

## HIGH VOLTAGE PNP SILICON TRANSISTORS

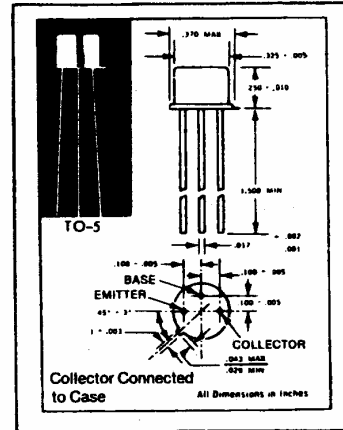
**2N3634  
THRU  
2N3637**

GEOMETRY 480

- High Voltage— to 175 V.  $V_{CE0}$
- Switching and Amplifier Applications

**MAXIMUM RATINGS**

Rating	Symbol	2N3634 2N3635	2N3636 2N3637	Unit
Collector-Emitter Voltage	$V_{CE0}$	140	175	Vdc
Collector-Base Voltage	$V_{CB}$	140	175	Vdc
Emitter-Base Voltage	$V_{EB}$	5.0		Vdc
Collector Current	$I_C$	1.0		Adc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.0	5.71	Watt mW/°C
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	5.0	28.6	Watts mW/°C
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	- 65 to + 200		°C



**ELECTRICAL CHARACTERISTICS AT 25°C FREE-AIR TEMPERATURE**

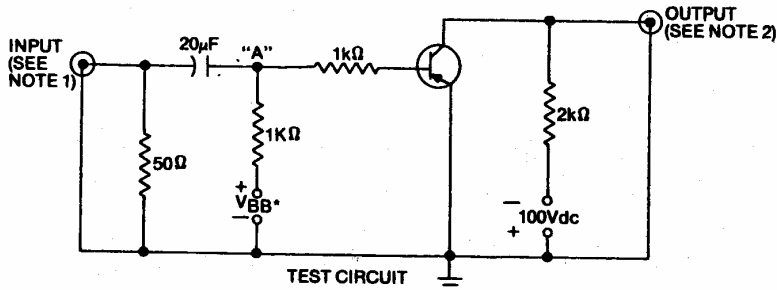
PARAMETER	TEST CONDITIONS	2N3634		2N3635		2N3636		2N3637		UNIT	
		min	max	min	max	min	max	min	max		
$BV_{CBO}$ Collector-Base Breakdown Voltage	$I_C = -100 \mu\text{A}, I_E = 0$	-140		-140		-175		-175		V	
$BV_{CEO}$ Collector-Emitter Breakdown Voltage	$I_C = -10 \text{ mA}, I_B = 0$ . See Note	-140		-140		-175		-175		V	
$BV_{EBO}$ Emitter-Base Breakdown Voltage	$I_E = -10 \mu\text{A}, I_C = 0$	-5		-5		-5		-5		V	
$I_{CBO}$ Collector Cutoff Current	$V_{CB} = -100\text{V}, I_E = 0$	-100		-100		-100		-100		nA	
$I_{EBO}$ Emitter Cutoff Current	$V_{EB} = -3\text{V}, I_C = 0$	-50		-50		-50		-50		nA	
$h_{FE}$ Static Forward Current Transfer Ratio	$V_{CE} = -10\text{V}, I_C = -0.1 \text{ mA}$	25		55		25		55			
	$V_{CE} = -10\text{V}, I_C = -1 \text{ mA}$	45		90		45		90			
	$V_{CE} = -10\text{V}, I_C = -10 \text{ mA}$	See Note		50		100		50		100	
	$V_{CE} = -10\text{V}, I_C = -50 \text{ mA}$	See Note		50		150		50		150	
$V_{BE}$ Base-Emitter Voltage	$I_C = -10 \text{ mA}, I_B = -1 \text{ mA}$	See Note		-0.8		-0.8		-0.8		v	
	$I_C = -50 \text{ mA}, I_B = -5 \text{ mA}$	See Note		-0.65		-0.9		-0.65		-0.9	
$V_{CE(sat)}$ Collector-Emitter Saturation Voltage	$I_C = -10 \text{ mA}, I_B = -1 \text{ mA}$	See Note		-0.3		-0.3		-0.3		v	
	$I_C = -50 \text{ mA}, I_B = -5 \text{ mA}$	See Note		0.6		0.6		0.6		v	
$h_{ie}$ Small-Signal Common-Emitter Input Impedance	$V_{CE} = -10\text{V}, I_C = -10 \text{ mA}, f = 1 \text{ kHz}$	0.1		0.6		0.2		1.2		k $\Omega$	
$h_{fe}$ Small-Signal Common-Emitter Forward Current Transfer Ratio		40		180		80		320			
$h_{re}$ Small-Signal Common-Emitter Reverse Voltage Transfer Ratio		$3 \times 10^{-4}$		$3 \times 10^{-4}$		$3 \times 10^{-4}$		$3 \times 10^{-4}$			
$h_{oe}$ Small-Signal Common-Emitter Output Admittance		200		200		200		200		$\mu\text{mho}$	

NOTE: These parameters must be measured using pulse techniques.  $t_w 300 \mu\text{s}$ , duty cycle < 2%.

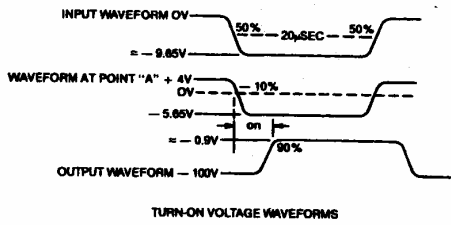
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**ELECTRICAL CHARACTERISTICS AT 25°C FREE-AIR TEMPERATURE**

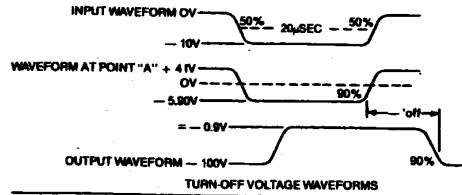
PARAMETER	TEST CONDITIONS	2N3634		2N3635		2N3636		2N3637		UNIT
		min	max	min	max	min	max	min	max	
$h_{fe}$ Small-Signal Common-Emitter Forward Current Transfer Ratio	$V_{CE} = -30V, I_C = -30 mA, f = 100 MHz$	1.5	8.0	2	8.5	1.5	8.0	2	8.5	
$C_{obo}$ Common-Base Open-Circuit Output Capacitance	$V_{CB} = -20V, I_E = 0, f = 100 kHz$	10		10		10		10		pF
$C_{ibo}$ Common-Base Open-Circuit Input Capacitance	$V_{EB} = -1V, I_C = 0, f = 100 kHz$	75		75		75		75		pF
NF Spot Noise Figure	$V_{CE} = -10V, I_C = -0.5 mA, R_G = 1 k\Omega, f = 1 kHz$	3		3		3		3		dB
$t_{on}$ Turn-On Time	$V_{CC} = -100V, I_C = -50 mA, I_{B(1)} = -5 mA, V_{BE(off)} = 4V, \text{ See Figure 1}$	400		400		400		400		nS
$t_{off}$ Turn-Off Time	$V_{CC} = -100V, I_C = -50 mA, I_{B(1)} = -5 mA, I_{B(2)} = 5 mA, \text{ See Figure 1}$	600		600		600		600		nS



\* $V_{BB} = 4.0 Vdc$  FOR  $t_{on}$ ,  $4.1 Vdc$  FOR  $t_{off}$  AT POINT "A"



TURN-ON VOLTAGE WAVEFORMS



TURN-OFF VOLTAGE WAVEFORMS

- NOTES
1. The rise time ( $t_r$ ) and fall time ( $t_f$ ) of the input pulse shall be  $< 2$  nsec, duty cycle  $< 2\%$ , pulse width = 20 μsec.
  2. Output monitored with oscilloscope with following characteristics  $Z_{in} > 1 Mo, 4 < 1$  nsec.

FIGURE 1. Switching-time test circuit.

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