



2N 1613

2N 1711

NPN SILICON PLANAR EPITAXIAL TRANSISTORS

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

CASE T0-39



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 ($T_A=25^\circ\text{C}$)	P _{tot}	0.8W
($T_C=25^\circ\text{C}$)		3W
($T_C=100^\circ\text{C}$)		1.7W
Operating Junction Temperature	T _j	200°C
Storage Temperature Range	T _{stg}	-65 to 300°C

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

PARAMETER	SYMBOL	2N1613 MIN MAX	2N1711 MIN MAX	UNIT	TEST CONDITIONS
Collector-Base Breakdown Voltage	BVCBO	75	75	V	$I_C=0.1\text{mA}$ $I_E=0$
Collector-Emitter Breakdown Voltage	LV _{CE} *	50	50	V	$I_C=100\text{mA}$ $R_{BE}<10\Omega$
Emitter-Base Breakdown Voltage	BVEBO	7	7	V	$I_E=0.1\text{mA}$ $I_C=0$
Collector Cutoff Current	ICBO	10	10	nA	$V_{CB}=60\text{V}$ $I_E=0$
		10	10	μA	$V_{CB}=60\text{V}$ $I_E=0$ $T_A=150^\circ\text{C}$
Emitter Cutoff Current	IEBO	10	5	nA	$V_{EB}=5\text{V}$ $I_C=0$
Base-Emitter Saturation Voltage	V _{BE} (sat) *	1.3	1.3	V	$I_C=150\text{mA}$ $I_B=15\text{mA}$
Collector-Emitter Saturation Voltage	V _{CE} (sat) *	1.5	1.5	V	$I_C=150\text{mA}$ $I_B=15\text{mA}$
D.C. Current Gain	H _{FE} *	20	35		$I_C=0.1\text{mA}$ $V_{CE}=10\text{V}$
		35	75		$I_C=10\text{mA}$ $V_{CE}=10\text{V}$
		40 120	100 300		$I_C=150\text{mA}$ $V_{CE}=10\text{V}$
		20	40		$I_C=500\text{mA}$ $V_{CE}=10\text{V}$
		20	35		$I_C=10\text{mA}$ $V_{CE}=10\text{V}$
Current Gain-Bandwidth Product	f _T	60	70	MHz	$T_A=-55^\circ\text{C}$
					$I_C=50\text{mA}$ $V_{CE}=10\text{V}$ $f=20\text{MHz}$

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