优尚

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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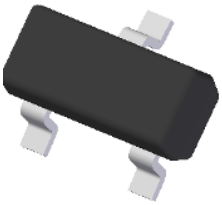
Features

- Epitaxial Planar Die Construction
- Ideal for Medium Power Amplification and Switching
- Complementary NPN Type: DIODES NK-MMBT4401

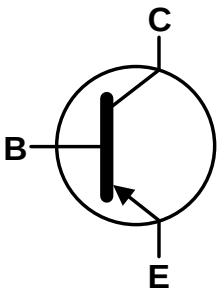
Mechanical Data

- Package: SOT23
- Package Material: Molded Plastic “Green” 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: 0.008 grams (Approximate)

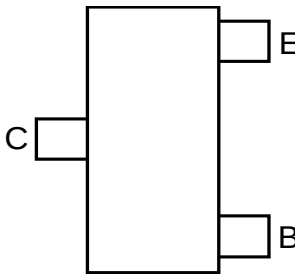
SOT23



Top View



Device Symbol



Top View
Pin-Out

Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

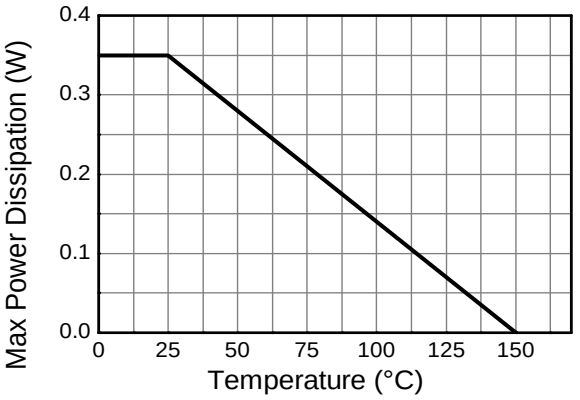
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-40	V
Collector-Emitter Voltage	V_{CEO}	-40	V
Emitter-Base Voltage	V_{EBO}	-6	V
Collector Current - Continuous (Note 7)	I_C	-600	mA

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

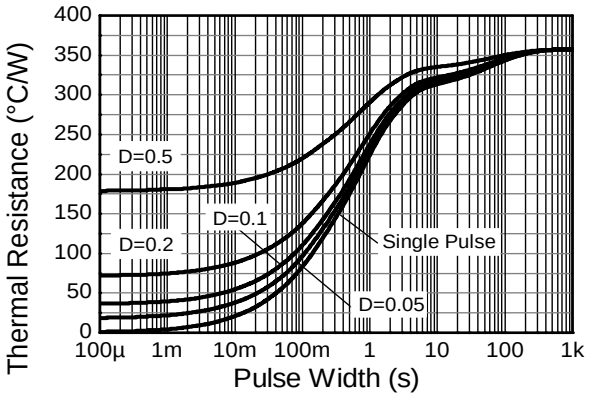
Characteristic		Symbol	Value	Unit
Collector Power Dissipation	(Note 5)	P_D	310	mW
	(Note 6)		350	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	403	°C/W
	(Note 6)		357	
Thermal Resistance, Junction to Leads	(Note 7)	$R_{\theta JL}$	350	°C/W
Thermal Resistance, Junction to Case	(Note 5)	$R_{\theta JC}$	55	°C/W
Operating and Storage Temperature Range		T_J,T_{STG}	-55 to +150	°C

Notes: 5. For the device mounted on minimum recommended pad layout FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
6. For the device mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
7. Thermal resistance from junction to solder-point (at the end of the collector lead).

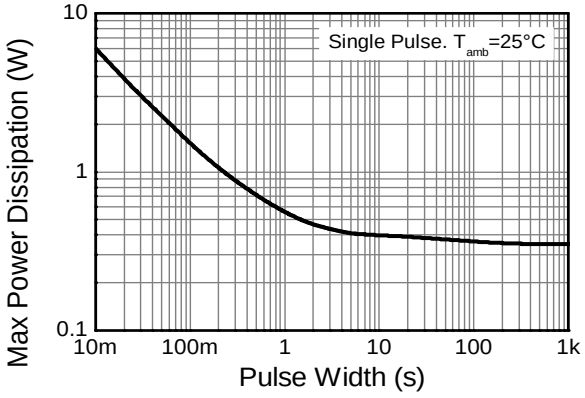
Thermal Characteristics and Derating Information



Derating Curve



Transient Thermal Impedance



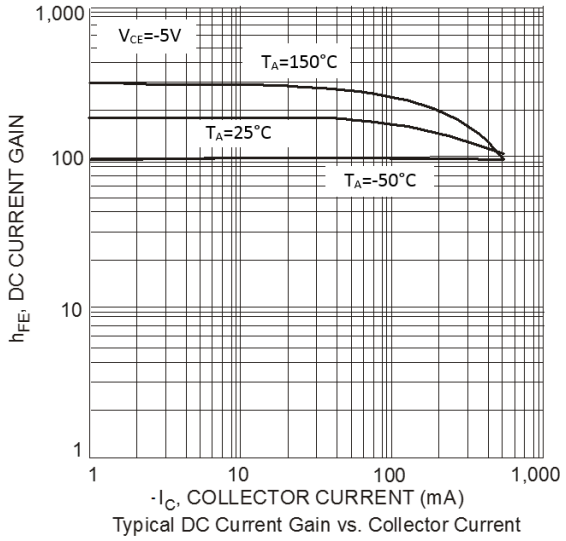
Pulse Power Dissipation

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

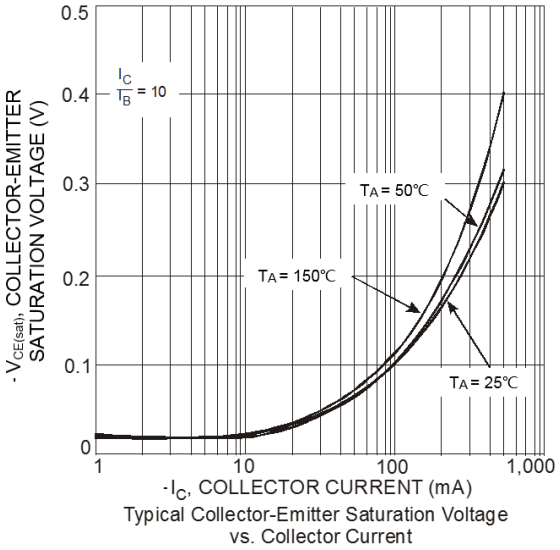
Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)					
Collector-Base Breakdown Voltage	BV_{CBO}	-40	—	V	I_C = -100μA
Collector-Emitter Breakdown Voltage	BV_{CEO}	-40	—	V	I_C = -10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-6	—	V	I_E = -100μA
Collector Cutoff Current	I_{CEX}	—	-100	nA	V_{CE} = -35V, $V_{EB(off)}$ = -0.4V
Base Cutoff Current	I_{BL}	—	-100	nA	V_{CE} = -35V, $V_{EB(off)}$ = -0.4V
ON CHARACTERISTICS (Note 8)					
DC Current Gain	h_{FE}	30 60 100 100 20	— — — 300 —	—	I_C = -100μA, V_{CE} = -1V I_C = -1.0mA, V_{CE} = -1V I_C = -10mA, V_{CE} = -1V I_C = -150mA, V_{CE} = -2V I_C = -500mA, V_{CE} = -2V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	-0.40 -0.75	V	I_C = -150mA, I_B = -15mA I_C = -500mA, I_B = -50mA
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	-0.75 —	-0.95 -1.30	V	I_C = -150mA, I_B = -15mA I_C = -500mA, I_B = -50mA
SMALL SIGNAL CHARACTERISTICS					
Output Capacitance	C_{obo}	—	8.5	pF	V_{CB} = -10V, f = 1.0MHz, I_E = 0
Input Capacitance	C_{ibo}	—	30	pF	V_{EB} = -0.5V, f = 1.0MHz, I_C = 0
Input Impedance	h_{ie}	1.5	15	kΩ	V_{CE} = -10V, I_C = -1mA, f = 1kHz
Voltage Feedback Ratio	h_{re}	0.1	8.0	x 10^{-4}	
Small Signal Current Gain	h_{fe}	60	500	—	
Output Admittance	h_{oe}	1.0	100	μS	
Current Gain-Bandwidth Product	f_T	200	—	MHz	V_{CE} = -10V, I_C = -20mA, f = 100MHz
SWITCHING CHARACTERISTICS					
Delay Time	t_d	—	15	ns	V_{CC} = -30V, I_C = -150mA, $V_{BE(off)}$ = -2V, I_{B1} = -15mA
Rise Time	t_r	—	20	ns	
Storage Time	t_s	—	225	ns	V_{CC} = -30V, I_C = -150mA, I_{B1} = $-I_{B2}$ = -15mA
Fall Time	t_f	—	30	ns	

Note: 8. Short duration pulse test used to minimize self-heating effect.

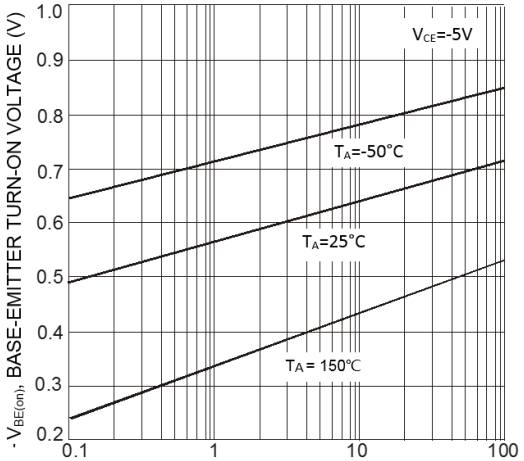
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



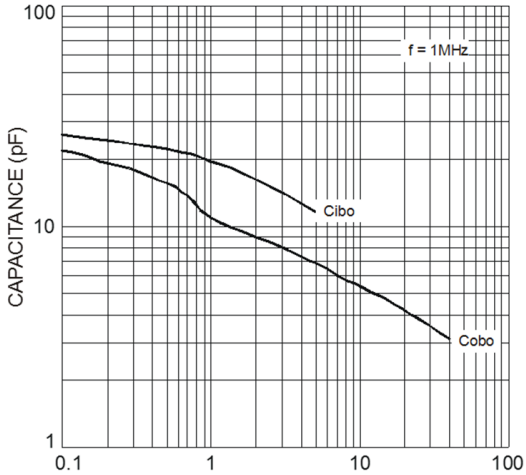
Typical DC Current Gain vs. Collector Current



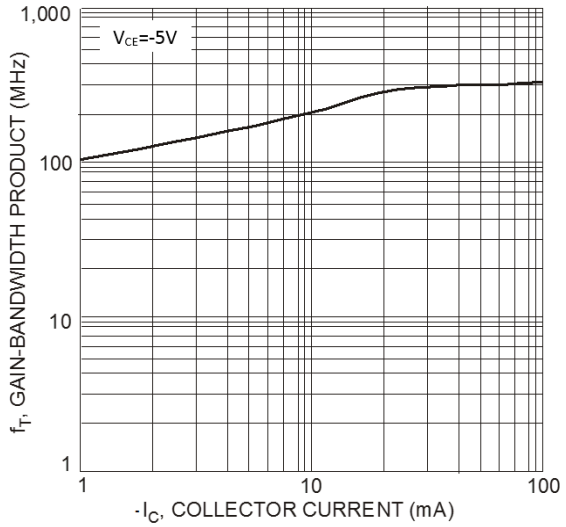
Typical Collector-Emitter Saturation Voltage vs. Collector Current



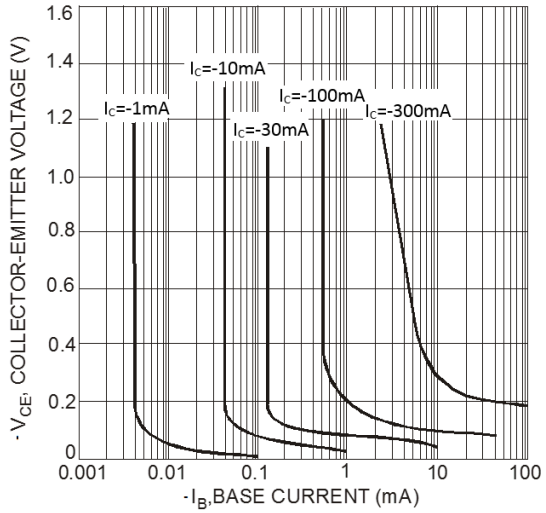
Typical Base-Emitter Turn-On Voltage vs. Collector Current



Typical Capacitance Characteristics



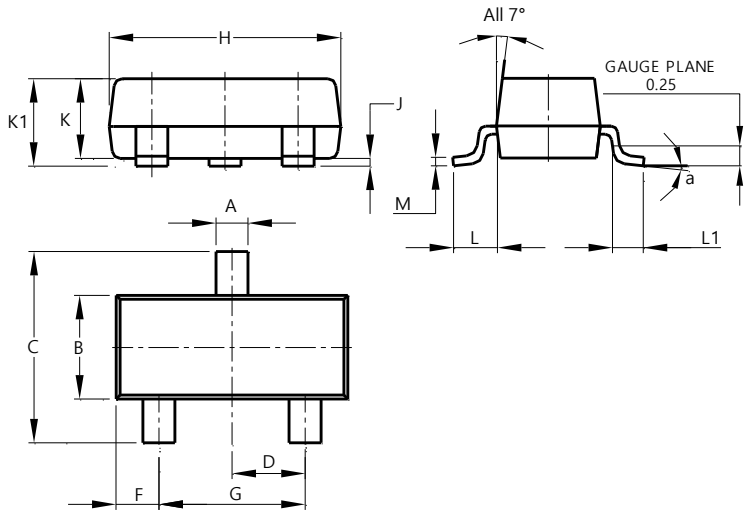
Typical Gain-Bandwidth Product vs. Collector Current



Typical Collector Saturation Region

Package Outline Dimensions

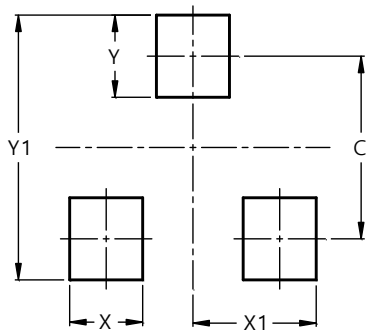
SOT23



SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

SOT23



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9