



# 2N 1613

# 2N 1711

NPB SILICON PLANAR EPITAXIAL TRANSISTORS

THE 2N1613 AND 2N1711 ARE NPN SILICON PLANAR EPITAXIAL TRANSISTORS DESIGNED FOR SWITCHING AND D.C. AMPLIFIERS.

CASE TO-39



C E B

### ABSOLUTE MAXIMUM RATINGS

Collector-Base Voltage	VCBO	75V
Collector-Emitter Voltage ( $R_{BE} \leq 10\Omega$ )	VCER	50V
Emitter-Base Voltage	VEBO	7V
Total Power Dissipation ( $T_A=25^\circ\text{C}$ ) ( $T_C=25^\circ\text{C}$ ) ( $T_C=100^\circ\text{C}$ )	P <sub>tot</sub>	0.8W
		3W
		1.7W
Operating Junction Temperature	T <sub>j</sub>	200°C
Storage Temperature Range	T <sub>stg</sub>	-65 to 300°C

### ELECTRICAL CHARACTERISTICS ( $T_A=25^\circ\text{C}$ unless otherwise noted)

PARAMETER	SYMBOL	2N1613		2N1711		UNIT	TEST CONDITIONS
		MIN	MAX	MIN	MAX		
Collector-Base Breakdown Voltage	BVCBO	75		75		V	I <sub>C</sub> =0.1mA I <sub>E</sub> =0
Collector-Emitter Breakdown Voltage	LV <sub>CE</sub> *	50		50		V	I <sub>C</sub> =100mA R <sub>BE</sub> <10Ω
Emitter-Base Breakdown Voltage	BVEBO	7		7		V	I <sub>E</sub> =0.1mA I <sub>C</sub> =0
Collector Cutoff Current	ICBO	10		10		nA	V <sub>CB</sub> =60V I <sub>E</sub> =0
		10		10		μA	V <sub>CB</sub> =60V I <sub>E</sub> =0 T <sub>A</sub> =150°C
Emitter Cutoff Current	IEBO	10		5		nA	VEB=5V I <sub>C</sub> =0
Base-Emitter Saturation Voltage	V <sub>BE</sub> (sat)*	1.3		1.3		V	I <sub>C</sub> =150mA I <sub>B</sub> =15mA
Collector-Emitter Saturation Voltage	V <sub>CE</sub> (sat)*	1.5		1.5		V	I <sub>C</sub> =150mA I <sub>B</sub> =15mA
D.C. Current Gain	H <sub>FE</sub> *	20		35			I <sub>C</sub> =0.1mA V <sub>CE</sub> =10V
		35		75			I <sub>C</sub> =10mA V <sub>CE</sub> =10V
		40	120	100	300		I <sub>C</sub> =150mA V <sub>CE</sub> =10V
		20		40			I <sub>C</sub> =500mA V <sub>CE</sub> =10V
		20		35			I <sub>C</sub> =10mA V <sub>CE</sub> =10V
Current Gain-Bandwidth Product	f <sub>T</sub>	60		70		MHz	T <sub>A</sub> =-55°C I <sub>C</sub> =50mA V <sub>CE</sub> =10V f=20MHz

\* Pulse Test : Pulse Width=0.3mS, Duty Cycle=1%

**MICRO ELECTRONICS LTD.**

38 HUNG TO ROAD, KWUN TONG, HONG KONG. TELEX 43510  
KWUN TONG P. O. BOX69477 CABLE ADDRESS "MICROTRON"  
TELEPHONE: 3-430181-6. 3-893363. 3-892423. 3-898221  
FAX: 3-410321

4.78.6100B

- - - Continued - - -

PARAMETER	SYMBOL	2N1613		2N1711		UNIT	TEST CONDITIONS
		MIN	MAX	MIN	MAX		
Output Capacitance	C <sub>ob</sub>		35		25	pF	V <sub>CB</sub> =10V I <sub>E</sub> =0
Input Capacitance	C <sub>ib</sub>		80		80	pF	V <sub>EB</sub> =0.5V I <sub>C</sub> =0
Noise Figure	NF		12		8	dB	I <sub>C</sub> =0.3mA V <sub>CE</sub> =10V R <sub>G</sub> =510Ω f=1kHz BW=1Hz
<u>Small Signal h-Parameters</u>							
Input Resistance	h <sub>ib</sub>	24	34	20	34	Ω	I <sub>C</sub> =1mA V <sub>CB</sub> =5V f=1kHz
		4	8	4	8	Ω	I <sub>C</sub> =5mA V <sub>CB</sub> =10V f=1kHz
Voltage Feedback Ratio	h <sub>rb</sub>		3		5	x10 <sup>-4</sup>	I <sub>C</sub> =1mA V <sub>CB</sub> =5V f=1kHz
			3		5	x10 <sup>-4</sup>	I <sub>C</sub> =5mA V <sub>CB</sub> =10V f=1kHz
Small Signal Current Gain	h <sub>fe</sub>	30	100	50	200		I <sub>C</sub> =1mA V <sub>CE</sub> =5V f=1kHz
		35	150	70	300		I <sub>C</sub> =5mA V <sub>CE</sub> =10V f=1kHz
Output Conductance	h <sub>ob</sub>	0.1	1	0.05	0.5	μS	I <sub>C</sub> =1mA V <sub>CB</sub> =5V f=1kHz
		0.1	1	0.05	0.5	μS	I <sub>C</sub> =5mA V <sub>CB</sub> =10V f=1kHz

2N1613  
2N1711