



Micro Commercial Components



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20736 Marilla Street Chatsworth
CA 91311

Phone: (818) 701-4933

Fax: (818) 701-4939

MMST3904

NPN Small Signal Transistors

Features

- Epitaxial Planar Die Construction
- Complementary PNP Type available (MMST3906)
- Ultra-small surface mount package
- Marking : K2N
- Lead Free Finish/RoHS Compliant ("P" Suffix designates RoHS Compliant. See ordering information)
- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1
- Halogen free available upon request by adding suffix "-HF"

Maximum Ratings

Symbol	Rating	Rating	Unit
V_{CEO}	Collector-Emitter Voltage	40	V
V_{CBO}	Collector-Base Voltage	60	V
V_{EBO}	Emitter-Base Voltage	6.0	V
I_C	Collector Current-Continuous ⁽¹⁾	200	mA
P_C	Power dissipation ⁽¹⁾	200	mW
T_J	Junction Temperature	-55 to +150	°C
T_{STG}	Storage Temperature	-55 to +150	°C

Electrical Characteristics @ 25°C Unless Otherwise Specified

Symbol	Parameter	Min	Max	Units
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OFF CHARACTERISTICS ⁽²⁾

$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage ($I_C=1.0mA$, $I_B=0$)	40	---	Vdc
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage ($I_C=10uA$, $I_E=0$)	60	---	Vdc
$V_{(BR)EBO}$	Collector-Emitter Breakdown Voltage ($I_C=10uA$, $I_C=0$)	5.0	---	Vdc
I_{CEX}	Collector-Base Cutoff Current ($V_{CE}=30Vdc$, $V_{EB(OFF)}=3.0Vdc$)	---	50	nAdc
I_{BL}	Emitter-Base Cutoff Current ($V_{CE}=30Vdc$, $V_{EB(OFF)}=3.0Vdc$)	---	50	nAdc

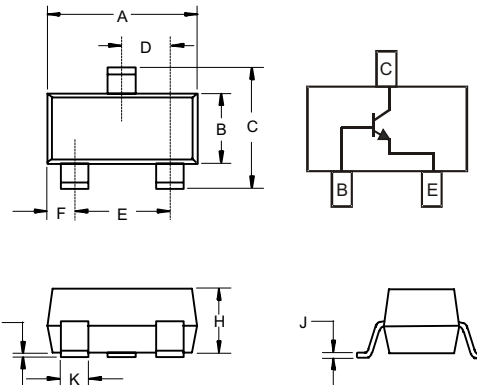
ON CHARACTERISTICS ⁽²⁾

h_{FE}	DC Current Gain ($I_C=100uA$, $V_{CE}=1.0Vdc$) ($I_C=1.0mA$, $V_{CE}=1.0Vdc$) ($I_C=10mA$, $V_{CE}=1.0Vdc$) ($I_C=50mA$, $V_{CE}=1.0Vdc$) ($I_C=500mA$, $V_{CE}=1.0Vdc$)	40 70 100 60 30	---	---
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage ($I_C=10mA$, $I_B=1.0mA$) ($I_C=50mA$, $I_B=5.0mA$)	---	0.25 0.30	Vdc
$V_{BE(sat)}$	Base-Emitter Saturation Voltage ($I_C=10mA$, $I_B=1.0mA$) ($I_C=50mA$, $I_B=5.0mA$)	0.65 ---	0.85 0.95	Vdc

Note: 1. Valid provided that terminals are kept at ambient temperature.

2. Pulse test: Pulse width<300us, duty cycle<2%

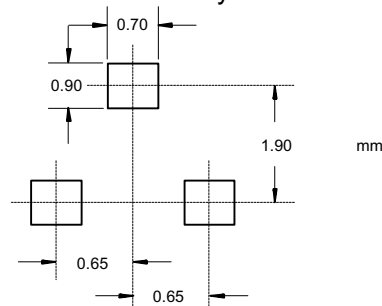
SOT-323



DIMENSIONS

DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	.071	.087	1.80	2.20	
B	.045	.053	1.15	1.35	
C	.083	.096	2.10	2.45	
D	.026 Nominal		0.65Nominal		
E	.047	.055	1.20	1.40	
F	.012	.016	.30	.40	
G	.000	.004	.000	.100	
H	.035	.039	.90	1.00	
J	.004	.010	.100	.250	
K	.006	.016	.15	.40	

Suggested Solder Pad Layout



SMALL SIGNAL CHARACTERISTICS

C _{obo}	Output Capacitance (V _{CB} =5.0Vdc, f=1.0MHz, I _E =0)		---	4.0	pF
C _{ibo}	Input Capacitance (V _{EB} =0.5Vdc, f=1.0MHz, I _C =0)		---	8.0	pF
h _{ie}	Input Impedance	V _{CE} =10Vdc, I _C =1.0mAdc, f=1.0KHz	1.0	10	kohms
h _{re}	Voltage Feedback Ratio		0.5	8.0	X 10 ⁻⁴
h _{fe}	Small Signal Current Gain		100	400	---
h _{oe}	Output Admittance		1.0	40	uS
f _T	Current Gain-Bandwidth Product (V _{CE} =20Vdc, I _C =10mAdc, f=100MHz)		300	---	NHz
NF	Noise Figure (V _{CE} =5.0Vdc, I _C =100uAdc, R _C =1.0KOHMS, f=1.0KHz)		---	5.0	dB

SWITCHING CHARACTERISTICS

td	Delay Time	$V_{CC}=3.0Vdc$, $I_C=100\mu A$, $V_{BE(off)}=0.5Vdc$, $I_{B1}=1.0mA$	---	35	ns
tr	Rise Time		---	35	ns

Ordering Information :

Device	Packing
Part Number-TP	Tape&Reel; 3Kpcs/Reel

Note : Adding "-HF" suffix for halogen free, eg. Part Number-TP-HF

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