



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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Features

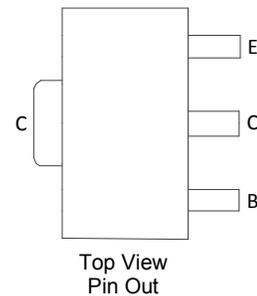
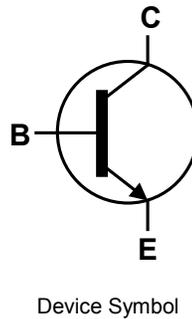
- $BV_{CEO} > 40V$
- $I_C = 3.0A$ Continuous Current
- Low Saturation Voltage $V_{CE(sat)} < 25mV @ 200mA$
- $R_{sat} = 57m\Omega$ for a Low Equivalent On-Resistance
- $P_D = 2W$ Power Dissipation
- Complementary part number: NK-FCX1151A

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 e3
- Weight: 0.05 grams (Approximate)

Application

- Motor drive
- Strobe flash
- MOSFET and IGBT gate driving
- DC - DC converters



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

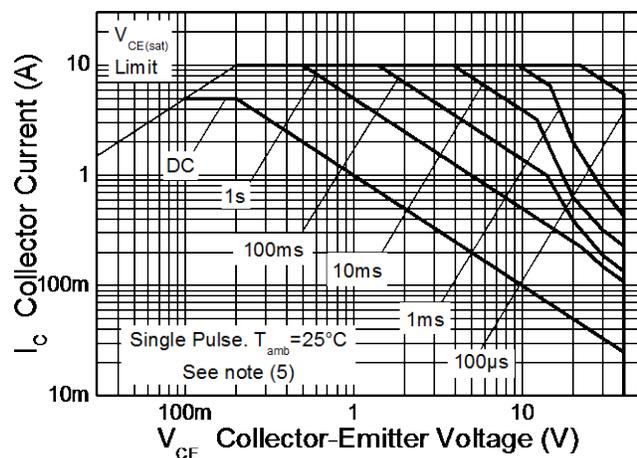
| Characteristic | Symbol | Value | Unit |
|---|-----------|-------|------|
| Collector-Base Voltage | V_{CBO} | 150 | V |
| Collector-Emitter Voltage | V_{CEO} | 40 | V |
| Emitter-Base Voltage | V_{EBO} | 5 | V |
| Continuous Collector Current | I_C | 3 | A |
| Peak Pulse Collector Current (single pulse) | I_{CM} | 10 | A |

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

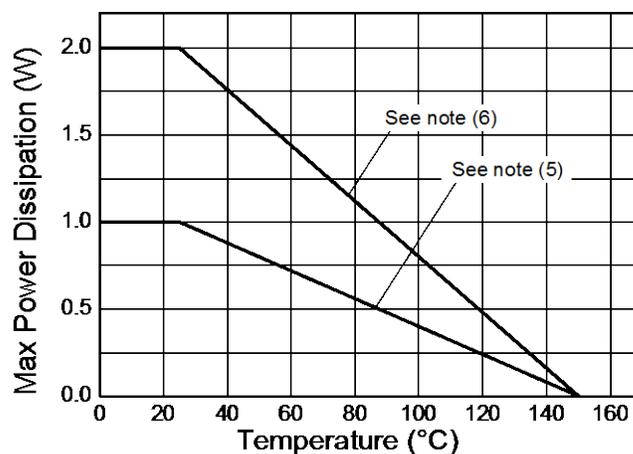
| Characteristic | Symbol | Value | Unit |
|---|----------------|-------------|------------------|
| Power Dissipation (Note 5) | P_D | 1 | W |
| Power Dissipation (Note 6) | P_D | 2 | W |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

- Notes:
5. For a device surface mounted on 15mm x 15mm x 0.6mm 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 40mm x 40mm x 0.6mm single sided 1oz weight copper.

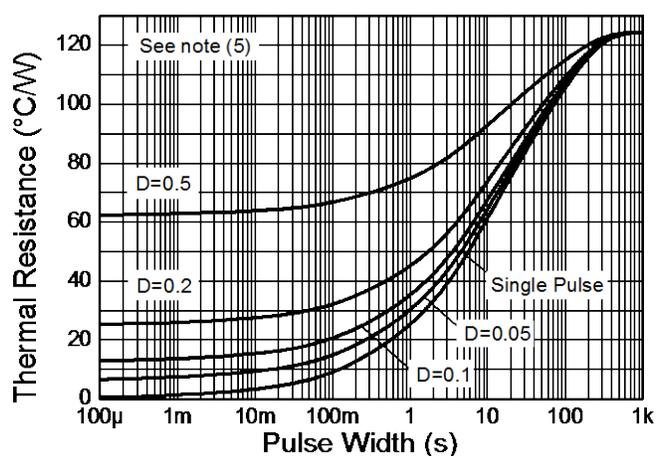
Thermal Characteristics and Derating Information



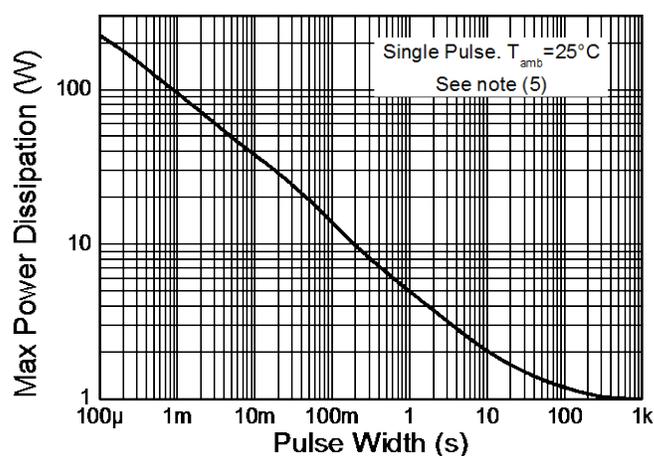
Safe Operating Area



Derating Curve



Transient Thermal Impedance



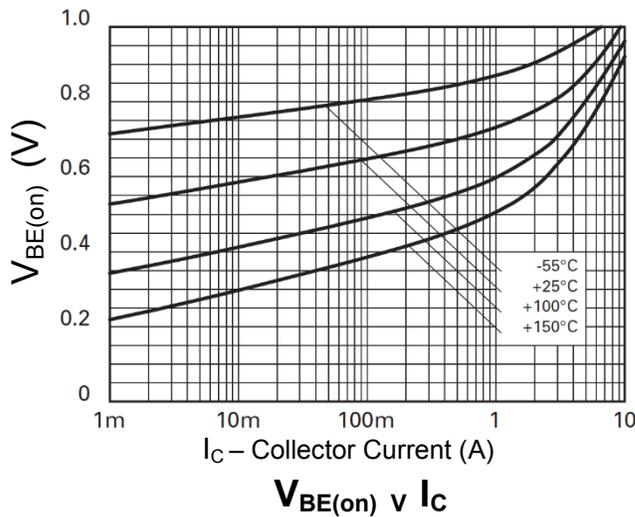
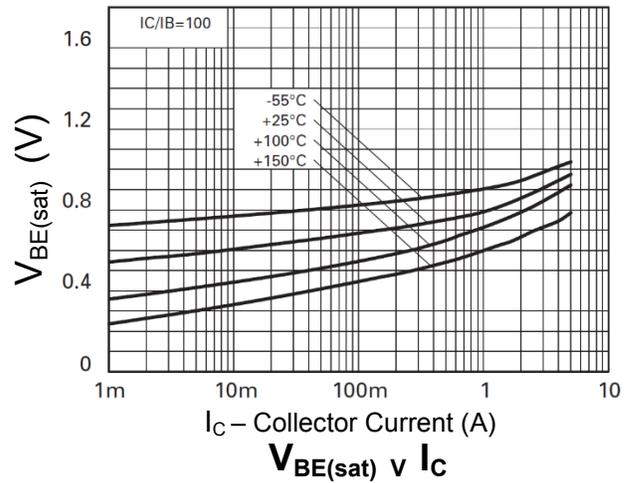
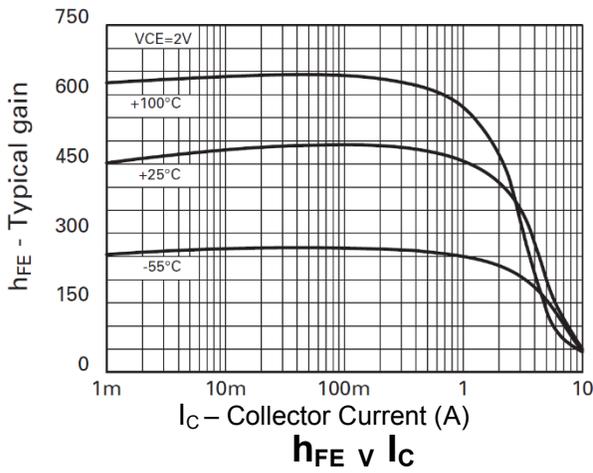
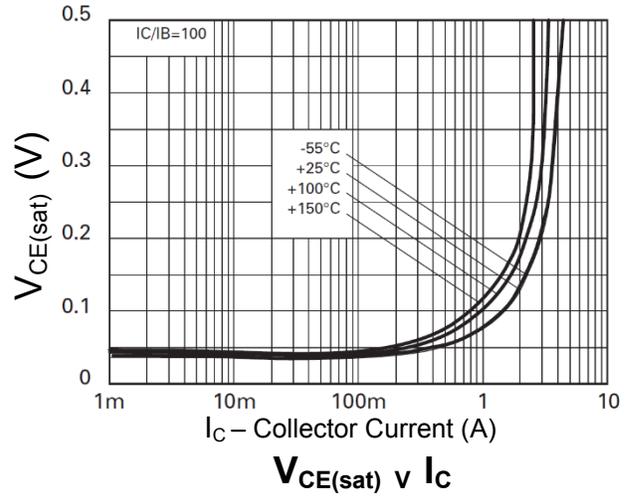
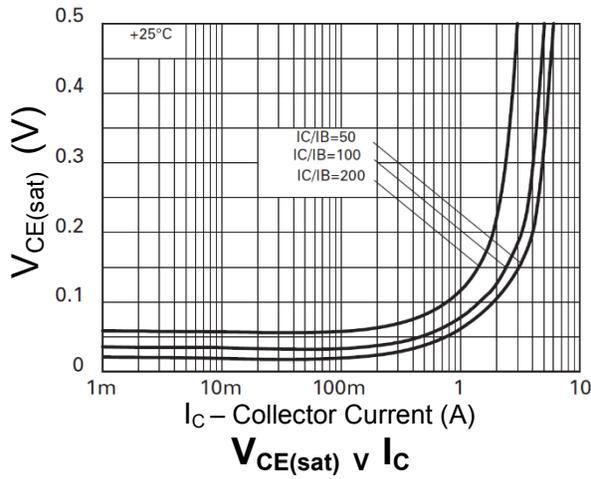
Pulse Power Dissipation

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} | 150 | — | — | V | $I_C = 100\mu\text{A}$ |
| Collector-Emitter Breakdown Voltage | BV_{CES} | 150 | — | — | V | $I_C = 100\mu\text{A}$ |
| Collector- Emitter Breakdown Voltage (Note 7) | BV_{CEO} | 40 | — | — | V | $I_C = 10\text{mA}$ |
| Collector-Emitter Breakdown Voltage | BV_{CEV} | 150 | — | — | V | $I_C = 100\mu\text{A}$, $V_{BE} = -1\text{V}$ |
| Emitter-Base Breakdown Voltage | BV_{EBO} | 5 | — | — | V | $I_E = 100\mu\text{A}$ |
| Collector Cut-Off Current | I_{CBO} | — | 0.3 | 10 | nA | $V_{CB} = 120\text{V}$ |
| 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 | $V_{CES} = 120\text{V}$ |
| Collector-Emitter Saturation Voltage (Note 7) | $V_{CE(sat)}$ | — | 17 85 140 170 250 | 25 120 180 250 340 | mV | $I_C = 0.2\text{A}$, $I_B = 10\text{mA}$ $I_C = 1\text{A}$, $I_B = 10\text{mA}$ $I_C = 2\text{A}$, $I_B = 20\text{mA}$ $I_C = 3\text{A}$, $I_B = 40\text{mA}$ $I_C = 5\text{A}$, $I_B = 100\text{mA}$ |
| Base-Emitter Saturation Voltage (Note 7) | $V_{BE(sat)}$ | — | 880 | 1000 | mV | $I_C = 3\text{A}$, $I_B = 40\text{mA}$ |
| Base-Emitter Turn-On Voltage (Note 7) | $V_{BE(on)}$ | — | 840 | 950 | mV | $I_C = 3\text{A}$, $V_{CE} = 2\text{V}$ |
| DC Current Gain (Note 7) | h_{FE} | 290 270 270 130 40 | 440 450 360 220 55 | 1200 — — — — | — | $I_C = 10\text{mA}$, $V_{CE} = 2\text{V}$ $I_C = 1\text{A}$, $V_{CE} = 2\text{V}$ $I_C = 3\text{A}$, $V_{CE} = 2\text{V}$ $I_C = 5\text{A}$, $V_{CE} = 2\text{V}$ $I_C = 10\text{A}$, $V_{CE} = 2\text{V}$ |
| Transitional frequency | f_T | — | 155 | — | MHz | $I_C = 50\text{mA}$, $V_{CE} = 10\text{V}$ $f = 100\text{MHz}$ |
| Output Capacitance | C_{obo} | — | 27 | 40 | pF | $V_{CB} = 10\text{V}$, $f = 1\text{MHz}$ |
| Switching Time | t_{on} | — | 220 | — | ns | $I_C = 3\text{A}$, $V_{CC} = 10\text{V}$, $I_B = 30\text{mA}$ |
| | t_{off} | — | 540 | — | | |

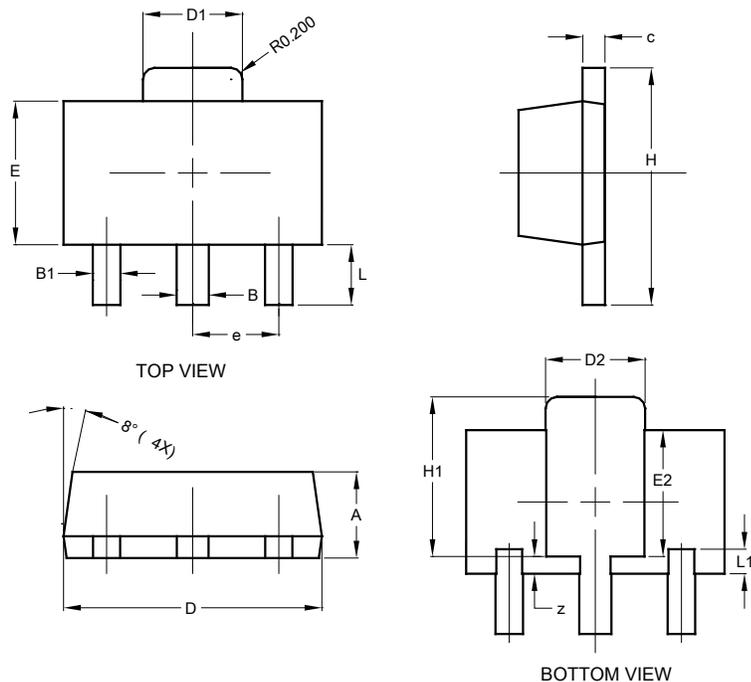
 Note: 7. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

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



Package Outline Dimensions

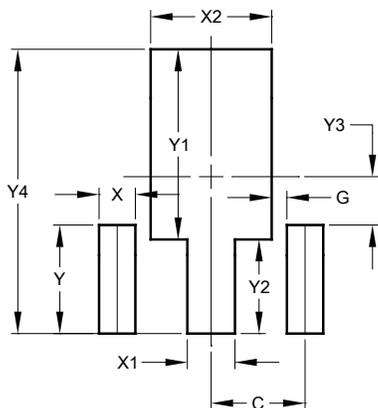
SOT89



| 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 |