



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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www.szyoushang.cn



企业微信二维码



企业QQ二维码

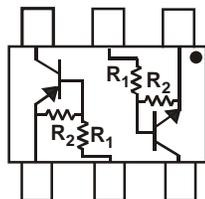
### Features

- Epitaxial Planar Die Construction
- Built-In Biasing Resistors

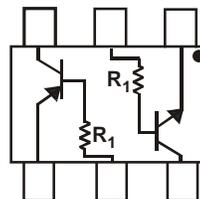
| Part Number | R1    | R2    | Marking |
|-------------|-------|-------|---------|
| NK-DCX124EH | 22kΩ  | 22kΩ  | C17     |
| NK-DCX144EH | 47kΩ  | 47kΩ  | C20     |
| NK-DCX143EH | 4.7kΩ | 4.7kΩ | C08     |
| NK-DCX114YH | 10kΩ  | 47kΩ  | C14     |
| NK-DCX123JH | 2.2kΩ | 47kΩ  | C06     |
| NK-DCX114EH | 10kΩ  | 10kΩ  | C13     |
| NK-DCX143TH | 4.7kΩ | —     | C07     |
| NK-DCX114TH | 10kΩ  | —     | C12     |

### Mechanical Data

- Case: SOT563
- Case Material: Molded Plastic “Green” Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 
- Terminal Connections: See Diagram
- Weight: 0.005 grams (Approximate)



R<sub>1</sub>, R<sub>2</sub> Device Schematic  
Top View



R<sub>1</sub> Only Device Schematic  
Top View

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

| Characteristic                              |  | Symbol          | Value  | Unit               |
|---|--|-----------------|--|--------------------|
| Supply Voltage                              |  | $V_{CC}$        | 50   | V                  |
| Input Voltage                               | NK-DCX124EH<br>NK-DCX144EH<br>NK-DCX143EH<br>NK-DCX114YH<br>NK-DCX123JH<br>NK-DCX114EH<br>NK-DCX143TH<br>NK-DCX114TH | $V_{IN}$        | -10 to +40<br>-10 to +40<br>-10 to +30<br>-6 to +40<br>-5 to +12<br>-10 to +40<br>-5V Max<br>-5V Max | V                  |
| Output Current                              | NK-DCX124EH<br>NK-DCX144EH<br>NK-DCX143EH<br>NK-DCX114YH<br>NK-DCX123JH<br>NK-DCX114EH<br>NK-DCX143TH<br>NK-DCX114TH | $I_O$           | 30<br>30<br>100<br>70<br>100<br>50<br>100<br>100   | mA                 |
| Output Current                              | All  | $I_C$ (Max)     | 100  | mA                 |
| Power Dissipation                           | (Total)  | $P_D$           | 150  | mW                 |
| Thermal Resistance, Junction to Ambient Air | (Note 5)   | $R_{\theta JA}$ | 833  | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range     |  | $T_J, T_{STG}$  | -55 to +150  | $^\circ\text{C}$   |

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

| Characteristic                          |  | Symbol         | Value  | Unit             |
|---|--|----------------|--|------------------|
| Supply Voltage                          |  | $V_{CC}$       | -50  | V                |
| Input Voltage                           | NK-DCX124EH<br>NK-DCX144EH<br>NK-DCX143EH<br>NK-DCX114YH<br>NK-DCX123JH<br>NK-DCX114EH<br>NK-DCX143TH<br>NK-DCX114TH | $V_{IN}$       | +10 to -40<br>+10 to -40<br>+10 to -30<br>+6 to -40<br>+5 to -12<br>+10 to -40<br>+5V max<br>+5V max | V                |
| Output Current                          | NK-DCX124EH<br>NK-DCX144EH<br>NK-DCX143EH<br>NK-DCX114YH<br>NK-DCX123JH<br>NK-DCX114EH<br>NK-DCX143TH<br>NK-DCX114TH | $I_O$          | -30<br>-30<br>-100<br>-70<br>-100<br>-50<br>-100<br>-100   | mA               |
| Output Current                          | All  | $I_C$ (Max)    | -100   | mA               |
| Power Dissipation                       | (Total)  | $P_D$          | 150  | mW               |
| Operating and Storage Temperature Range |  | $T_J, T_{STG}$ | -55 to +150  | $^\circ\text{C}$ |

**Electrical Characteristics NPN Section** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic (NK-DCX143TH & NK-DCX114TH Only) | Symbol               | Min | Typ | Max | Unit | Test Condition  |
|---|----------------------|-----|-----|-----|------|---|
| Collector-Base Breakdown Voltage                | BV <sub>CBO</sub>    | 50  | —   | —   | V    | I <sub>C</sub> = 50μA   |
| Collector-Emitter Breakdown Voltage             | BV <sub>CEO</sub>    | 50  | —   | —   | V    | I <sub>C</sub> = 1mA  |
| Emitter-Base Breakdown Voltage                  | BV <sub>EBO</sub>    | 5   | —   | —   | V    | I <sub>E</sub> = 50μA   |
| Collector Cut-Off Current                       | I <sub>CBO</sub>     | —   | —   | 0.5 | μA   | V <sub>CB</sub> = 50V   |
| Emitter Cut-Off Current                         | I <sub>EBO</sub>     | —   | —   | 0.5 | μA   | V <sub>EB</sub> = 4V  |
| Collector-Emitter Saturation Voltage            | V <sub>CE(SAT)</sub> | —   | —   | 0.3 | V    | I <sub>C</sub> /I <sub>B</sub> = 2.5mA / 0.25mA NK-DCX143TH<br>I <sub>C</sub> /I <sub>B</sub> = 1mA / 0.1mA NK-DCX114TH |
| DC Current Transfer Ratio                       | h <sub>FE</sub>      | 100 | 250 | 600 | —    | I <sub>C</sub> = 1mA, V <sub>CE</sub> = 5V  |
| Gain-Bandwidth Product (Note 6)                 | f <sub>T</sub>       | —   | 250 | —   | MHz  | V <sub>CE</sub> = 10V, I <sub>E</sub> = 5mA, f = 100MHz   |

| Characteristic  | Symbol              | Min         | Typ | Max | Unit | Test Condition                             |   |   |  |   |   |
|-----------------|---------------------|-------------|-----|-----|------|--|---|---|--|---|---|
| Input Voltage   | V <sub>I(OFF)</sub> | NK-DCX124EH | 0.5 | 1.1 | —    | V  | V <sub>CC</sub> = 5V, I <sub>O</sub> = 100μA  |   |  |   |   |
|                 |                     | NK-DCX144EH | 0.5 | 1.1 |      |  |   |   |  |   |   |
| NK-DCX143EH     |                     | 0.5         | 1.1 |     |      |  |   |   |  |   |   |
| NK-DCX114YH     |                     | 0.3         | —   |     |      |  |   |   |  |   |   |
| NK-DCX123JH     |                     | 0.5         | —   |     |      |  |   |   |  |   |   |
| NK-DCX114EH     |                     | 0.5         | 1.1 |     |      |  |   |   |  |   |   |
| Input Voltage   | V <sub>I(ON)</sub>  | NK-DCX124EH | —   | 1.9 | 3.0  | V  | V <sub>O</sub> = 0.3V, I <sub>O</sub> = 5mA   |   |  |   |   |
|                 |                     | NK-DCX144EH | —   | 1.9 | 3.0  |  |   | V <sub>O</sub> = 0.3V, I <sub>O</sub> = 2mA |  |   |   |
|                 |                     | NK-DCX143EH | —   | 1.9 | 3.0  |  |   |   | V <sub>O</sub> = 0.3V, I <sub>O</sub> = 20mA |   |   |
|                 |                     | NK-DCX114YH | —   | —   | 1.4  |  |   |   |  | V <sub>O</sub> = 0.3V, I <sub>O</sub> = 1mA |   |
|                 |                     | NK-DCX123JH | —   | —   | 1.1  |  |   |   |  |   | V <sub>O</sub> = 0.3V, I <sub>O</sub> = 5mA |
|                 |                     | NK-DCX114EH | —   | 1.9 | 3.0  |  |   |   |  |   |   |
| Output Voltage  | V <sub>O(ON)</sub>  | NK-DCX124EH | —   | 0.1 | 0.3  | V  | I <sub>O</sub> /I <sub>I</sub> = 10mA / 0.5mA |   |  |   |   |
|                 |                     | NK-DCX144EH |     |     |      |  | I <sub>O</sub> /I <sub>I</sub> = 10mA / 0.5mA |   |  |   |   |
|                 |                     | NK-DCX143EH |     |     |      |  | I <sub>O</sub> /I <sub>I</sub> = 10mA / 0.5mA |   |  |   |   |
|                 |                     | NK-DCX114YH |     |     |      |  | I <sub>O</sub> /I <sub>I</sub> = 5mA / 0.25mA |   |  |   |   |
|                 |                     | NK-DCX123JH |     |     |      |  | I <sub>O</sub> /I <sub>I</sub> = 5mA / 0.25mA |   |  |   |   |
|                 |                     | NK-DCX114EH |     |     |      |  | I <sub>O</sub> /I <sub>I</sub> = 10mA / 0.5mA |   |  |   |   |
| Input Current   | I <sub>I</sub>      | NK-DCX124EH | —   | —   | 0.36 | mA   | V <sub>I</sub> = 5V                           |   |  |   |   |
|                 |                     | NK-DCX144EH |     |     | 0.18 |  |   |   |  |   |   |
|                 |                     | NK-DCX143EH |     |     | 1.8  |  |   |   |  |   |   |
|                 |                     | NK-DCX114YH |     |     | 0.88 |  |   |   |  |   |   |
|                 |                     | NK-DCX123JH |     |     | 3.6  |  |   |   |  |   |   |
|                 |                     | NK-DCX114EH |     |     | 0.88 |  |   |   |  |   |   |
| Output Current  | I <sub>O(OFF)</sub> | —           | —   | 0.5 | μA   | V <sub>CC</sub> = 50V, V <sub>I</sub> = 0V |   |   |  |   |   |
| DC Current Gain | G <sub>I</sub>      | NK-DCX124EH | 56  | —   | —    | —  | V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA     |   |  |   |   |
|                 |                     | NK-DCX144EH | 68  |     |      |  | V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA     |   |  |   |   |
|                 |                     | NK-DCX143EH | 20  |     |      |  |   | V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA  |  |   |   |
|                 |                     | NK-DCX114YH | 68  |     |      |  |   |   | V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA   |   |   |
|                 |                     | NK-DCX123JH | 80  |     |      |  |   |   |  | V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA  |   |
|                 |                     | NK-DCX114EH | 30  |     |      |  |   |   |  |   | V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA   |

Note: 6. Transistor - For Reference Only.

**Electrical Characteristics PNP Section** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic (NK-DCX143TH & NK-DCX114TH Only) | Symbol               | Min | Typ | Max  | Unit | Test Condition  |
|---|----------------------|-----|-----|------|------|---|
| Collector-Base Breakdown Voltage                | BV <sub>CBO</sub>    | -50 | —   | —    | V    | I <sub>C</sub> = -50μA  |
| Collector-Emitter Breakdown Voltage             | BV <sub>CEO</sub>    | -50 | —   | —    | V    | I <sub>C</sub> = -1mA   |
| Emitter-Base Breakdown Voltage                  | BV <sub>EBO</sub>    | -5  | —   | —    | V    | I <sub>E</sub> = -50μA  |
| Collector Cut-Off Current                       | I <sub>CBO</sub>     | —   | —   | -0.5 | μA   | V <sub>CB</sub> = -50V  |
| Emitter Cut-Off Current                         | I <sub>EBO</sub>     | —   | —   | -0.5 | μA   | V <sub>EB</sub> = -4V   |
| Collector-Emitter Saturation Voltage            | V <sub>CE(SAT)</sub> | —   | —   | -0.3 | V    | c/I <sub>B</sub> = -2.5mA / -0.25mA NK-DCX143TH<br>c/I <sub>B</sub> = -1mA / -0.1mA NK-DCX114TH |
| DC Current Transfer Ratio                       | h <sub>FE</sub>      | 100 | 250 | 600  | —    | I <sub>C</sub> = -1mA, V <sub>CE</sub> = -5V  |
| Gain-Bandwidth Product (Note 6)                 | f <sub>T</sub>       | —   | 250 | —    | MHz  | V <sub>CE</sub> = -10V, I <sub>E</sub> = -5mA, f = 100MHz                                       |

| Characteristic                  |  | Symbol              | Min  | Typ                                    | Max  | Unit | Test Condition   |
|---------------------------------|--|---------------------|--|--|--|------|--|
| Input Voltage                   | NK-DCX124EH<br>NK-DCX144EH<br>NK-DCX143EH<br>NK-DCX114YH<br>NK-DCX123JH<br>NK-DCX114EH | V <sub>I(OFF)</sub> | -0.5<br>-0.5<br>-0.5<br>-0.3<br>-0.5<br>-0.5 | -1.1<br>-1.1<br>-1.1<br>—<br>—<br>-1.1 | —  | —    | V <sub>CC</sub> = -5V, I <sub>O</sub> = -100μA   |
|                                 | NK-DCX124EH<br>NK-DCX144EH<br>NK-DCX143EH<br>NK-DCX114YH<br>NK-DCX123JH<br>NK-DCX114EH | V <sub>I(ON)</sub>  | —  | —<br>-1.9<br>-1.9<br>-1.9<br>—<br>-1.9 | -3.0<br>-3.0<br>-3.0<br>-1.4<br>-1.1<br>-3.0     | V    | V <sub>O</sub> = -0.3V, I <sub>O</sub> = -5mA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -2mA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -20mA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -1mA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -5mA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -10mA           |
| Output Voltage                  | NK-DCX124EH<br>NK-DCX144EH<br>NK-DCX143EH<br>NK-DCX114YH<br>NK-DCX123JH<br>NK-DCX114EH | V <sub>O(ON)</sub>  | —  | -0.1                                   | -0.3   | V    | I <sub>O</sub> /I <sub>I</sub> = -10mA / -0.5mA<br>I <sub>O</sub> /I <sub>I</sub> = -10mA / -0.5mA<br>I <sub>O</sub> /I <sub>I</sub> = -10mA / -0.5mA<br>I <sub>O</sub> /I <sub>I</sub> = -5mA / -0.25mA<br>I <sub>O</sub> /I <sub>I</sub> = -5mA / -0.25mA<br>I <sub>O</sub> /I <sub>I</sub> = -10mA / -0.5mA |
| Input Current                   | NK-DCX124EH<br>NK-DCX144EH<br>NK-DCX143EH<br>NK-DCX114YH<br>NK-DCX123JH<br>NK-DCX114EH | I <sub>I</sub>      | —  | —                                      | -0.36<br>-0.18<br>-1.8<br>-0.88<br>-3.6<br>-0.88 | mA   | V <sub>I</sub> = -5V   |
| Output Current                  |  | I <sub>O(OFF)</sub> | —  | —                                      | -0.5   | μA   | V <sub>CC</sub> = -50V, V <sub>I</sub> = 0V  |
| DC Current Gain                 | NK-DCX124EH<br>NK-DCX144EH<br>NK-DCX143EH<br>NK-DCX114YH<br>NK-DCX123JH<br>NK-DCX114EH | G <sub>I</sub>      | 56<br>68<br>20<br>68<br>80<br>30             | —                                      | —  | —    | V <sub>O</sub> = -5V, I <sub>O</sub> = -5mA<br>V <sub>O</sub> = -5V, I <sub>O</sub> = -5mA<br>V <sub>O</sub> = -5V, I <sub>O</sub> = -10mA<br>V <sub>O</sub> = -5V, I <sub>O</sub> = -10mA<br>V <sub>O</sub> = -5V, I <sub>O</sub> = -10mA<br>V <sub>O</sub> = -5V, I <sub>O</sub> = -5mA                      |
| Gain-Bandwidth Product (Note 6) |  | f <sub>T</sub>      | —  | 250                                    | —  | MHz  | V <sub>CE</sub> = -10V, I <sub>E</sub> = -5mA, f = 100MHz  |

Note: 6. Transistor - For Reference Only.

**Typical Curves – NK-DCX143EH NPN Section**

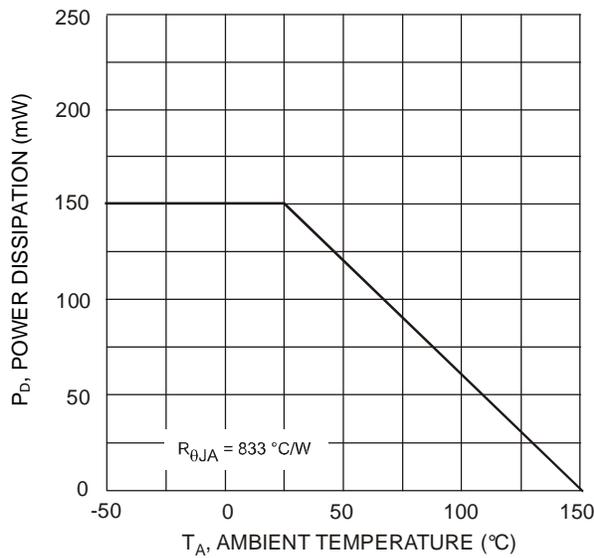


Fig. 1 Derating Curve - Total

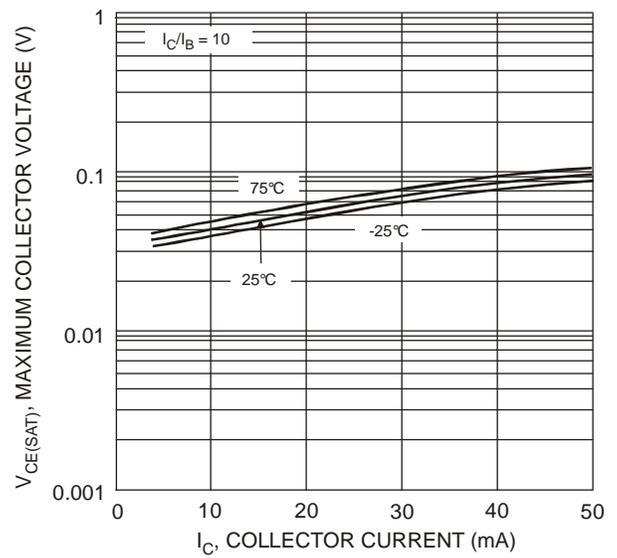


Fig. 2  $V_{CE(SAT)}$  vs.  $I_C$

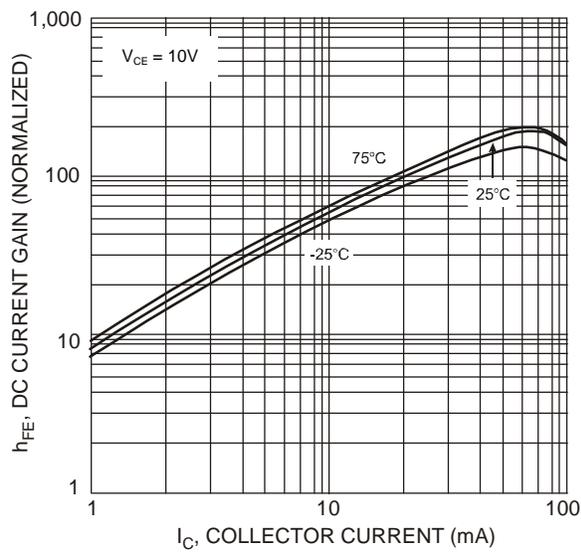


Fig. 3 DC Current Gain

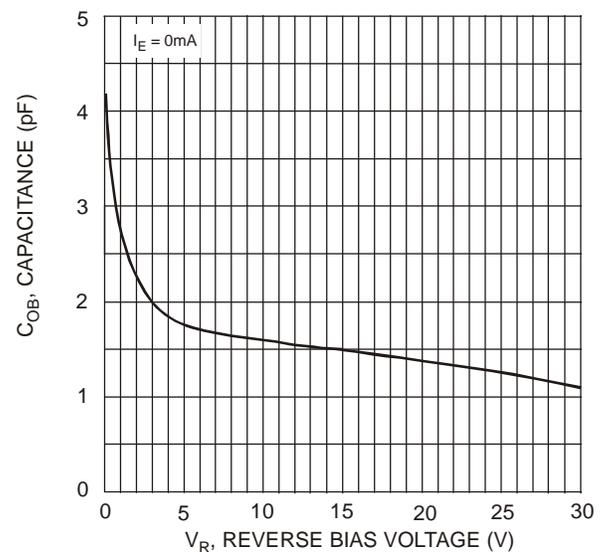


Fig. 4 Output Capacitance

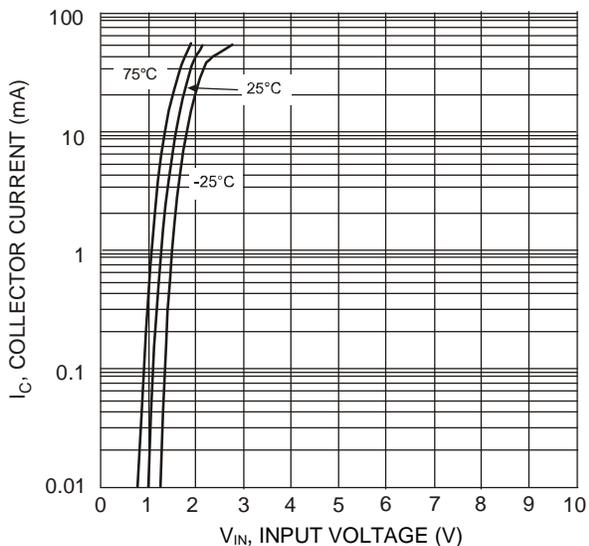


Fig. 5 Collector Current vs. Input Voltage

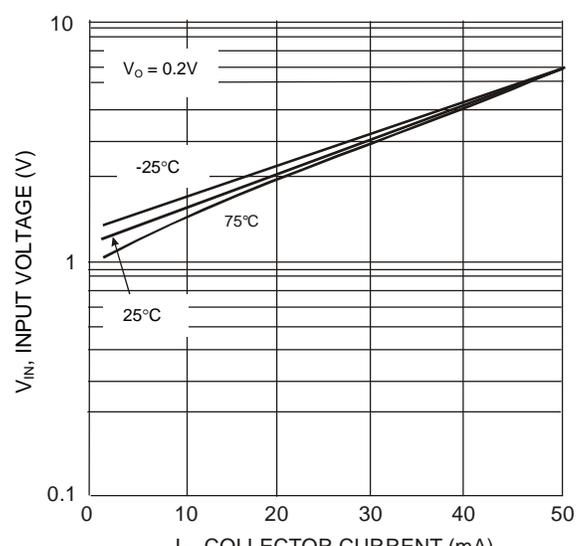


Fig. 6 Input Voltage vs. Collector Current

**Typical Curves – NK-DCX143EH PNP Section**

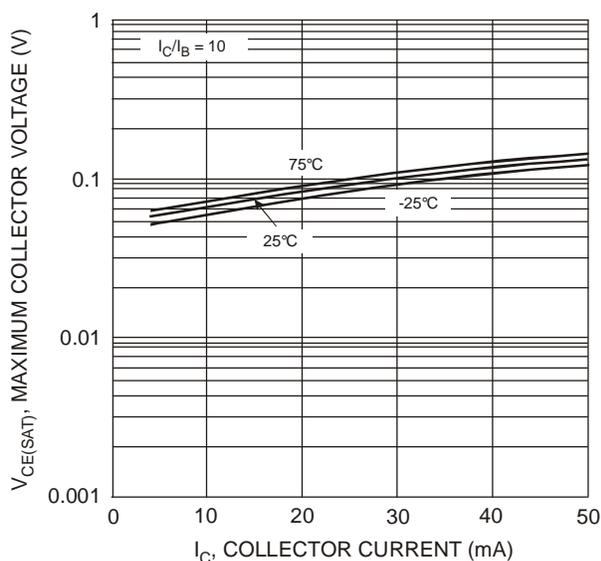


Fig. 7  $V_{CE(SAT)}$  vs.  $I_C$

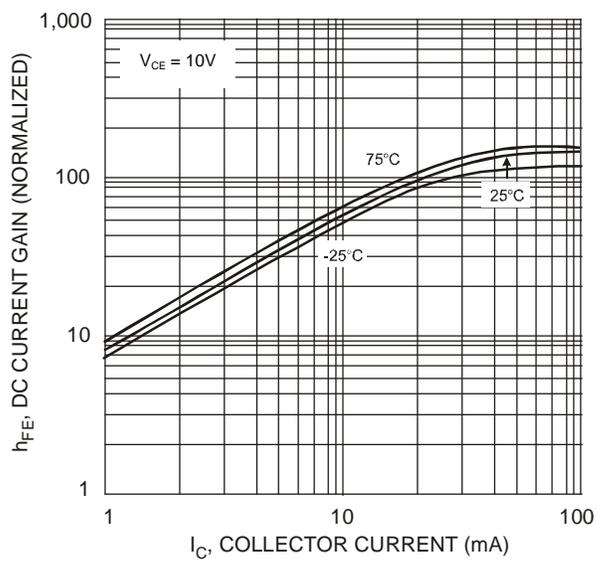


Fig. 8 DC Current Gain

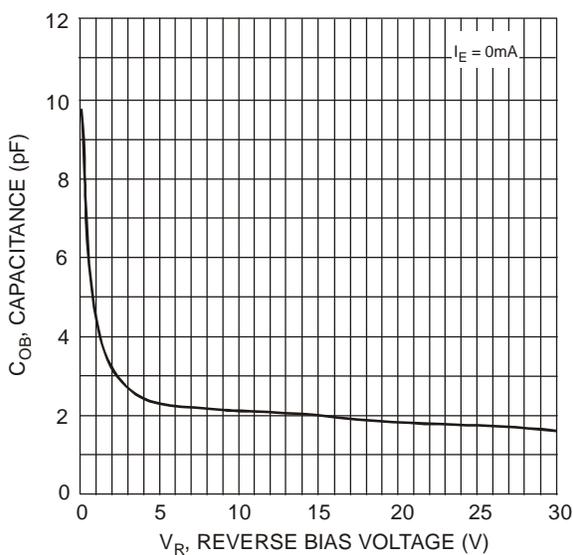


Fig. 9 Output Capacitance

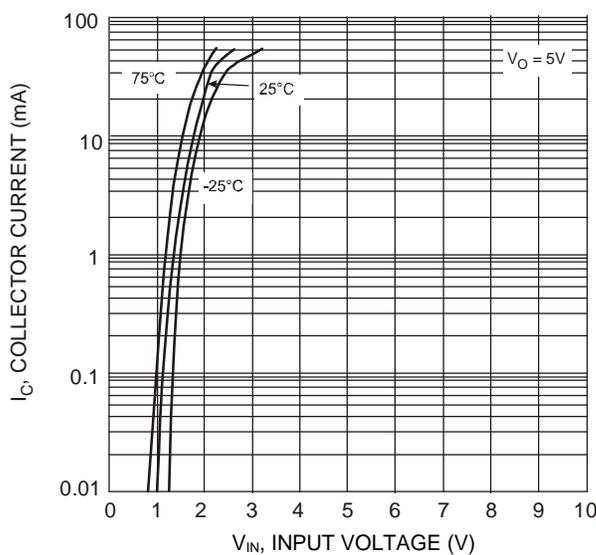


Fig. 10 Collector Current vs. Input Voltage

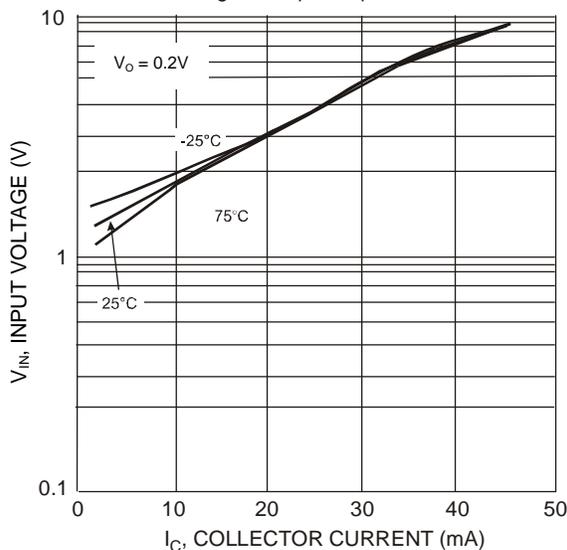
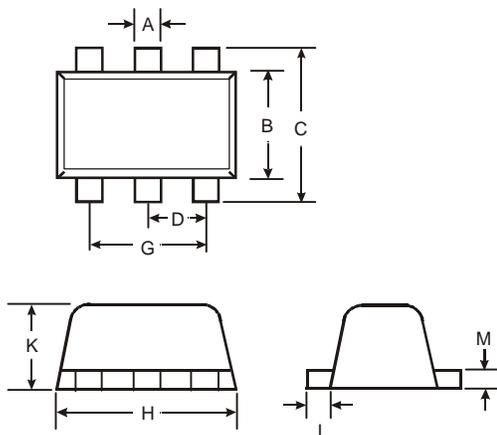


Fig. 11 Input Voltage vs. Collector Current

## Package Outline Dimensions

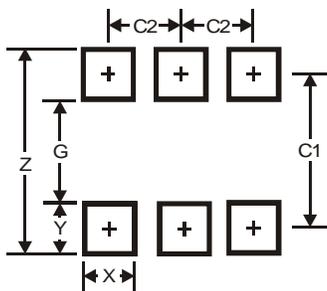
### SOT563



| SOT563               |      |      |      |
|----------------------|------|------|------|
| Dim                  | Min  | Max  | Typ  |
| A                    | 0.15 | 0.30 | 0.20 |
| B                    | 1.10 | 1.25 | 1.20 |
| C                    | 1.55 | 1.70 | 1.60 |
| D                    | -    | -    | 0.50 |
| G                    | 0.90 | 1.10 | 1.00 |
| H                    | 1.50 | 1.70 | 1.60 |
| K                    | 0.55 | 0.60 | 0.60 |
| L                    | 0.10 | 0.30 | 0.20 |
| M                    | 0.10 | 0.18 | 0.11 |
| All Dimensions in mm |      |      |      |

## Suggested Pad Layout

### SOT563



| Dimensions | SOT563 |
|------------|--------|
| Z          | 2.2    |
| G          | 1.2    |
| X          | 0.375  |
| Y          | 0.5    |
| C1         | 1.7    |
| C2         | 0.5    |