-----------|-------|------|
| Collector-Base Voltage | V_{CBO} | 130 | V |
| Collector-Emitter Voltage (forward blocking) | V_{CEX} | 130 | V |
| Collector-Emitter Voltage | V_{CEO} | 40 | V |
| Emitter-collector voltage (reverse blocking) | V_{ECO} | 6 | V |
| Emitter-Base Voltage | V_{EBO} | 7 | V |
| Continuous Collector Current | I_C | 5 | A |
| Peak Pulse Collector Current | I_{CM} | 10 | A |
| Base current | I_B | 1 | A |

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

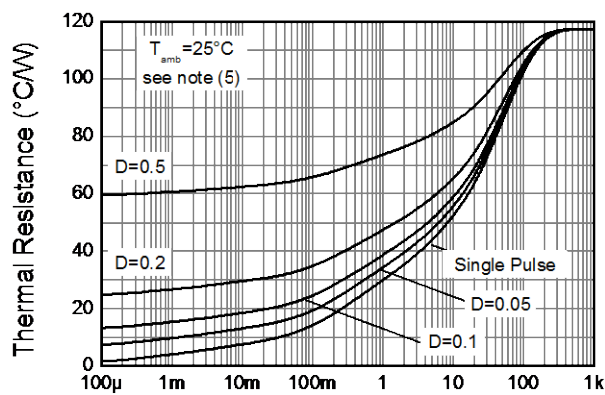
| Characteristic | Symbol | Value | Unit |
|--|-----------------|-------------|------------|
| Power Dissipation (Note 5) | P_D | 1.1 | W mW/°C |
| Linear Derating Factor | | 8.8 | |
| Power Dissipation (Note 6) | | 1.8 | |
| Linear Derating Factor | | 14.4 | |
| Power Dissipation (Note 7) | | 2.4 | |
| Linear Derating Factor | | 19.2 | |
| Power Dissipation (Note 8) | | 4.46 | |
| Linear Derating Factor | | 35.7 | |
| Thermal Resistance, Junction to Ambient (Note 5) | $R_{\theta JA}$ | 117 | °C/W |
| Thermal Resistance, Junction to Ambient (Note 6) | | 63 | |
| Thermal Resistance, Junction to Ambient (Note 7) | | 51 | |
| Thermal Resistance, Junction to Ambient (Note 8) | | 28 | |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | °C |

- Notes:
5. For a device surface mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; device measured when operating in steady state condition.
 6. Same as note (5), except the device is mounted on 25mm x 25mm x 1.6mm single sided 2oz weight copper.
 7. Same as note (5), except the device is mounted on 50mm x 50mm x 1.6mm single sided 2oz weight copper.
 8. Same as note (5), except the device is measured at $t < 5$ seconds.

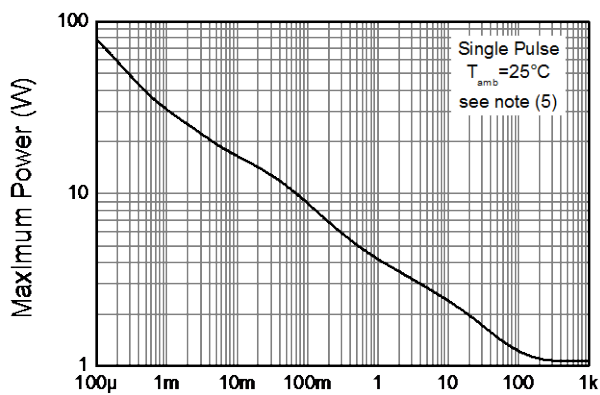
Thermal Characteristics and Derating Information



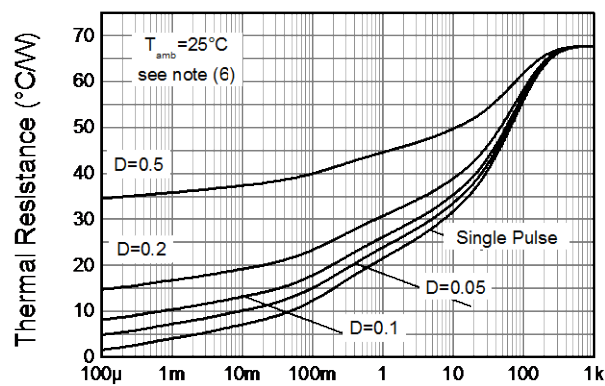
Thermal Characteristics and Derating Information



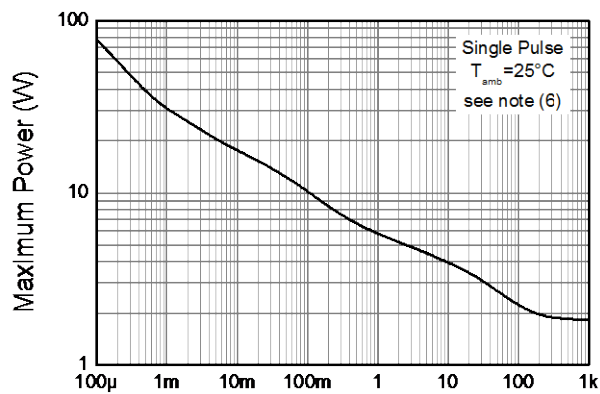
Transient Thermal Impedance



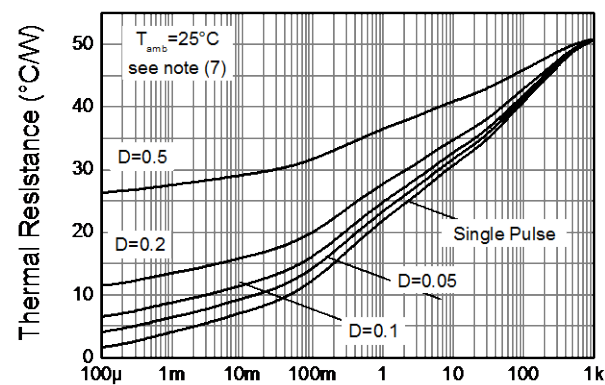
Pulse Power Dissipation



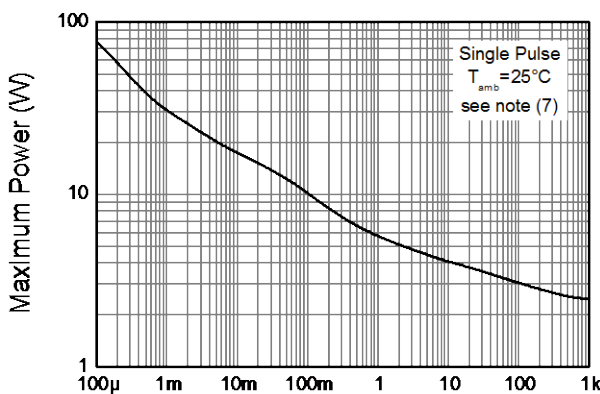
Transient Thermal Impedance



Pulse Power Dissipation



Transient Thermal Impedance



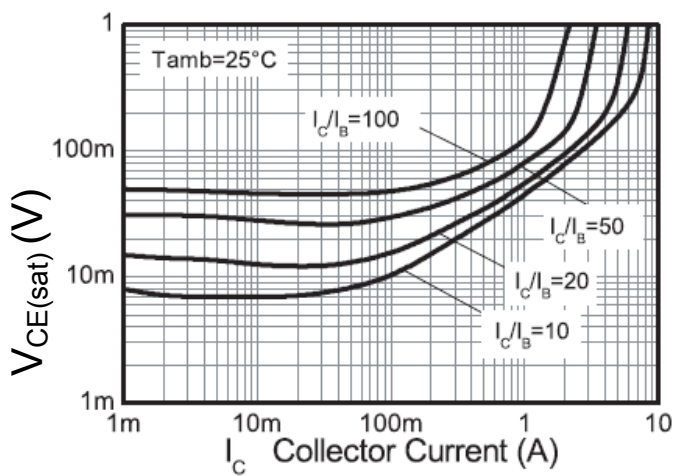
Pulse Power Dissipation

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

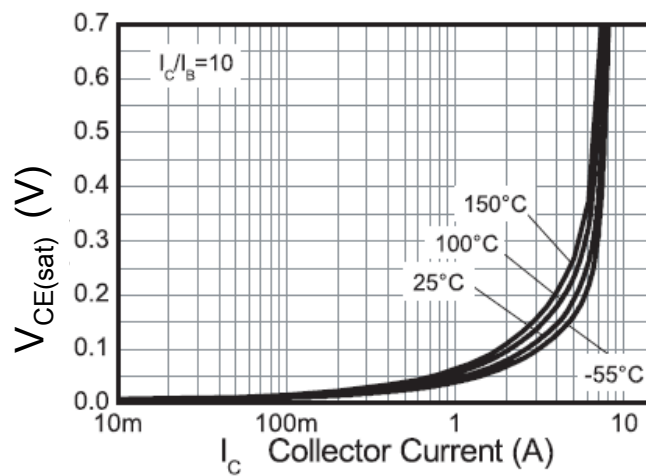
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------------------------------|-----------------------|-------------------------|-------------------------|---------------------|---|
| Collector-Base Breakdown Voltage | BV_{CBO} | 130 | 170 | — | V | $I_C = 100\mu\text{A}$ |
| Collector-Emitter Breakdown Voltage (forward blocking) | BV_{CEX} | 130 | 170 | — | V | $I_C = 100\mu\text{A}$; $R_{BE} \leq 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$ |
| Collector-Emitter Breakdown Voltage (Note 9) | BV_{CEO} | 40 | 63 | — | V | $I_C = 10\text{mA}$ |
| Emitter-Base Breakdown Voltage | BV_{EBO} | 7 | 8.3 | — | V | $I_E = 100\mu\text{A}$ |
| Emitter-Collector Breakdown voltage (reverse blocking) | BV_{ECX} | 6 | 7.4 | — | V | $I_E = 100\mu\text{A}$, $R_{BC} \leq 1\text{k}\Omega$ or $0.25\text{V} > V_{BC} > -0.25\text{V}$ |
| Emitter-Collector Breakdown voltage | BV_{ECO} | 6 | 7.4 | — | V | $I_E = 100\mu\text{A}$ |
| Collector Base Cut-Off Current | I_{CBO} | — | 1 | 50 | nA μA | $V_{CB} = 100\text{V}$ $V_{CB} = 100\text{V}$, $T_A = +100^\circ\text{C}$ |
| Collector Emitter Cut-Off Current | I_{CEX} $R \leq 1\text{k}\Omega$ | — | — | 100 | nA | $V_{CE} = 100\text{V}$; $R_{BE} \leq 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$ |
| Emitter Cut-Off Current | I_{EBO} | — | 1 | 50 | nA | $V_{EB} = 5.6\text{V}$ |
| Collector-Emitter Saturation Voltage (Note 9) | $V_{CE(sat)}$ | — | 50 125 140 190 | 60 215 215 260 | mV | $I_C = 1\text{A}$, $I_B = 100\text{mA}$ $I_C = 1\text{A}$, $I_B = 10\text{mA}$ $I_C = 2\text{A}$, $I_B = 40\text{mA}$ $I_C = 5\text{A}$, $I_B = 500\text{mA}$ |
| Base-Emitter Saturation Voltage (Note 9) | $V_{BE(sat)}$ | — | 1000 | 1100 | mV | $I_C = 5\text{A}$, $I_B = 500\text{mA}$ |
| Base-Emitter Turn-On Voltage (Note 9) | $V_{BE(on)}$ | — | 910 | 1000 | mV | $I_C = 5\text{A}$, $V_{CE} = 2\text{V}$ |
| DC Current Gain (Note 9) | h_{FE} | 300 300 20 — | 450 450 40 10 | 900 — — — | — | $I_C = 10\text{mA}$, $V_{CE} = 2\text{V}$ $I_C = 1\text{A}$, $V_{CE} = 2\text{V}$ $I_C = 5\text{A}$, $V_{CE} = 2\text{V}$ $I_C = 10\text{A}$, $V_{CE} = 2\text{V}$ |
| Transitional frequency | f_T | — | 190 | — | MHz | $I_C = 50\text{mA}$, $V_{CE} = 10\text{V}$, $f = 100\text{MHz}$ |
| Output Capacitance | C_{obo} | — | 11.7 | 20 | pF | $V_{CB} = 10\text{V}$, $f = 1\text{MHz}$ |
| Delay time | t_d | — | 64 | — | ns | $V_{CC} = 10\text{V}$ $I_C = 1\text{A}$, $I_{B1} = -I_{B2} = 10\text{mA}$ |
| Rise time | t_r | | 108 | | | |
| Storage time | t_s | | 428 | | | |
| Fall time | t_f | | 130 | | | |

 Note: 9. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

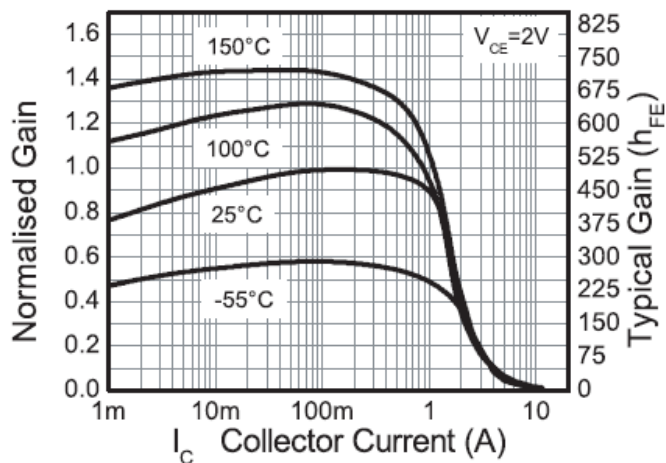
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



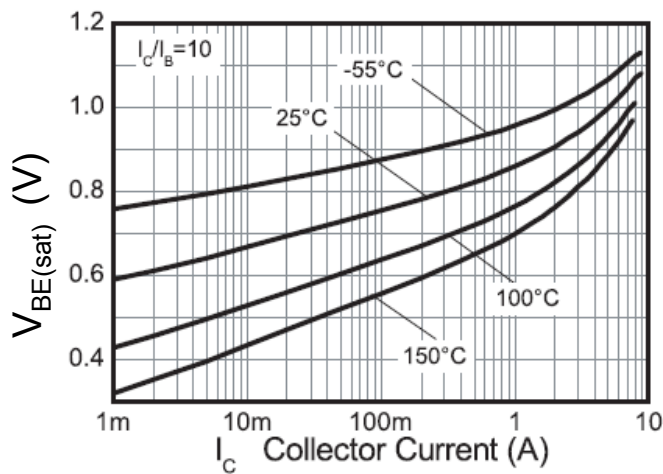
$V_{CE(sat)} \text{ v } I_C$



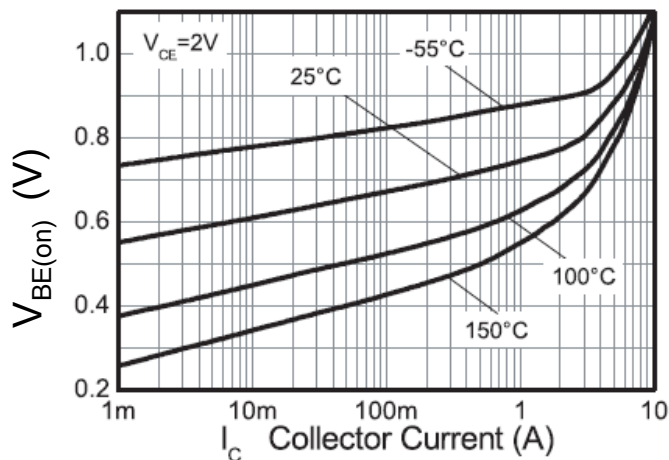
$V_{CE(sat)} \text{ v } I_C$



$h_{FE} \text{ v } I_C$



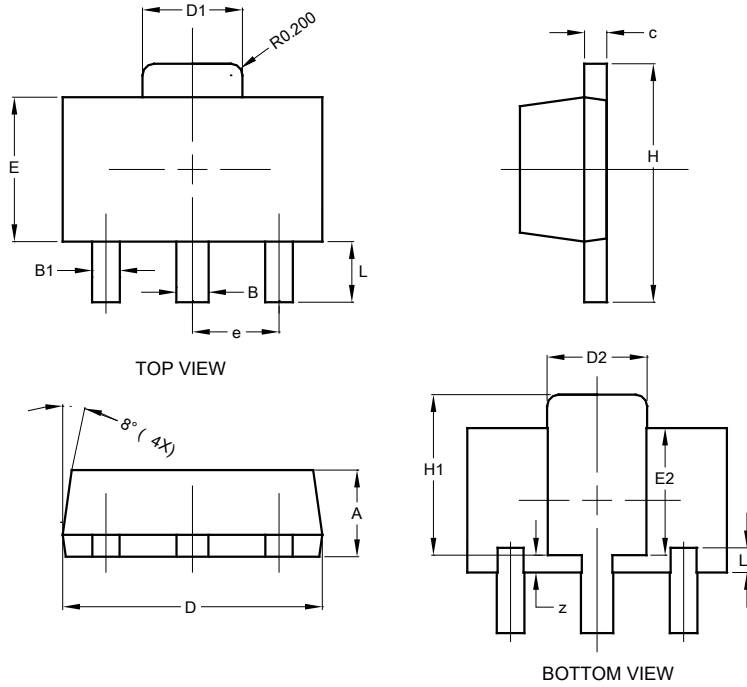
$V_{BE(sat)} \text{ v } I_C$



$V_{BE(on)} \text{ v } I_C$

Package Outline Dimensions

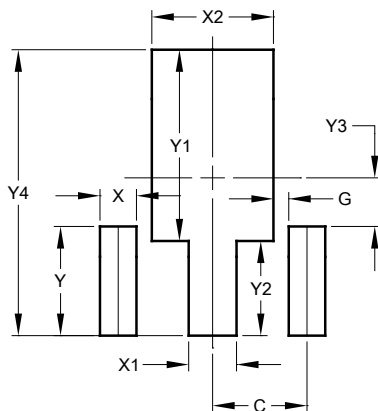
SOT89



| SOT89 | | | |
|----------------------|-------|-------|-------|
| Dim | Min | Max | Typ |
| A | 1.40 | 1.60 | 1.50 |
| B | 0.50 | 0.62 | 0.56 |
| B1 | 0.42 | 0.54 | 0.48 |
| c | 0.35 | 0.43 | 0.38 |
| D | 4.40 | 4.60 | 4.50 |
| D1 | 1.62 | 1.83 | 1.733 |
| D2 | 1.61 | 1.81 | 1.71 |
| E | 2.40 | 2.60 | 2.50 |
| E2 | 2.05 | 2.35 | 2.20 |
| e | - | - | 1.50 |
| H | 3.95 | 4.25 | 4.10 |
| H1 | 2.63 | 2.93 | 2.78 |
| L | 0.90 | 1.20 | 1.05 |
| L1 | 0.327 | 0.527 | 0.427 |
| z | 0.20 | 0.40 | 0.30 |
| All Dimensions in mm | | | |

Suggested Pad Layout

SOT89



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 1.500 |
| G | 0.244 |
| X | 0.580 |
| X1 | 0.760 |
| X2 | 1.933 |
| Y | 1.730 |
| Y1 | 3.030 |
| Y2 | 1.500 |
| Y3 | 0.770 |
| Y4 | 4.530 |