


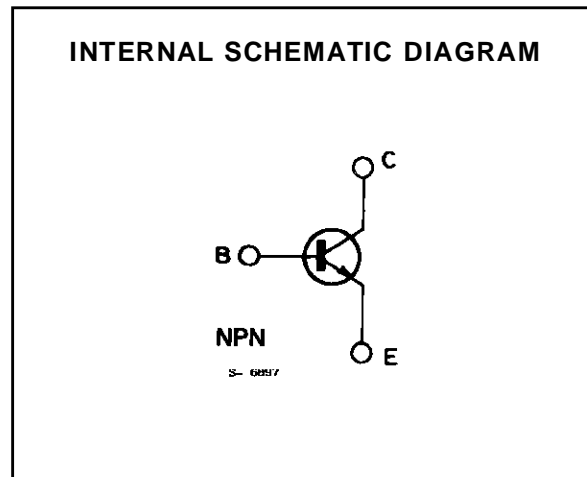
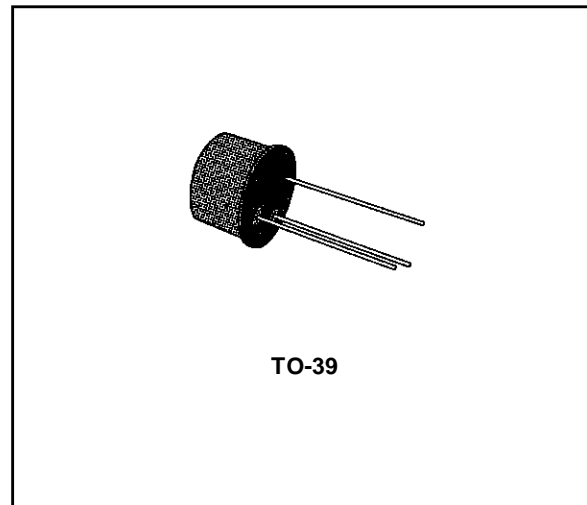
SWITCHES AND UNIVERSAL AMPLIFIERS

DESCRIPTION

The 2N1613 and 2N1711 are silicon planar epitaxial NPN transistors in Jedec TO-39 metal case. They are designed for use in high-performance amplifier, oscillator and switching circuits.

The 2N1711 is also used to advantage in amplifiers where low noise is an important factor.

 Products approved to CECC 50002-104 available on request.



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-base Voltage ($I_E = 0$)	75	V
V_{CER}	Collector-emitter Voltage ($R_{BE} \leq 10 \Omega$)	50	V
V_{EBO}	Emitter-base Voltage ($I_C = 0$)	7	V
I_C	Collector Current	500	mA
P_{tot}	Total Power Dissipation at $T_{amb} \leq 25 \text{ }^\circ\text{C}$	0.8	W
	at $T_{case} \leq 25 \text{ }^\circ\text{C}$	3	W
	at $T_{case} \leq 100 \text{ }^\circ\text{C}$	1.7	W
T_{stg}, T_j	Storage and Junction Temperature	- 65 to 200	$^\circ\text{C}$

2N1613-2N1711

THERMAL DATA

$R_{th\ j-case}$	Thermal Resistance Junction-case	Max	58	°C/W
$R_{th\ j-amb}$	Thermal Resistance Junction-ambient	Max	219	°C/W

ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ °C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cutoff Current ($I_E = 0$)	$V_{CB} = 60\text{ V}$			10	nA
		$V_{CB} = 60\text{ V}$ $T_{amb} = 150\text{ °C}$			10	μA
I_{EBO}	Emitter Cutoff Current ($I_C = 0$)	$V_{EB} = 5\text{ V}$ for 2N1613 for 2N1711			10 5	nA nA
$V_{(BR)\ CBO}$	Collector-base Breakdown Voltage	$I_C = 0.1\text{ mA}$	75			V
$V_{(BR)\ CER}^*$	Collector-emitter Breakdown Voltage ($R_{BE} \leq 10\ \Omega$)	$I_C = 10\text{ mA}$	50			V
$V_{(BR)\ EBO}$	Emitter-base Breakdown Voltage ($I_C = 0$)	$I_E = 0.1\text{ mA}$	7			V
$V_{CE(sat)}^*$	Collector-emitter Saturation Voltage	$I_C = 150\text{ mA}$ $I_B = 15\text{ mA}$		0.5	1.5	V
$V_{BE(sat)}^*$	Base-emitter Saturation Voltage	$I_C = 150\text{ mA}$ $I_B = 15\text{ mA}$		0.95	1.3	V
h_{FE}^*	DC Current Gain	for 2N1613				
		$I_C = 0.01\text{ mA}$ $V_{CE} = 10\text{ V}$		35		
		$I_C = 0.1\text{ mA}$ $V_{CE} = 10\text{ V}$	20	50		
		$I_C = 10\text{ mA}$ $V_{CE} = 10\text{ V}$	35	80		
		$I_C = 150\text{ mA}$ $V_{CE} = 10\text{ V}$	40	80	120	
		$I_C = 500\text{ mA}$ $V_{CE} = 10\text{ V}$	20	55		
		$I_C = 10\text{ mA}$ $V_{CE} = 10\text{ V}$				
		$T_{amb} = -55\text{ °C}$	20	35		
h_{FE}^*	DC Current Gain	for 2N1711				
		$I_C = 0.01\text{ mA}$ $V_{CE} = 10\text{ V}$	20	60		
		$I_C = 0.1\text{ mA}$ $V_{CE} = 10\text{ V}$	35	80		
		$I_C = 10\text{ mA}$ $V_{CE} = 10\text{ V}$		130		
		$I_C = 150\text{ mA}$ $V_{CE} = 10\text{ V}$		130	300	
		$I_C = 500\text{ mA}$ $V_{CE} = 10\text{ V}$		75		
		$I_C = 10\text{ mA}$ $V_{CE} = 10\text{ V}$				
		$T_{amb} = 55\text{ °C}$		65		
h_{fe}	Small Signal Current Gain	for 2N1613				
		$I_C = 1\text{ mA}$ $V_{CE} = 10\text{ V}$ $f = 1\text{ kHz}$	30	70	150	
		for 2N1711				
		$I_C = 1\text{ mA}$ $V_{CE} = 10\text{ V}$ $f = 1\text{ kHz}$	70	135	300	
f_t	Transition Frequency	$I_C = 50\text{ mA}$ $V_{CE} = 10\text{ V}$				
		$f = 20\text{ MHz}$ for 2N1613 for 2N1711	60 70	80 100		MHz MHz
C_{EBO}	Emitter-base Capacitance	$I_C = 0$ $V_{EB} = 0.5\text{ V}$ $f = 1\text{ MHz}$		50	80	pF
C_{CBO}	Collector-base Capacitance	$I_E = 0$ $V_{CB} = 10\text{ V}$ $f = 1\text{ MHz}$		18	25	pF

* Pulsed : pulse duration = 300 μs, duty cycle = 1 %.

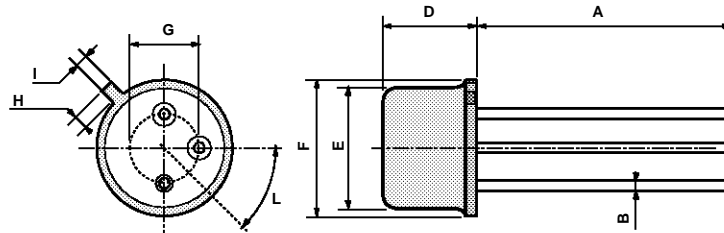
ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
NF	Noise Figure	$I_C = 0.3 \text{ mA}$ $R_g = 510 \Omega$				
		$V_{CE} = 10 \text{ V}$ $f = 1 \text{ kHz}$ for 2N1613 for 2N1711		6 3.5	12 8	dB dB
h_{ie}	Input Impedance	$I_C = 1 \text{ mA}$ $f = 1 \text{ kHz}$				
		$V_{CE} = 5 \text{ V}$ for 2N1613 for 2N1711		2.2 4.4		k Ω k Ω
h_{re}	Reverse Voltage Ratio	$I_C = 1 \text{ mA}$ $f = 1 \text{ kHz}$				
		$V_{CE} = 5 \text{ V}$ for 2N1613 for 2N1711		3.6×10^{-4} 7.3×10^{-4}		
h_{oe}	Output Admittance	$I_C = 1 \text{ mA}$ $f = 1 \text{ kHz}$				
		$V_{CE} = 5 \text{ V}$ for 2N1613 for 2N1711		12.5 23.8		μS μS

* Pulsed : pulse duration = 300 μs , duty cycle = 1 %.

TO39 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	12.7			0.500		
B			0.49			0.019
D			6.6			0.260
E			8.5			0.334
F			9.4			0.370
G	5.08			0.200		
H			1.2			0.047
I			0.9			0.035
L	45° (typ.)					



P008B

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.

© 1994 SGS-THOMSON Microelectronics - All Rights Reserved

SGS-THOMSON Microelectronics GROUP OF COMPANIES

Australia - Brazil - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands -
Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A