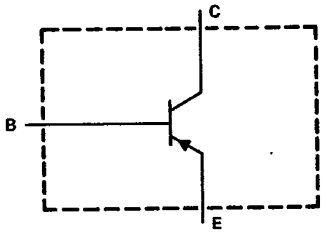
TIP2955
P-N-P SILICON POWER TRANSISTOR

T-33-21

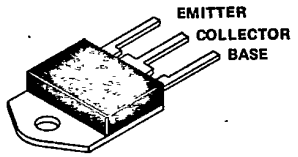
JANUARY 1972 – REVISED OCTOBER 1984

- Designed for Complementary Use with TIP3055
- 90 W at 25°C Case Temperature
- 15 A Rated Collector Current
- Designed for Automotive Ignition, Linear Amplifier, and Power Amplifier Applications

device schematic



TO-218AA PACKAGE



THE COLLECTOR IS IN ELECTRICAL CONTACT WITH THE MOUNTING TAB

absolute maximum ratings at 25°C case temperature (unless otherwise noted)

	TIP2955
Collector-base voltage	−100 V
Collector-emitter voltage (R_{BE} = 100 Ω)	−70 V
Emitter-base voltage	−7 V
Continuous collector current	−15 A
Continuous base current	−7 A
Safe operating region at (or below) 25°C case temperature	See Figure 4
Continuous device dissipation at (or below) 25°C case temperature (see Note 1)	90 W
Continuous device dissipation at (or below) 25°C free-air temperature (see Note 2)	3.5 W
Unclamped inductive load energy (see Note 3)	62.5 mJ
Operating collector junction and storage temperature range	−65°C to 150°C
Lead temperature 3,2 mm (0.125 inch) from case for 10 seconds	260°C

NOTES: 1. Derate linearly to 150°C case temperature at the rate of 0.72 W/°C.
2. Derate linearly to 150°C free-air temperature at the rate of 28 mW/°C.
3. This rating is based on the capability of the transistor to operate safely in the circuit of Figure 2. L = 20 mH, R_{BB2} = 100 Ω, V_{BB2} = 0 V, R_S = 0.1 Ω, V_{CC} = −10 V. Energy ≈ $I_C^2L/2$.

TIP2955
P-N-P SILICON POWER TRANSISTOR

electrical characteristics at 25°C case temperature

PARAMETER	TEST CONDITIONS			MIN	TYP	MAX	UNIT
$V_{(BR)CEO}$	$I_C = -30$ mA,	$I_B = 0$,	See Note 4	−60			V
I_{CEO}	$V_{CE} = -30$ V,	$I_B = 0$				−0.7	mA
I_{CEV}	$V_{CE} = -100$ V,	$V_{BE} = 1.5$ V				−5	mA
I_{EBO}	$V_{EB} = -7$ V,	$I_C = 0$				−5	mA
h_{FE}	$V_{CE} = -4$ V,	$I_C = -4$ A,	See Notes 4 and 5	20		70	
	$V_{CE} = -4$ V,	$I_C = -10$ A,	See Notes 4 and 5	5			
V_{BE}	$V_{CE} = -4$ V,	$I_C = -4$ A,	See Notes 4 and 5			−1.8	V
$V_{CE(sat)}$	$I_B = -0.4$ V,	$I_C = -4$ A,	See Notes 4 and 5			−1.1	V
	$I_B = -3.3$ A,	$I_C = -10$ A,	See Notes 4 and 5			−3	
h_{fe}	$V_{CE} = -10$ V,	$I_C = -0.5$ A,	f = 1 kHz	20			
$\|h_{fe}\|$	$V_{CE} = 10$ V,	$I_C = -0.5$ A,	f = 1 MHz	3			

NOTES: 4. These parameters must be measured using pulse techniques, $t_w = 300\ \mu s$, duty cycle ≤ 2%.
5. These parameters are measured with voltage-sensing contacts separate from the current-carrying contacts and located within 3,2 mm (0.125 inch) from the device body.

thermal characteristics

PARAMETER		MIN	TYP	MAX	UNIT
$R_{\theta JC}$				1.39	°C/W
$R_{\theta JA}$				35.7	°C/W

resistive-load switching characteristics at 25°C case temperature

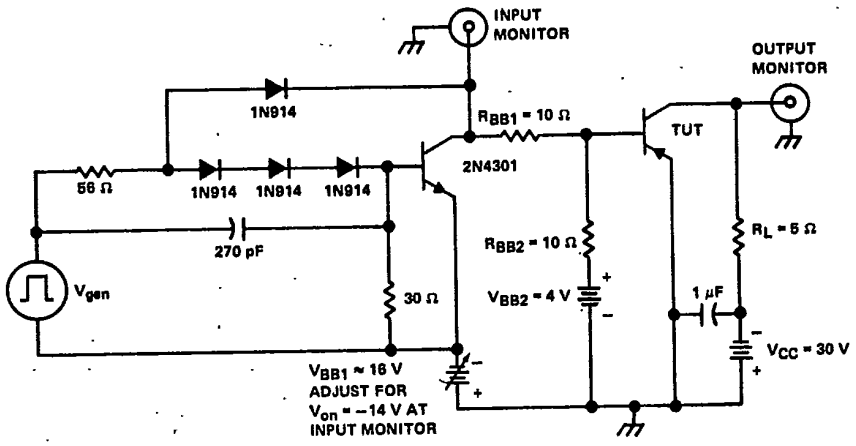
PARAMETER	TEST CONDITIONS†			MIN	TYP	MAX	UNIT
t_{on}	$I_C = -6$ A,	$I_{B(1)} = -0.6$ A,	$I_{B(2)} = 0.6$ A,			0.4	μs
t_{off}	$V_{BE(off)} = 4$ V,	$R_L = 5\ \Omega$,	See Figure 1			0.7	μs

†Voltage and current values shown are nominal; exact values vary slightly with transistor parameters.

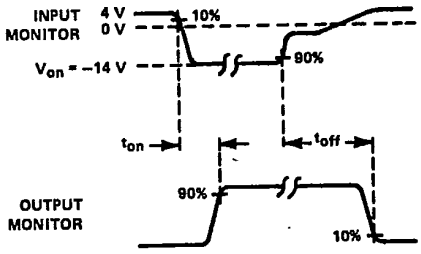
TEXAS INSTRUMENTS
POST OFFICE BOX 225012 • DALLAS, TEXAS 75265

T-33-21

PARAMETER MEASUREMENT INFORMATION



TEST CIRCUIT



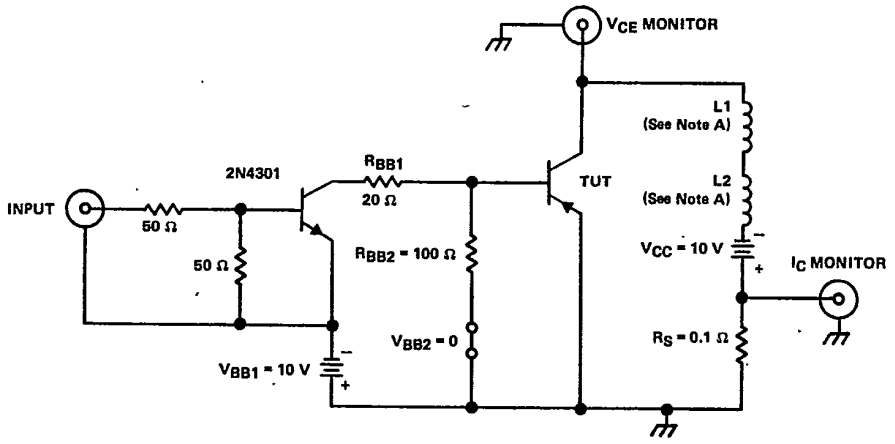
VOLTAGE WAVEFORMS

NOTES: A. V_{gen} is a 30-V pulse into a 50 Ω termination.
B. The V_{gen} waveform is supplied by a generator with the following characteristics: $t_r \leq 15$ ns, $t_f \leq 15$ ns, $Z_{out} = 50\ \Omega$, $t_w = 20\ \mu s$, duty cycle ≤ 2%.
C. Waveforms are monitored on an oscilloscope with the following characteristics: $t_r \leq 15$ ns, $R_{in} \geq 10\ M\Omega$, $C_{in} \leq 11.5$ pF.
D. Resistors must be noninductive types.
E. The d-c power supplies may require additional bypassing in order to minimize ringing.

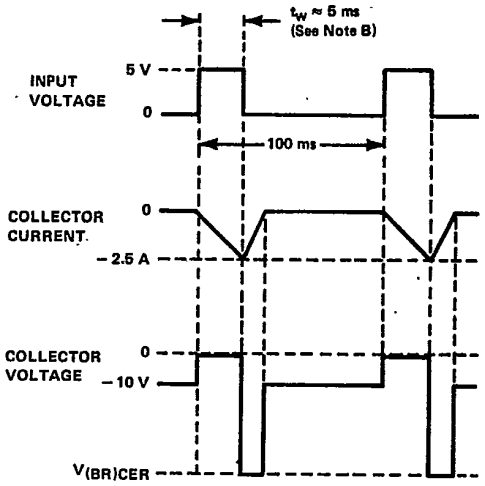
FIGURE 1. RESISTIVE-LOAD SWITCHING

TIP2955
P-N-P SILICON POWER TRANSISTOR

PARAMETER MEASUREMENT INFORMATION



TEST CIRCUIT



VOLTAGE AND CURRENT WAVEFORMS

NOTES: A. L1 and L2 are 10 mH, 0.11 Ω, Chicago Standard Transformer Corporation C-2688, or equivalent.
B. Input pulse duration is increased until $I_{CM} = -2.5$ A.

FIGURE 2. INDUCTIVE-LOAD SWITCHING

TEXAS INSTRUMENTS
POST OFFICE BOX 225012 • DALLAS, TEXAS 75265
1283

TIP2955
P-N-P SILICON POWER TRANSISTOR

T-33-21

TYPICAL CHARACTERISTICS

STATIC FORWARD CURRENT TRANSFER RATIO
vs
COLLECTOR CURRENT

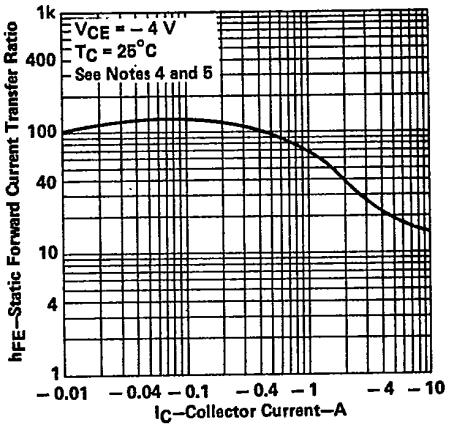


FIGURE 3

NOTES: 4. These parameters must be measured using pulse techniques, t_W = 300 μs, duty cycle ≤ 2%.
5. These parameters are measured with voltage-sensing contacts separate from the current-carrying contacts and located within 3,2 mm (0.125 inch) from the device body.

MAXIMUM SAFE OPERATING AREA

FORWARD-BIAS SAFE OPERATING AREA

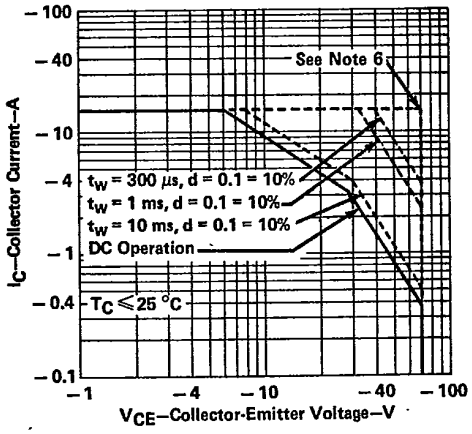


FIGURE 4

NOTE 6: This combination of maximum voltage and current may be achieved only when switching from saturation to cutoff with a clamped inductive load.

TIP2955
P-N-P SILICON POWER TRANSISTOR

THERMAL INFORMATION

DISSIPATION DERATING CURVE

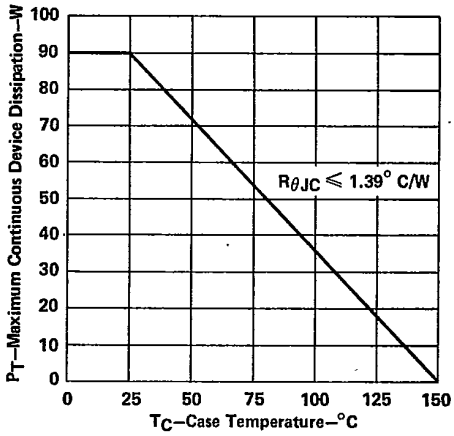


FIGURE 5

TEXAS INSTRUMENTS
POST OFFICE BOX 225012 • DALLAS, TEXAS 75265