



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**

0755-83047638

ysbdt@szyoushang.cn

www.szyoushang.cn



企业微信二维码



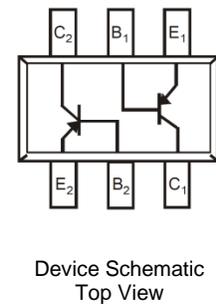
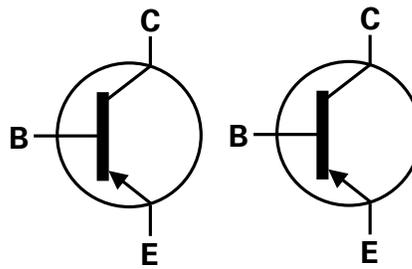
企业QQ二维码

## Features

- $BV_{CEO} > -40V$
- $I_C = -200mA$  High Collector Current
- Epitaxial Planar Die Construction
- Ideal for Medium Power Amplification and Switching
- Ultra-Small Surface-Mount Package
- Complementary NPN Type: NK-MMDT3904Q

## Mechanical Data

- Package: SOT363
- Package Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Finish; Solderable per MIL-STD-202, Method 208 
- Weight: 0.006 grams (Approximate)



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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CB0}$	-40	V
Collector-Emitter Voltage	$V_{CEO}$	-40	V
Emitter-Base Voltage	$V_{EBO}$	-6	V
Collector Current	$I_C$	-200	mA

### Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	$P_D$	200	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	625	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

### ESD Ratings (Note 6)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4000	V	3A
Electrostatic Discharge - Charged Device Model	ESD CDM	1000	V	C3

Notes: 5. For a device mounted on minimum recommended pad layout with 1oz copper that is on a single-sided 1.6mm FR4 PCB; the device is measured under still air conditions whilst operating in a steady-state.  
 6. Refer to JEDEC specification JS-001 and JS-002.

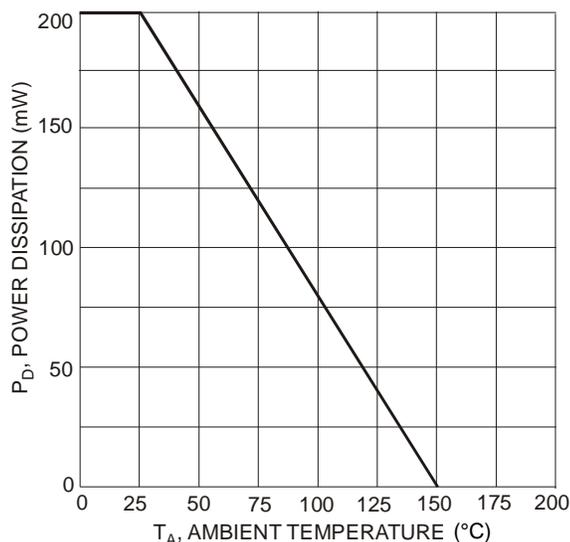


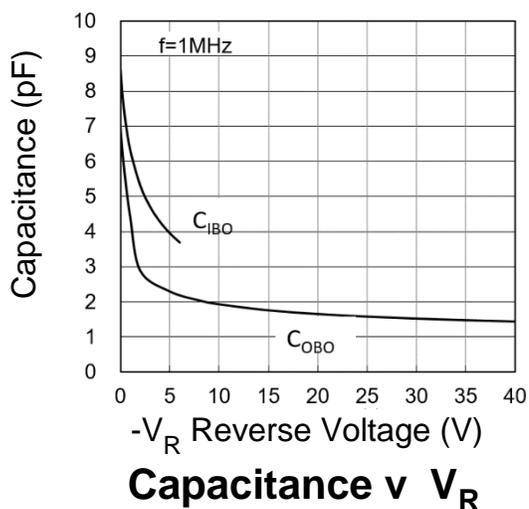
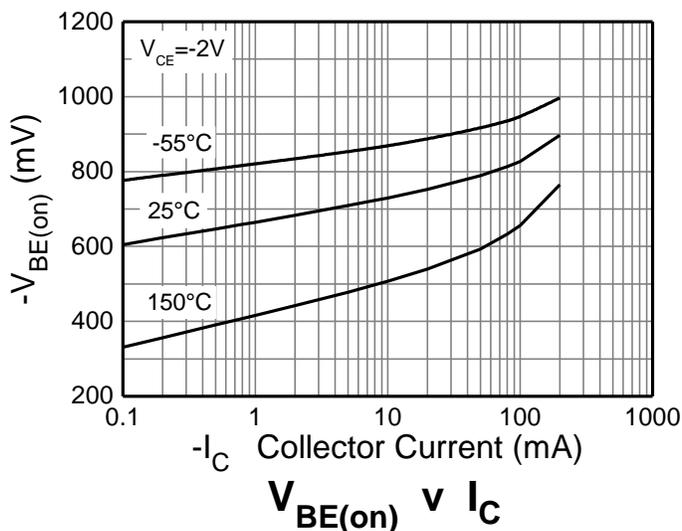
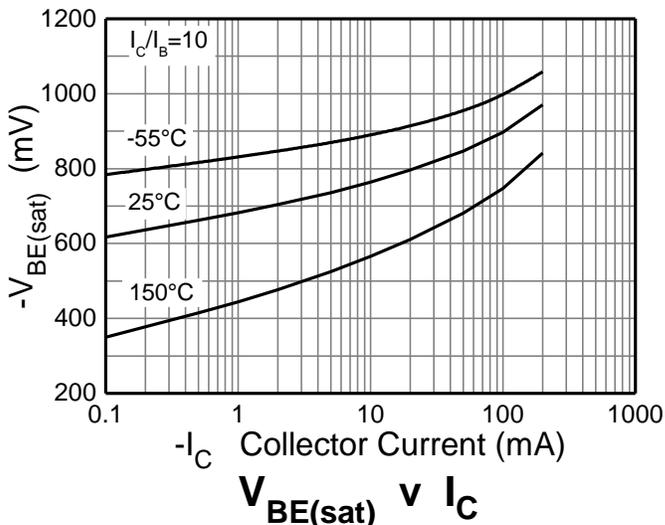
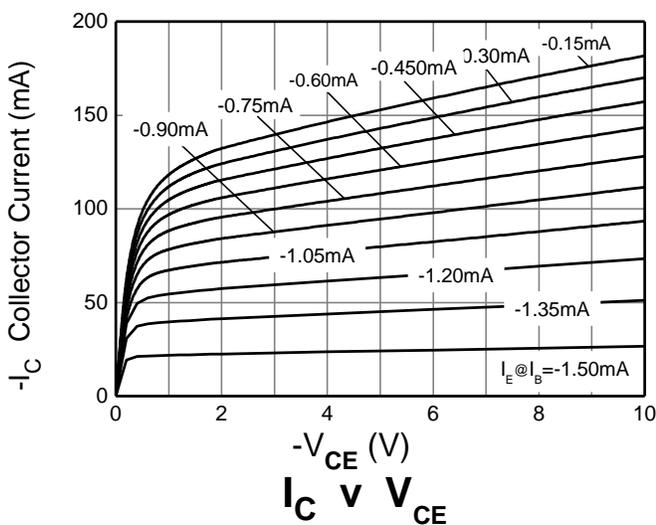
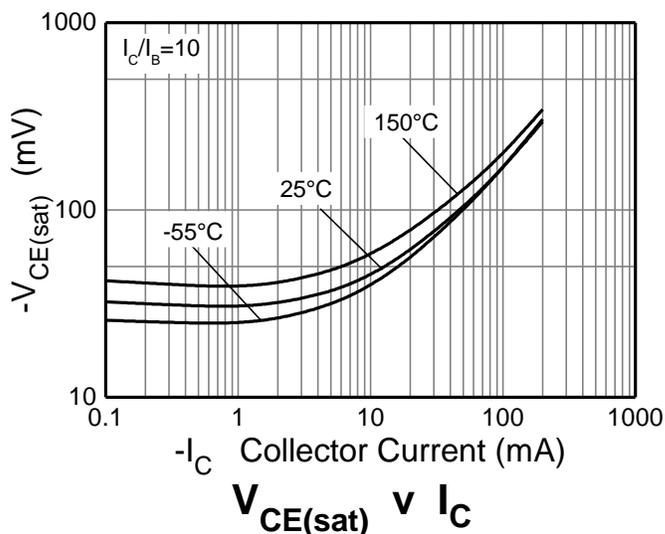
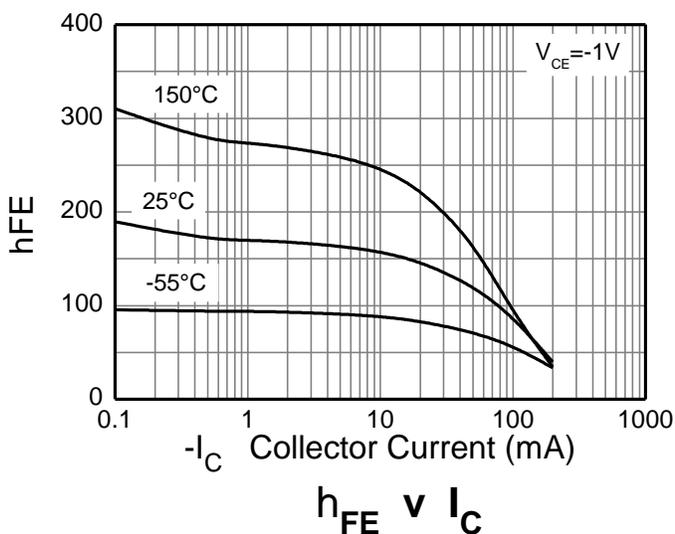
Fig. 1, Power Dissipation vs. Ambient Temperature (Total Device)

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

Characteristic	Symbol	Min	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>					
Collector-Base Breakdown Voltage	BV <sub>CB0</sub>	-40	—	V	I <sub>C</sub> = -100μA, I <sub>E</sub> = 0
Collector-Emitter Breakdown Voltage (Note 7)	BV <sub>CEO</sub>	-40	—	V	I <sub>C</sub> = -1mA, I <sub>B</sub> = 0
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-6	—	V	I <sub>E</sub> = -100μA, I <sub>C</sub> = 0
Collector Cut-Off Current	I <sub>CEX</sub>	—	-50	nA	V <sub>CE</sub> = -30V, V <sub>EB(off)</sub> = -3.0V
Base Cut-Off Current	I <sub>BL</sub>	—	-50	nA	V <sub>CE</sub> = -30V, V <sub>EB(off)</sub> = -3.0V
<b>ON CHARACTERISTICS (Note 7)</b>					
DC Current Gain	h <sub>FE</sub>	60 80 100 60 30	— — 300 — —	—	I <sub>C</sub> = -100μA, V <sub>CE</sub> = -1V I <sub>C</sub> = -1.0mA, V <sub>CE</sub> = -1V I <sub>C</sub> = -10mA, V <sub>CE</sub> = -1V I <sub>C</sub> = -50mA, V <sub>CE</sub> = -1V I <sub>C</sub> = -100mA, V <sub>CE</sub> = -1V
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	-0.25 -0.40	V	I <sub>C</sub> = -10mA, I <sub>B</sub> = -1mA I <sub>C</sub> = -50mA, I <sub>B</sub> = -5mA
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	-0.65 —	-0.85 -0.95	V	I <sub>C</sub> = -10mA, I <sub>B</sub> = -1mA I <sub>C</sub> = -50mA, I <sub>B</sub> = -5mA
<b>SMALL-SIGNAL CHARACTERISTICS</b>					
Output Capacitance	C <sub>OBO</sub>	—	4.5	pF	V <sub>CB</sub> = -5.0V, f = 1.0MHz, I <sub>E</sub> = 0
Input Capacitance	C <sub>IBO</sub>	—	10	pF	V <sub>EB</sub> = -0.5V, f = 1.0MHz, I <sub>C</sub> = 0
Input Impedance	h <sub>ie</sub>	2	12	kΩ	V <sub>CE</sub> = -10V, I <sub>C</sub> = -1.0mA, f = 1.0kHz
Voltage Feedback Ratio	h <sub>re</sub>	0.1	10	x 10 <sup>-4</sup>	
Small-Signal Current Gain	h <sub>fe</sub>	100	400	—	
Output Admittance	h <sub>oe</sub>	3	60	μS	
Current Gain-Bandwidth Product	f <sub>T</sub>	250	—	MHz	V <sub>CE</sub> = -20V, I <sub>C</sub> = -10mA, f = 100MHz
Noise Figure	N <sub>F</sub>	—	4.0	dB	V <sub>CE</sub> = -5.0V, I <sub>C</sub> = -100μA, R <sub>S</sub> = 1.0kΩ, f = 1.0kHz
<b>SWITCHING CHARACTERISTICS</b>					
Delay Time	t <sub>d</sub>	—	35	ns	V <sub>CC</sub> = -3.0V, I <sub>C</sub> = -10mA, I <sub>B1</sub> = -I <sub>B2</sub> = -1.0mA
Rise Time	t <sub>r</sub>	—	35	ns	
Storage Time	t <sub>s</sub>	—	200	ns	
Fall Time	t <sub>f</sub>	—	50	ns	

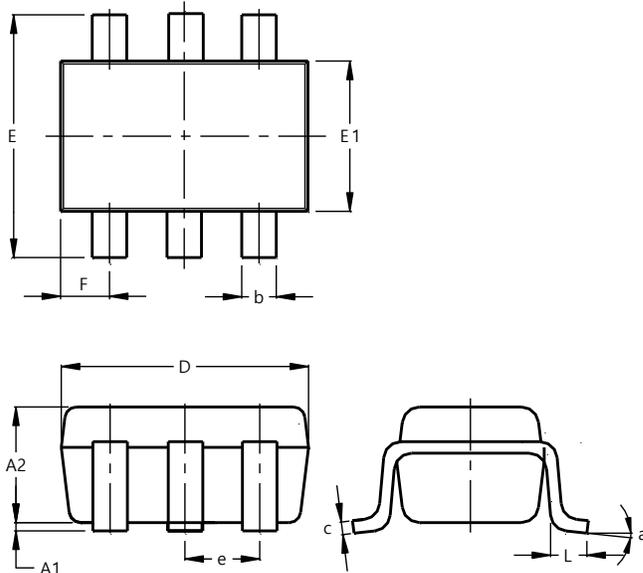
Note: 7. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



## Package Outline Dimensions

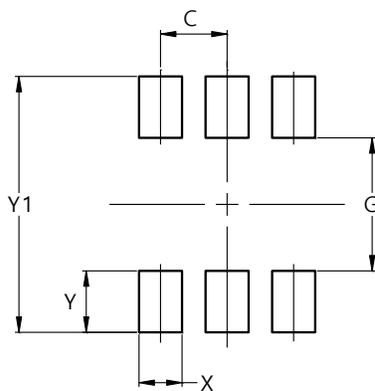
SOT363



SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

## Suggested Pad Layout

SOT363



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.420
Y	0.600
Y1	2.500