



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



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## Summary

$BV_{CEO} = -140V$  ;  $R_{SAT} = 85m\Omega$ ;  $I_C = -3A$

## Description

Packaged in the SOT89 outline this new 5th generation low saturation 140V PNP transistor offers low on state losses making it ideal for use in DC-DC circuits, line switching and various driving and power management functions.

## Features

- 3 amps continuous current
- Up to 10 amps peak current
- Very low saturation voltages

## Applications

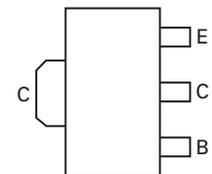
- Motor driving
- Line switching
- High side switches
- Subscriber line interface cards (SLIC)

## Ordering Information

| Device      | Reel Size | Tape Width | Quantity Per Reel |
|-------------|-----------|------------|-------------------|
| NK-ZX5T955T | 7"        | 12mm       | 1000              |

## Device Marking

955



Pinout - top view

### Absolute maximum ratings

| Parameter  | Symbol         | Limit       | Unit       |
|--|----------------|-------------|------------|
| Collector-base voltage   | $BV_{CBO}$     | -180        | V          |
| Collector-emitter voltage  | $BV_{CEO}$     | -140        | V          |
| Emitter-base voltage   | $BV_{EBO}$     | -7          | V          |
| Continuous collector current <sup>(a)</sup>                                | $I_C$          | -3          | A          |
| Peak pulse current   | $I_{CM}$       | -10         | A          |
| Power dissipation at $T_{amb}=25^{\circ}C^{(a)}$<br>Linear derating factor | $P_D$          | 1.5<br>12   | W<br>mW/°C |
| Power dissipation at $T_{amb}=25^{\circ}C^{(b)}$<br>Linear derating factor | $P_D$          | 2.1<br>16.8 | W<br>mW/°C |
| Operating and storage temperature range                                    | $T_j, T_{stg}$ | -55 to 150  | °C         |

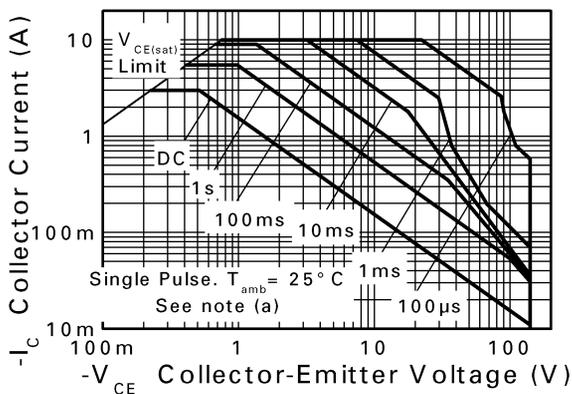
### Thermal resistance

| Parameter                          | Symbol          | Limit | Unit |
|------------------------------------|-----------------|-------|------|
| Junction to ambient <sup>(a)</sup> | $R_{\theta JA}$ | 83    | °C/W |
| Junction to ambient <sup>(b)</sup> | $R_{\theta JA}$ | 60    | °C/W |

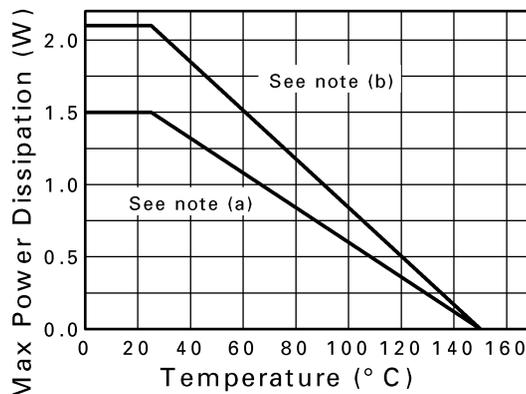
(a) For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

(b) For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

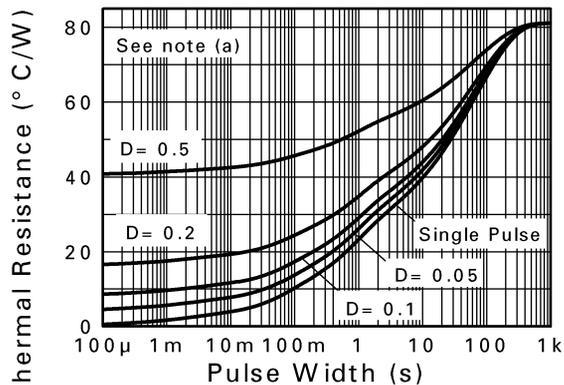
**Characteristics**



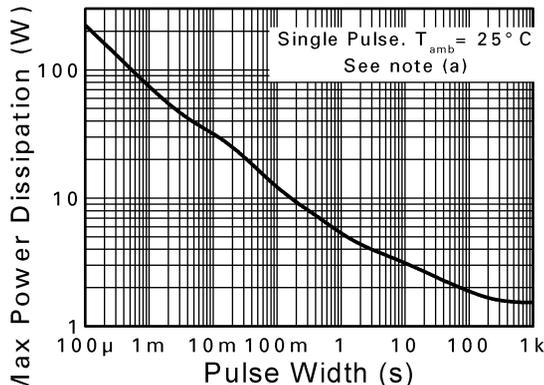
**Safe Operating Area**



**Derating Curve**



**Transient Thermal Impedance**



**Pulse Power Dissipation**

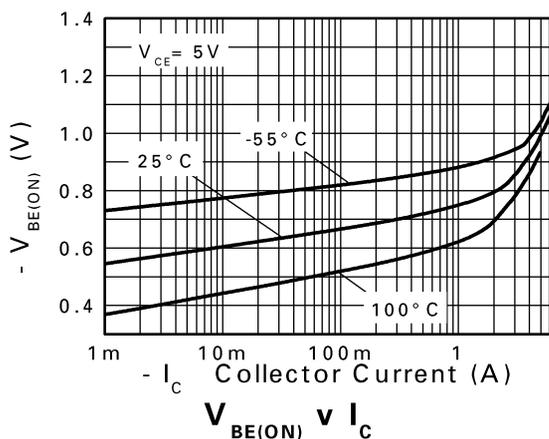
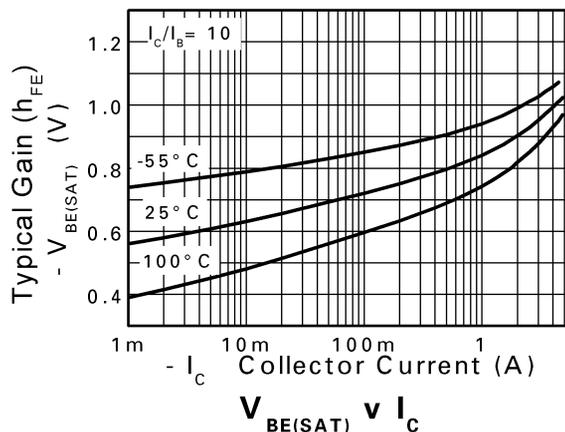
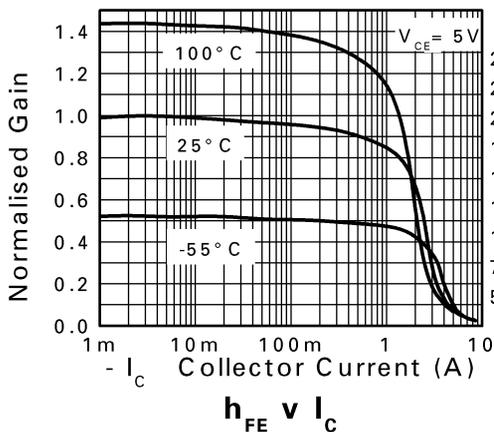
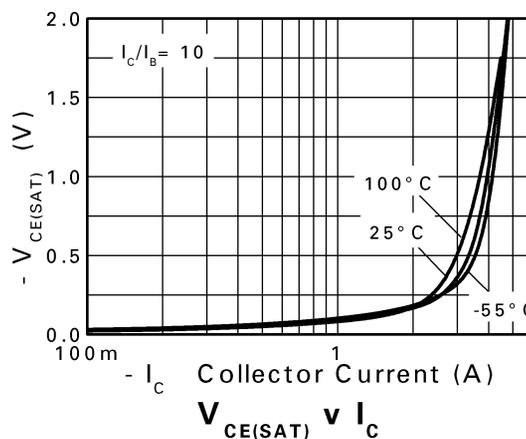
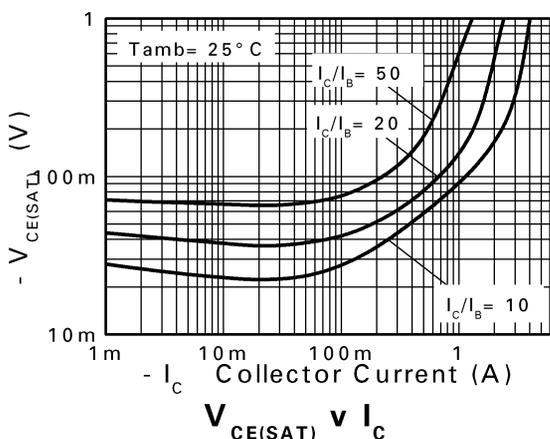
**Electrical Characteristics** (at  $T_{amb} = 25^{\circ}\text{C}$  unless otherwise stated)

| Parameter                             | Symbol                             | Min. | Typ. | Max.        | Unit                | Conditions   |
|---------------------------------------|------------------------------------|------|------|-------------|---------------------|--|
| Collector-Base breakdown voltage      | $BV_{CBO}$                         | -180 | -200 |             | V                   | $I_C = -100\mu\text{A}$  |
| Collector-Emitter breakdown voltage   | $BV_{CER}$                         | -180 | -200 |             | V                   | $I_C = -100\mu\text{A}$ , $R_B < 1\text{k}\Omega$                                    |
| Collector-Emitter breakdown voltage   | $BV_{CEO}$                         | -140 | -160 |             | V                   | $I_C = -10\text{mA}^{(*)}$   |
| Emitter-Base breakdown voltage        | $BV_{EBO}$                         | -7.0 | -8.0 |             | V                   | $I_E = -100\mu\text{A}$  |
| Collector cut-off current             | $I_{CBO}$                          |      | <1   | -20<br>-0.5 | nA<br>$\mu\text{A}$ | $V_{CB} = -150\text{V}$<br>$V_{CB} = -150\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$ |
| Collector cut-off current             | $I_{CER}$<br>$R < 1\text{k}\Omega$ |      | <1   | -20<br>-0.5 | nA<br>$\mu\text{A}$ | $V_{CB} = -150\text{V}$<br>$V_{CB} = -150\text{V}$ , $T_{amb} = 100^{\circ}\text{C}$ |
| Emitter cut-off current               | $I_{EBO}$                          |      | <1   | -10         | nA                  | $V_{EB} = -6\text{V}$  |
| Collector-Emitter saturation voltage  | $V_{CE(sat)}$                      |      | -37  | -60         | mV                  | $I_C = -0.1\text{A}$ , $I_B = -5\text{mA}^{(*)}$                                     |
|                                       |                                    |      | -50  | -75         | mV                  | $I_C = -0.5\text{A}$ , $I_B = -50\text{mA}^{(*)}$                                    |
|                                       |                                    |      | -80  | -115        | mV                  | $I_C = -1\text{A}$ , $I_B = -100\text{mA}^{(*)}$                                     |
|                                       |                                    |      | -255 | -330        | mV                  | $I_C = -3\text{A}$ , $I_B = -300\text{mA}^{(*)}$                                     |
| Base-emitter saturation voltage       | $V_{BE(sat)}$                      |      | -910 | -1010       | mV                  | $I_C = -3\text{A}$ , $I_B = -300\text{mA}^{(*)}$                                     |
| Base-emitter turn-on voltage          | $V_{BE(on)}$                       |      | -800 | -900        | mV                  | $I_C = -3\text{A}$ , $V_{CE} = -5\text{V}^{(*)}$                                     |
| Static forward current transfer ratio | $h_{FE}$                           | 100  | 225  |             |                     | $I_C = -10\text{mA}$ , $V_{CE} = -5\text{V}^{(*)}$                                   |
|                                       |                                    | 100  | 200  | 300         |                     | $I_C = -1\text{A}$ , $V_{CE} = -5\text{V}^{(*)}$                                     |
|                                       |                                    | 45   | 100  |             |                     | $I_C = -3\text{A}$ , $V_{CE} = -5\text{V}^{(*)}$                                     |
|                                       |                                    |      | 5    |             |                     | $I_C = -10\text{A}$ , $V_{CE} = -5\text{V}^{(*)}$                                    |
| Transition frequency                  | $f_T$                              |      | 120  |             | MHz                 | $I_C = -100\text{mA}$ , $V_{CE} = -10\text{V}$<br>$f = 50\text{MHz}$                 |
| Output capacitance                    | $C_{OBO}$                          |      | 33   |             | pF                  | $V_{CB} = -10\text{V}$ , $f = 1\text{MHz}^{(*)}$                                     |
| Switching times                       | $t_{on}$                           |      | 42   |             | ns                  | $I_C = -1\text{A}$ , $V_{CC} = -50\text{V}$ ,  |
|                                       | $t_{off}$                          |      | 636  |             | ns                  | $I_{B1} = -I_{B2} = -100\text{mA}$   |

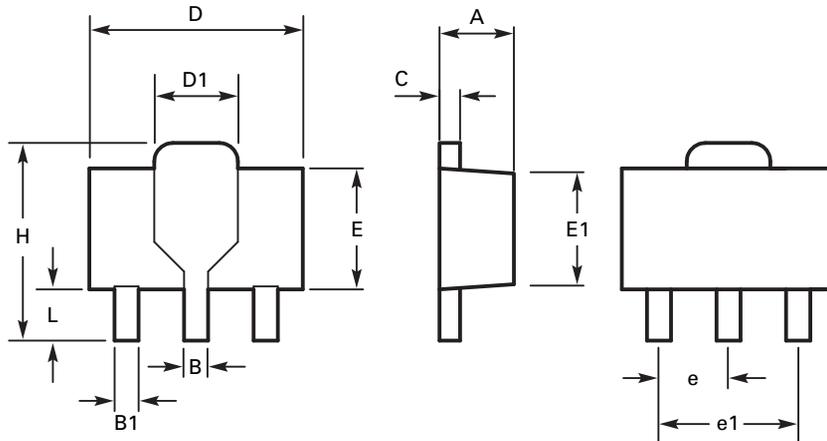
**NOTES:**

 (\*) Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .

Typical characteristics



### Package Outline



| DIM | Millimeters |      | Inches |       | DIM | Millimeters |      | Inches |       |
|-----|-------------|------|--------|-------|-----|-------------|------|--------|-------|
|     | Min         | Max  | Min    | Max   |     | Min         | Max  | Min    | Max   |
| A   | 1.40        | 1.60 | 0.550  | 0.630 | e   | 1.40        | 1.50 | 0.055  | 0.059 |
| b   | 0.38        | 0.48 | 0.015  | 0.019 | E   | 3.75        | 4.25 | 0.150  | 0.167 |
| b1  | -           | 0.53 | -      | 0.021 | E1  | -           | 2.60 | -      | 0.102 |
| b2  | 1.50        | 1.80 | 0.060  | 0.071 | G   | 2.90        | 3.00 | 0.114  | 0.118 |
| c   | 0.28        | 0.44 | 0.011  | 0.017 | H   | 2.60        | 2.85 | 0.102  | 0.112 |
| D   | 4.40        | 4.60 | 0.173  | 0.181 | -   | -           | -    | -      | -     |