



NPN 2N1613 – 2N1711

SILICON PLANAR EPITAXIAL TRANSISTORS

The 2N1613 and 2N1711 are NPN transistors mounted in TO-39 metal package with the collector connected to the 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.

Compliance to RoHS.

ABSOLUTE MAXIMUM RATINGS

Symbol	Ratings	Value	Unit	
V_{CBO}	Collector-Base Voltage	75	V	
V_{CER}	Collector-Emitter Voltage ($R_{BE} = 10\Omega$)	50	V	
V_{EBO}	Emitter-Base Voltage	7	V	
I_C	Collector Current	0.5	A	
I_{CM}	Peak Collector Current	1	A	
P_D	Total Power Dissipation	@ $T_{case} = 25^\circ$	3	Watts
		@ $T_{case} = 100^\circ$	1.7	Watts
		@ $T_{amb} = 25^\circ$	0.8	Watts
T_J	Junction Temperature	200	$^\circ C$	
T_{Stg}	Storage Temperature range	-65 to +200	$^\circ C$	

THERMAL CHARACTERISTICS

Symbol	Ratings	Value	Unit
R_{thJ-c}	Thermal Resistance, Junction-case	58	$^\circ C/W$
$R_{thJ-amb}$	Thermal Resistance, Junction-ambient	219	$^\circ C/W$

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ELECTRICAL CHARACTERISTICS

TC=25°C unless otherwise noted

Symbol	Ratings	Test Condition(s)	Min	Typ	Mx	Unit	
I_{CBO}	Collector Cutoff Current	$V_{CE}=60\text{ V}, I_E=0$	-	-	10	nA	
		$V_{CE}=60\text{ V}, I_E=0, T_{amb} = 150^\circ\text{C}$	-	-	10	μA	
I_{EBO}	Emitter Cutoff Current	2N1613 $V_{EB}=5\text{ V}$	-	-	10	nA	
		2N1711 $V_{EB}=5\text{ V}$	-	-	5		
V_{CBO}	Collector Base Breakdown Voltage	$I_C=0.1\text{ mA}$	75	-	-	V	
$V_{CER(*)}$	Collector Emitter Breakdown Voltage	$I_C=10\text{ mA}, R_{BE}=10\ \Omega$	50	-	-	V	
V_{EBO}	Emitter Base Breakdown Voltage	$I_E=100\ \mu\text{A}, I_C=0$	7	-	-	V	
$V_{CE(SAT)(*)}$	Collector-Emitter saturation Voltage	$I_C=150\text{ mA}, I_B=15\text{ mA}$	-	-	1.5	V	
$V_{BE(SAT)(*)}$	Base-Emitter saturation Voltage	$I_C=150\text{ mA}, I_B=15\text{ mA}$	-	-	1.3	V	
$h_{FE(*)}$	DC Current Gain	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	-	-	
			$I_C=10\text{ mA}, V_{CE}=10\text{ V}$	35	-	-	
			$I_C=150\text{ mA}, V_{CE}=10\text{ V}$	40	-	120	
			$I_C=500\text{ mA}, V_{CE}=10\text{ V}$	20	-	-	
		$I_C=10\text{ mA}, V_{CE}=10\text{ V}, T_{amb}=55^\circ\text{C}$	20	-	-		
		2N1711	$I_C=0.01\text{ mA}, V_{CE}=10\text{ V}$	20	-	-	
			$I_C=0.1\text{ mA}, V_{CE}=10\text{ V}$	35	-	-	
			$I_C=10\text{ mA}, V_{CE}=10\text{ V}$	75	130	-	
			$I_C=150\text{ mA}, V_{CE}=10\text{ V}$	100	-	300	
$I_C=500\text{ mA}, V_{CE}=10\text{ V}$	40		75	-			
$I_C=10\text{ mA}, V_{CE}=10\text{ V}, T_{amb}=55^\circ\text{C}$	35	65	-				
h_{fe}	Small Signal Current Gain	2N1613 $I_C=1\text{ mA}, V_{CE}=10\text{ V}, f = 1\text{ kHz}$	30	-	150	-	
		2N1711 $I_C=1\text{ mA}, V_{CE}=10\text{ V}, f = 1\text{ kHz}$	70	-	300		
h_{je}	Input Impedance	2N1613 $I_C=1\text{ mA}, V_{CE}=5\text{ V}, f = 1\text{ kHz}$	-	2.2	-	k Ω	
		2N1711 $I_C=1\text{ mA}, V_{CE}=5\text{ V}, f = 1\text{ kHz}$	-	4.4	-		
h_{re}	Reverse VoltageRatio	2N1613 $I_C=1\text{ mA}, V_{CE}=5\text{ V}, f = 1\text{ kHz}$	-	3.6×10^{-4}	-	-	
		2N1711 $I_C=1\text{ mA}, V_{CE}=5\text{ V}, f = 1\text{ kHz}$	-	7.3×10^{-4}	-		
h_{oe}	Output Admittance	2N1613 $I_C=1\text{ mA}, V_{CE}=5\text{ V}, f = 1\text{ kHz}$	-	12.5	-	μS	
		2N1711 $I_C=1\text{ mA}, V_{CE}=5\text{ V}, f = 1\text{ kHz}$	-	23.8	-		

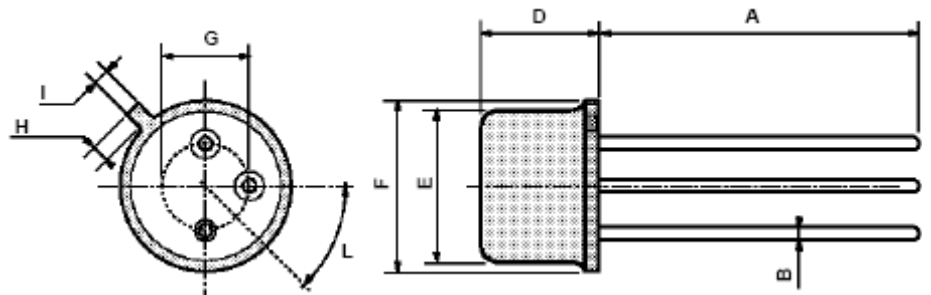
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Symbol	Ratings	Test Condition(s)	Min	Typ	Mx	Unit
f_T	Transition Frequency	2N1613 $I_C=50\text{ mA}, V_{CE}=10\text{ V}, f=20\text{ MHz}$	60	-	-	MHz
		2N1711 $I_C=50\text{ mA}, V_{CE}=10\text{ V}, f=20\text{ MHz}$	70	-	-	
C_{CBO}	Collector-Base Capacitance	$I_E=0, V_{CB}=10\text{ V}, f=1\text{ MHz}$	-	-	25	pF
C_{EBO}	Emitter-Base Capacitance	$I_C=0, V_{EB}=0.5\text{ V}, f=1\text{ MHz}$	-	-	80	pF
NF	Noise Figure	2N1613 $I_C=0.3\text{ mA}, V_{CE}=10\text{ V}, f=1\text{ kHz}, R_g=510\ \Omega$	-	-	12	dB
		2N1711 $I_C=0.3\text{ mA}, V_{CE}=10\text{ V}, f=1\text{ kHz}, R_g=510\ \Omega$	-	-	8	

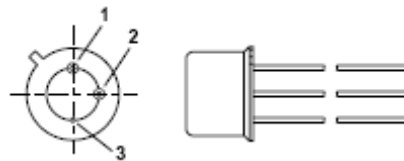
(*) Pulse conditions : $t_p < 300\ \mu\text{s}, \delta = 1\%$.

MECHANICAL DATA CASE TO-39

DIMENSIONS (mm)			
	min	typ	max
A	12.7	-	-
B	-	-	0.49
D	-	-	6.6
E	-	-	8.5
F	-	-	9.4
G	5.08	-	-
H	-	-	1.2
I	-	-	0.9
L	45°	-	-



Pin 1 :	Emitter
Pin 2 :	Base
Case :	Collector



Information furnished is believed to be accurate and reliable. However, CS assumes no responsibility for the consequences of use of such information nor for errors that could appear.
Data are subject to change without notice.