



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	5	mA	
I_{CM}	Peak Collector Current	1	A	
I_{BM}	Peak Base Current	200	mA	
P_D	Total Power Dissipation	@ $T_{case} = 25^\circ$	3	W
		@ $T_{case} = 100^\circ$	1.7	W
		@ $T_{amb} = 25^\circ$	0.8	W
T_J	Junction Temperature	200	$^\circ\text{C}$	
T_{stg}	Storage Temperature range	-65 to +150	$^\circ\text{C}$	

THERMAL CHARACTERISTICS

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

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ELECTRICAL CHARACTERISTICS

TC=25°C unless otherwise noted

Symbol	Ratings	Test Condition(s)	Min	Typ	Max	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	$V_{EB}=5\text{ V}$ 2N1613	-	-	10	nA	
		$V_{EB}=5\text{ V}$ 2N1711	-	-	5		
V_{CBO}	Collector Base Breakdown Voltage	$I_C=0.1\text{ mA}$	75	-	-	V	
V_{EBO}	Emitter Base Breakdown Voltage	$I_E=100\text{ }\mu\text{A}, I_C=0$	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	$I_C=0.1\text{ mA}, V_{CE}=10\text{ V}$	2N1613	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	-	-	
		$I_C=10\text{ }\mu\text{A}, V_{CE}=10\text{ V}$	2N1711	20	-	-	
		$I_C=0.1\text{ mA}, V_{CE}=10\text{ V}$		35	-	-	
		$I_C=10\text{ mA}, V_{CE}=10\text{ V}$		75	-	-	
		$I_C=150\text{ mA}, V_{CE}=10\text{ V}$		100	-	300	
		$I_C=500\text{ mA}, V_{CE}=10\text{ V}$		40	-	-	

Symbol	Ratings	Test Condition(s)	Min	Typ	Mx	Unit
f_T	Transition Frequency	$I_C=50\text{ mA}, V_{CE}=10\text{ V}, f=100\text{ MHz}$ 2N1613	60	-	-	MHz
		2N1711	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	$I_C=0.3\text{ mA}, V_{CE}=10\text{ V}, f=1\text{ kHz}, R_g=510\text{ }\Omega$ 2N1613	-	-	12	dB
		$I_C=0.3\text{ mA}, V_{CE}=10\text{ V}, f=1\text{ kHz}, R_g=510\text{ }\Omega$ 2N1711	-	-	8	

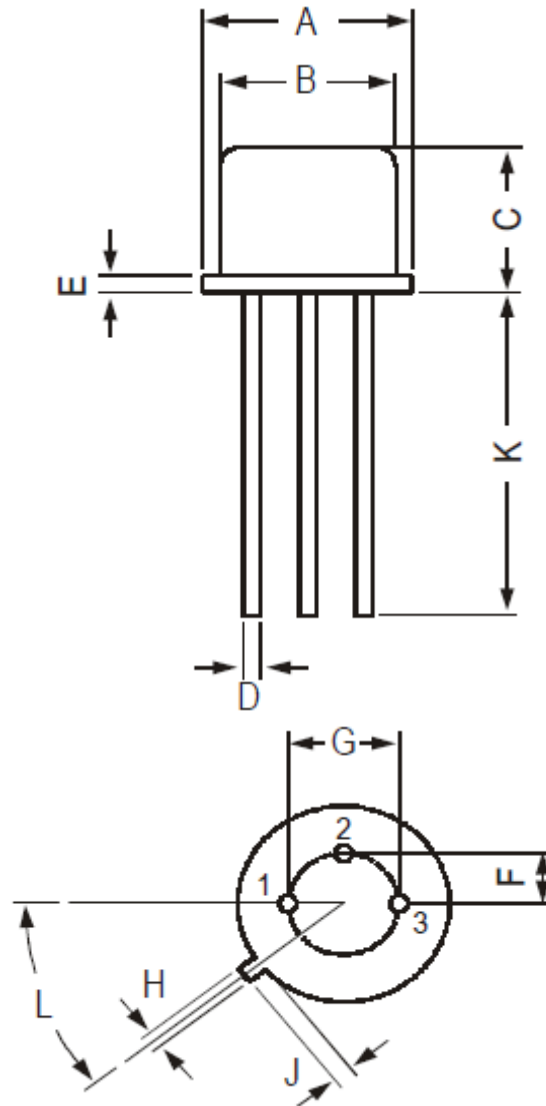
(*) Pulse conditions : $t_p < 300\text{ }\mu\text{s}, \delta = 2\%$.

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MECHANICAL DATA CASE TO-39

DIMENSIONS (mm)		
	min	max
A	8.50	9.39
B	7.74	8.50
C	6.09	6.60
D	0.40	0.53
E	-	0.88
F	2.41	2.66
G	4.82	5.33
H	0.71	0.86
J	0.73	1.02
K	12.70	-
L	42°	48°

Pin 1 :	Emitter
Pin 2 :	Base
Pin 3 :	Collector
Case :	Collector



Revised August 2012

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