

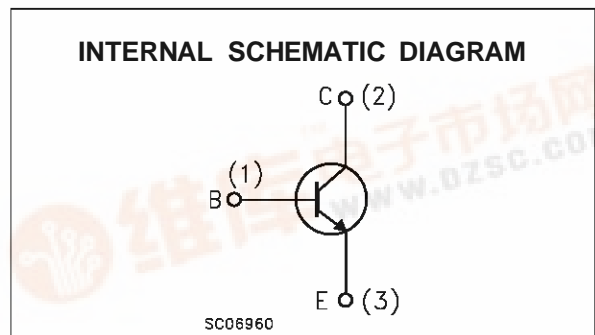


SO2222
SO2222A

SMALL SIGNAL NPN TRANSISTORS

Type	Marking
SO2222	N13
SO2222A	N20

- SILICON EPITAXIAL PLANAR NPN TRANSISTORS
- MINIATURE PLASTIC PACKAGE FOR APPLICATION IN SURFACE MOUNTING CIRCUITS
- MEDIUM CURRENT AF AMPLIFICATION AND SWITCHING
- PNP COMPLEMENTS ARE RESPECTIVELY SO2907 AND SO2907A



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		SO2222	SO2222A	
V_{CBO}	Collector-Emitter Voltage ($V_{BE} = 0$)	60	75	V
V_{CEO}	Collector-Emitter Voltage ($I_B = 0$)	30	40	V
V_{EBO}	Emitter-Base Voltage ($I_C = 0$)	5	6	V
I_{CM}	Collector Peak Current	0.8		A
P_{tot}	Total Dissipation at $T_c = 25^\circ\text{C}$	350		mW
T_{stg}	Storage Temperature	-65 to 150		$^\circ\text{C}$
T_j	Max. Operating Junction Temperature	150		$^\circ\text{C}$

SO2222/SO2222A

THERMAL DATA

$R_{thj-amb}$ •	Thermal Resistance Junction-Ambient	Max	350	$^{\circ}\text{C}/\text{W}$
R_{thj-SR} •	Thermal Resistance Junction-Substrate	Max	290	$^{\circ}\text{C}/\text{W}$

• Mounted on a ceramic substrate area = 15 x 15 x 0.6 mm

ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CEX}	Collector Cut-off Current ($V_{BE} = 0$)	$V_{CE} = 60\text{ V}$ $V_{BE} = -3\text{ V}$ for SO2222A			10	nA
I_{BEX}	Base Cut-off Current ($V_{BE} = 0$)	$V_{CE} = 60\text{ V}$ $V_{BE} = -3\text{ V}$ for SO2222A			20	nA
I_{CBO}	Collector Cut-off Current ($I_E = 0$)	$V_{CB} = \text{rated } V_{CBO}$ $V_{CB} = \text{rated } V_{CBO}$ $T_j = 150^{\circ}\text{C}$			10 10	nA μA
I_{EBO}	Emitter Cut-off Current ($I_C = 0$)	$V_{EB} = 3\text{ V}$ for SO2222 for SO2222A			30 15	nA nA
$V_{(BR)CEO}^*$	Collector-Emitter Breakdown Voltage ($I_B = 0$)	$I_C = 10\text{ mA}$ for SO2222 for SO2222A	30 40			V V
$V_{(BR)CBO}^*$	Collector-Base Breakdown Voltage ($I_B = 0$)	$I_C = 10\text{ }\mu\text{A}$ for SO2222 for SO2222A	60 75			V V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage ($I_C = 0$)	$I_E = 10\text{ }\mu\text{A}$ for SO2222 for SO2222A	5 6			V V
$V_{CE(sat)}^*$	Collector-Emitter Saturation Voltage	$I_C = 150\text{ mA}$ $I_B = 15\text{ mA}$ for SO2222 for SO2222A $I_C = 500\text{ mA}$ $I_B = 50\text{ mA}$ for SO2222 for SO2222A			0.4 0.3 1.6 1	V V V V
$V_{BE(sat)}^*$	Collector-Base Saturation Voltage	$I_C = 150\text{ mA}$ $I_B = 15\text{ mA}$ for SO2222 for SO2222A $I_C = 500\text{ mA}$ $I_B = 50\text{ mA}$ for SO2222 for SO2222A	0.6		1.3 1.2 2.6 2	V V V V
h_{FE}^*	DC Current Gain	$I_C = 0.1\text{ mA}$ $V_{CE} = 10\text{ V}$ $I_C = 1\text{ mA}$ $V_{CE} = 10\text{ V}$ $I_C = 10\text{ mA}$ $V_{CE} = 10\text{ V}$ $I_C = 150\text{ mA}$ $V_{CE} = 10\text{ V}$ $I_C = 150\text{ mA}$ $V_{CE} = 1\text{ V}$ $I_C = 500\text{ mA}$ $V_{CE} = 10\text{ V}$ for SO2222 for SO2222A	35 50 75 100 50 30 40		300	
f_T	Transition Frequency	$I_C = 20\text{ mA}$ $V_{CE} = 20\text{ V}$ $f = 100\text{ MHz}$ for SO2222 for SO2222A	250 300			MHz MHz
C_{CB}	Collector Base Capacitance	$I_E = 0$ $V_{CB} = 10\text{ V}$ $f = 1\text{ MHz}$			8	pF

* Pulsed: Pulse duration = 300 μs , duty cycle $\leq 2\%$

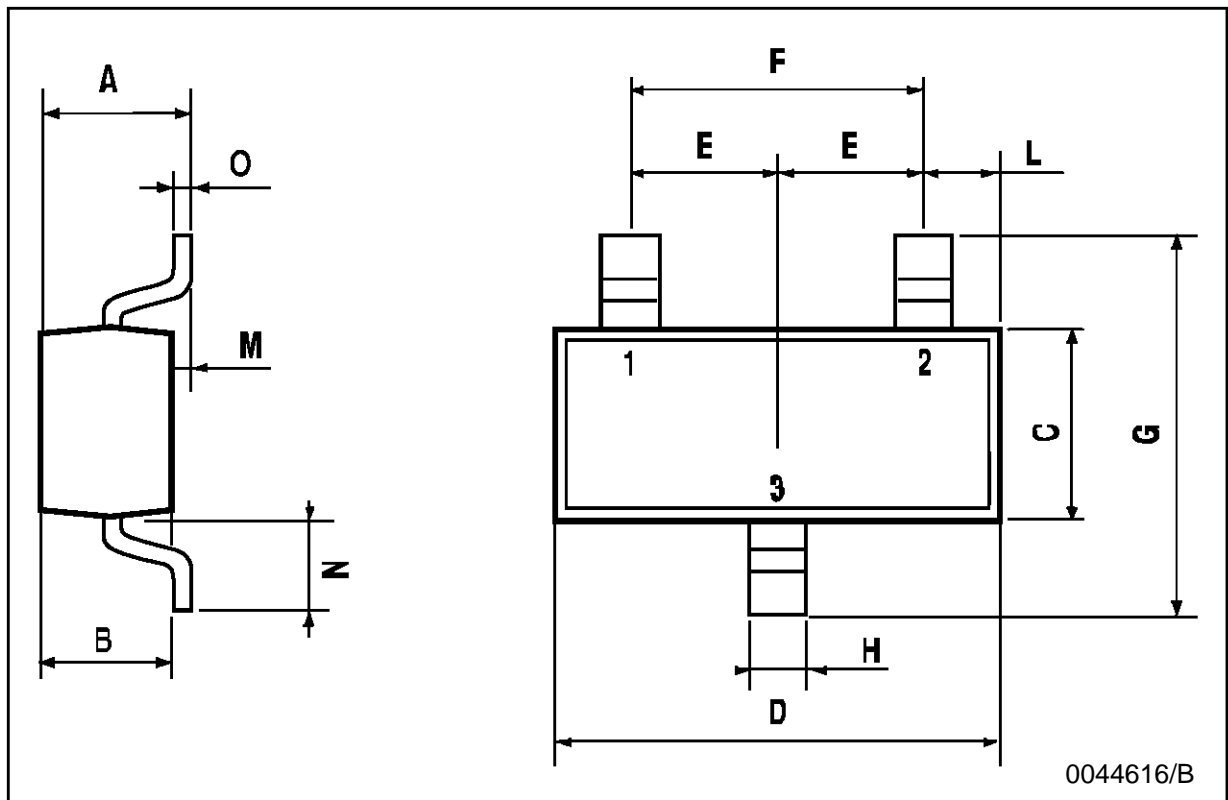
ELECTRICAL CHARACTERISTICS (Continued)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
C_{EB}	Emitter Base Capacitance	$I_E = 0$ $V_{EB} = 0.5$ V $f = 1$ MHz for SO2222 for SO2222A			30 25	pF pF
NF	Noise Figure	$I_C = 0.1$ mA $V_{CE} = 10$ V $f = 1$ KHz $\Delta f = 200$ Hz $R_G = 1$ K Ω for SO2222A only			4	dB
h_{ie}^*	Input Impedance	$V_{CE} = 10$ V $I_C = 1$ mA $f = 1$ KHz $V_{CE} = 10$ V $I_C = 10$ mA $f = 1$ KHz for SO2222A only	2 0.25		8 1.25	K Ω K Ω
h_{re}^*	Reverse Voltage Ratio	$V_{CE} = 10$ V $I_C = 1$ mA $f = 1$ KHz $V_{CE} = 10$ V $I_C = 10$ mA $f = 1$ KHz for SO2222A only			8 4	10^{-4} 10^{-4}
h_{fe}^*	Small Signal Current Gain	$V_{CE} = 10$ V $I_C = 1$ mA $f = 1$ KHz $V_{CE} = 10$ V $I_C = 10$ mA $f = 1$ KHz for SO2222A only	50 75		300 375	
h_{oe}^*	Output Admittance	$V_{CE} = 10$ V $I_C = 1$ mA $f = 1$ KHz $V_{CE} = 10$ V $I_C = 10$ mA $f = 1$ KHz for SO2222A only	5 25		35 200	μ S μ S
t_d	Delay Time	$I_C = -150$ mA $V_{BE} = -0.5$ V for SO2222A only $I_C = 150$ mA $I_{B1} = -I_{B2} = 15$ mA for SO2222A only			10	ns
t_r	Rise Time				25	ns
t_s	Storage Time				225	ns
t_f	Fall Time				60	ns

* Pulsed: Pulse duration = 300 μ s, duty cycle ≤ 2 %

SOT-23 MECHANICAL DATA

DIM.	mm			mils		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	0.85		1.1	33.4		43.3
B	0.65		0.95	25.6		37.4
C	1.20		1.4	47.2		55.1
D	2.80		3	110.2		118
E	0.95		1.05	37.4		41.3
F	1.9		2.05	74.8		80.7
G	2.1		2.5	82.6		98.4
H	0.38		0.48	14.9		18.8
L	0.3		0.6	11.8		23.6
M	0		0.1	0		3.9
N	0.3		0.65	11.8		25.6
O	0.09		0.17	3.5		6.7



Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1995 SGS-THOMSON Microelectronics - Printed in Italy - All Rights Reserved

SGS-THOMSON Microelectronics GROUP OF COMPANIES
Australia - Brazil - Canada - China - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands -
Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A