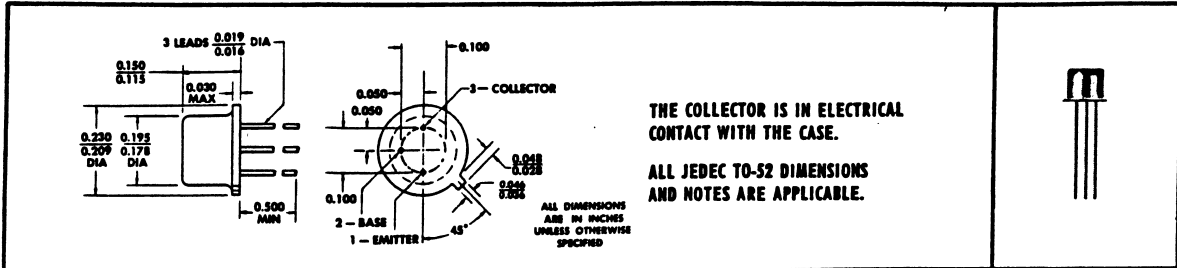


TYPE 2N3013
N-P-N EPITAXIAL PLANAR SILICON TRANSISTOR

DESIGNED FOR VERY-HIGH-SPEED, HIGH-CURRENT SWITCHING APPLICATIONS

*mechanical data



*absolute maximum ratings at 25°C free-air temperature (unless otherwise noted)

Collector-Base Voltage	40 v
Collector-Emitter Voltage (See Note 1)	40 v
Collector-Emitter Voltage (See Note 2)	15 v
Emitter-Base Voltage	5 v
Collector Current, Continuous	200 ma
Collector Current, Peak (See Note 3)	500 ma
Total Device Dissipation at (or below) 25°C Free-Air Temperature (See Note 4)	0.36 w
Total Device Dissipation at (or below) 25°C Case Temperature (See Note 5)	1.2 w
Total Device Dissipation at 100°C Case Temperature	0.68 w
Operating Collector Junction Temperature	200°C
Storage Temperature Range	-65°C to +200°C

*electrical characteristics at 25°C free-air temperature (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	MAX	UNIT
BV_{CBO}	Collector-Base Breakdown Voltage	$I_C = 100 \mu a, I_E = 0$	40		v
BV_{CEO}	Collector-Emitter Breakdown Voltage	$I_C = 10 ma, I_B = 0, \text{ See Note 6}$	15		v
BV_{CES}	Collector-Emitter Breakdown Voltage	$I_C = 100 \mu a, V_{BE} = 0$	40		v
BV_{EBO}	Emitter-Base Breakdown Voltage	$I_E = 100 \mu a, I_C = 0$	5		v
I_{CES}	Collector Cutoff Current	$V_{CE} = 20 v, V_{BE} = 0$	0.3		μa
		$V_{CE} = 20 v, V_{BE} = 0, T_A = 125^\circ C$	40		μa
I_B	Base Current	$V_{CE} = 20 v, V_{BE} = 0$	-0.3		μa
h_{FE}	Static Forward Current Transfer Ratio	$V_{CE} = 0.4 v, I_C = 30 ma, \text{ See Note 6}$	30	120	
		$V_{CE} = 0.5 v, I_C = 100 ma, \text{ See Note 6}$	25		
		$V_{CE} = 1 v, I_C = 300 ma, \text{ See Note 6}$	15		
		$V_{CE} = 0.4 v, I_C = 30 ma, T_A = -55^\circ C, \text{ See Note 6}$	12		
V_{BE}	Base-Emitter Voltage	$I_B = 3 ma, I_C = 30 ma, \text{ See Note 6}$	0.75	0.95	v
		$I_B = 10 ma, I_C = 100 ma, \text{ See Note 6}$	1.20		v
		$I_B = 30 ma, I_C = 300 ma, \text{ See Note 6}$	1.70		v
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_B = 3 ma, I_C = 30 ma, \text{ See Note 6}$	0.18		v
		$I_B = 10 ma, I_C = 100 ma, \text{ See Note 6}$	0.28		v
		$I_B = 30 ma, I_C = 300 ma, \text{ See Note 6}$	0.50		v
		$I_B = 3 ma, I_C = 30 ma, T_A = 125^\circ C, \text{ See Note 6}$	0.25		v
$ h_{fe} $	Small-Signal Common-Emitter Forward Current Transfer Ratio	$V_{CE} = 10 v, I_C = 30 ma, f = 100 Mc$	3.5		
C_{ob}	Common-Base Open-Circuit Output Capacitance	$V_{CB} = 5 v, I_E = 0, f = 140 kc$	5.0		pf
C_{ib}	Common-Base Open-Circuit Input Capacitance	$V_{EB} = 0.5 v, I_C = 0, f = 140 kc$	8.0		pf

NOTES: 1. This value applies when the base-emitter diode is short-circuited.
 2. This value applies between 10 μa and 10 ma collector current when the base-emitter diode is open-circuited.
 3. This value applies for $PW < 10 \mu sec$

4. Derate linearly to 200°C free-air temperature at the rate of 2.06 mw/°C.
 5. Derate linearly to 200°C case temperature at the rate of 6.85 mw/°C.
 6. These parameters must be measured using pulse techniques. $PW = 300 \mu sec,$
 Duty Cycle $< 2\%$.