

TEXAS INSTR {OPTO}

62 DE 8961726 0037027 4

8961726 TEXAS INSTR (OPTO)

62C 37027 D

T-33-13

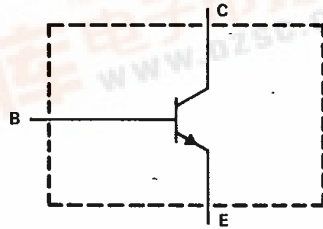
TIPL753, TIPL753A

N-P-N SILICON POWER TRANSISTORS

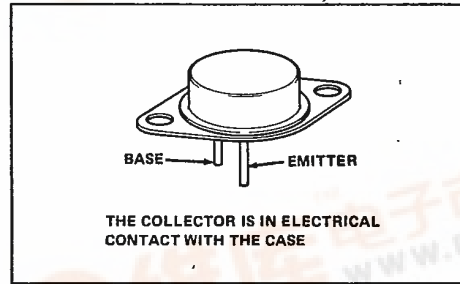
OCTOBER 1982 - REVISED OCTOBER 1984

- 150 W at 25°C Case Temperature
- 8 A Continuous Collector Current
- 14 A Peak Collector Current
- Operating Characteristics Fully Guaranteed at 100°C
- Transient Power Dissipation Guaranteed at 100°C
- ICES < 100 μA at Maximum Rated VCE at 100°C
- High Sustaining Voltage
TIPL753 ... 350 V Min.
TIPL753A ... 400 V Min.
- 1000 V Blocking Capability
- Specifically Designed for High-Voltage, Inductive-Load Switching Applications

device schematic



TO-3 PACKAGE



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

	TIPL753	TIPL753A
Collector-base voltage ($I_E = 0$)	800 V	1000 V
Collector-emitter voltage ($V_{BE} = 0$)	800 V	1000 V
Collector-emitter voltage ($I_B = 0$)	350 V	400 V
Base-emitter voltage	10 V	
Continuous collector current	8 A	
Peak collector current (see Note 1)	14 A	
Continuous device dissipation at (or below) 25°C case temperature (see Figure 12)	150 W	
Operating junction and storage temperature range	-65°C to 200°C	

NOTE 1: This value applies for, $t_W \leq 10$ ms, duty cycle $\leq 2\%$.

TIPL Devices



8961726 TEXAS INSTR (OPTO)

62C 37028 D

TIPL753, TIPL753A
N-P-N SILICON POWER TRANSISTORS

T-33-13

electrical characteristics at 25°C case temperature (unless otherwise noted)

PARAMETER	TEST CONDITIONS	TIPL753		TIPL753A		UNIT
		MIN	TYP MAX	MIN	TYP MAX	
V _{CEO(sus)}	I _C = 100 mA, L = 25 mH, See Note 2	350		400		V
I _{CEO}	V _{CE} = 350 V, I _B = 0		50			μA
	V _{CE} = 400 V, I _B = 0				50	
I _{CES}	V _{CE} = 800 V, V _{BE} = 0		50			μA
	V _{CE} = 1000 V, V _{BE} = 0				50	
	V _{CE} = 800 V, V _{BE} = 0, T _C = 100°C		100			
	V _{CE} = 1000 V, V _{BE} = 0, T _C = 100°C				100	
I _{EBO}	V _{EB} = 10 V, I _C = 0		1		1	mA
h _{FE}	V _{CE} = 5 V, I _C = 0.5 A, See Notes 3 and 4	15	60	15	60	
V _{CE(sat)}	I _C = 2 A, I _B = 0.4 A, See Notes 3 and 4		0.5		0.5	V
	I _C = 5 A, I _B = 1 A, See Notes 3 and 4		1		1	
	I _C = 8 A, I _B = 1.6 A, See Notes 3 and 4		2.5		2.5	
	I _C = 8 A, I _B = 1.6 A, T _C = 100°C, See Notes 3 and 4		5		5	
V _{BE(sat)}	I _C = 2 A, I _B = 0.4 A, See Notes 3 and 4		1.1		1.1	V
	I _C = 5 A, I _B = 1 A, See Notes 3 and 4		1.3		1.3	
	I _C = 8 A, I _B = 1.6 A, See Notes 3 and 4		1.6		1.6	
	I _C = 8 A, I _B = 1.6 A, T _C = 100°C, See Notes 3 and 4		1.5		1.5	
f _T	V _{CE} = 10 V, I _C = 0.5 A, See Note 5		8		8	MHz
C _{obo}	V _{CB} = 20 V, I _E = 0, f = 0.1 MHz		105		105	pF

- NOTES: 2. Inductive loop switching measurement.
 3. These parameters must be measured using pulse techniques, pulse duration = 300 μs, duty cycle = 2%.
 4. 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.
 5. To obtain f_T, the |h_{fe}| response is extrapolated at the rate of -6 dB per octave from f = 1 MHz to the frequency at which |h_{fe}| = 1.

TIPL Devices



8961726 TEXAS INSTR (OPTO)

62C 37029 D

T-33-13

TIPL753, TIPL753A
N-P-N SILICON POWER TRANSISTORS

thermal characteristics

PARAMETER	MIN	TYP	MAX	UNIT
$R_{\theta JC}$			1.17	$^{\circ}C/W$

resistive-load switching characteristics

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{on}	$I_C = 8 A, V_{CC} = 200 V, I_{B(1)} = 1.6 A,$ $I_{B2} = -1.6 A, T_C = 25^{\circ}C,$ See Figure 1			0.8	μs
t_s				2.5	μs
t_f				0.45	μs
t_{on}	$I_C = 8 A, V_{CC} = 200 V, I_{B1} = 1.6 A,$ $I_{B2} = -1.6 A, T_C = 100^{\circ}C,$ See Figure 1			1.4	μs
t_s				3	μs
t_f				1	μs

inductive-load switching characteristics

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{sv}	$I_C = 8 A, I_{B1} = 1.6 A, V_{BE(off)} = -10 V,$ $T_C = 25^{\circ}C,$ See Figure 2			2.5	μs
t_{rv}				200	ns
t_{fi}				150	ns
t_{tj}	$T_C = 100^{\circ}C,$ See Figure 2			50	ns
t_{xo}				300	ns
t_{sv}				3	μs
t_{rv}	$I_C = 8 A, I_{B1} = 1.6 A, V_{BE(off)} = -10 V,$ $T_C = 100^{\circ}C,$ See Figure 2			300	ns
t_{fi}				150	ns
t_{tj}				50	ns
t_{xo}				500	ns

TIPL Devices



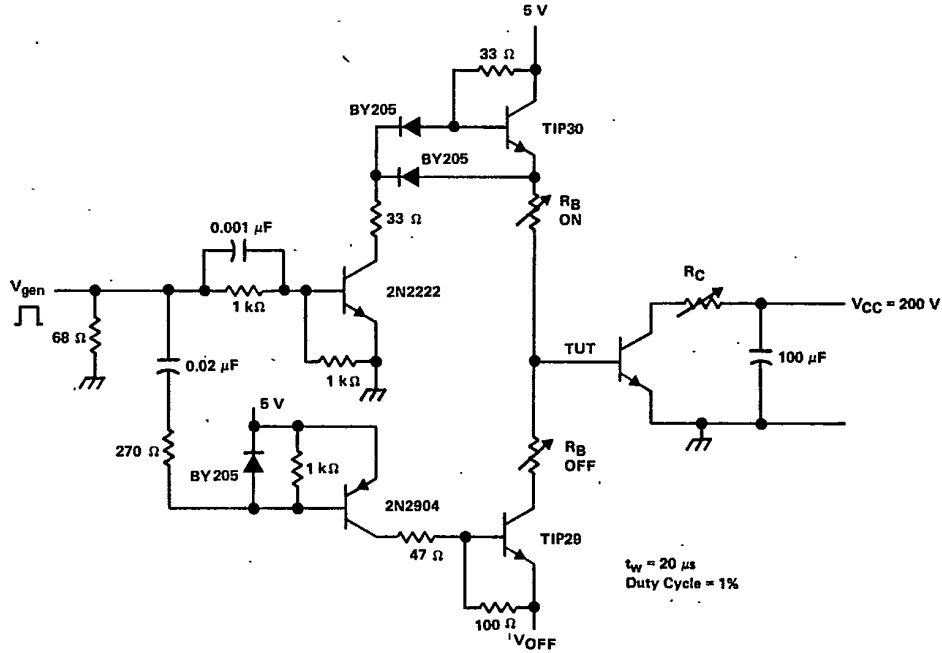
8961726 TEXAS INSTR (OPTO)

62C 37030 D

7-33-13

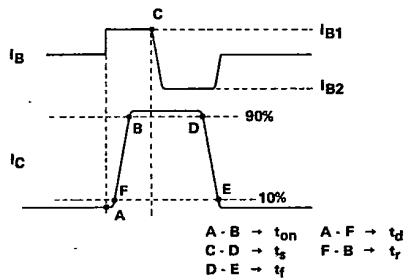
TIPL753, TIPL753A
N-P-N SILICON POWER TRANSISTORS

PARAMETER MEASUREMENT INFORMATION



$t_w = 20 \mu s$
Duty Cycle = 1%

TEST CIRCUIT



CURRENT WAVEFORMS

- NOTES: A. The V_{gen} waveform is supplied by the following characteristics: $t_r \leq 15 \text{ ns}$, $t_f \leq 15 \text{ ns}$, $Z_{out} = 50 \Omega$, $t_w = 20 \mu s$, duty cycle $\leq 2\%$.
B. Waveforms are monitored on an oscilloscope with the following characteristics: $t_r \leq 15 \text{ ns}$, $R_{in} \geq 10 \text{ M}\Omega$, $C_{in} \leq 11.5 \text{ pF}$.
C. Resistors must be noninductive types.

FIGURE 1. RESISTIVE-LOAD SWITCHING

TIPL Devices



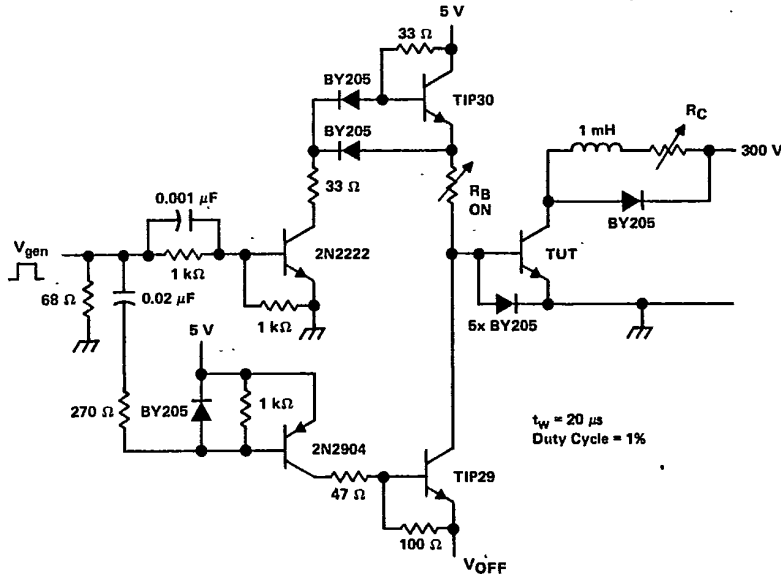
8961726 TEXAS INSTR (OPTO)

62C 37031 D

7-33-13

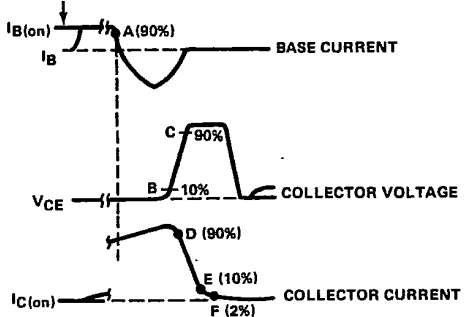
TIPL753, TIPL753A
N-P-N SILICON POWER TRANSISTORS

PARAMETER MEASUREMENT INFORMATION



$t_w = 20 \mu s$
Duty Cycle = 1%

ADJUST R_C FOR REQUIRED I_C
TEST CIRCUIT



A-B = t_{sv}
A-C = t_{rv}
D-E = t_{fi}
E-F = t_{ti}
B-E = t_{xo}

VOLTAGE AND CURRENT WAVEFORMS

NOTES: A. Waveforms are monitored on an oscilloscope with the following characteristics: $t_r \leq 15 \text{ ns}$, $R_{in} \geq 10 \Omega$, $C_{in} \leq 11.5 \text{ pF}$.
B. Resistors must be noninductive types.

FIGURE 2. INDUCTIVE-LOAD SWITCHING

TIPL Devices



8961726 TEXAS INSTR (OPT0)

62C 37032 D

T-33-13

TIPL753, TIPL753A
N-P-N SILICON POWER TRANSISTORS

TYPICAL CHARACTERISTICS

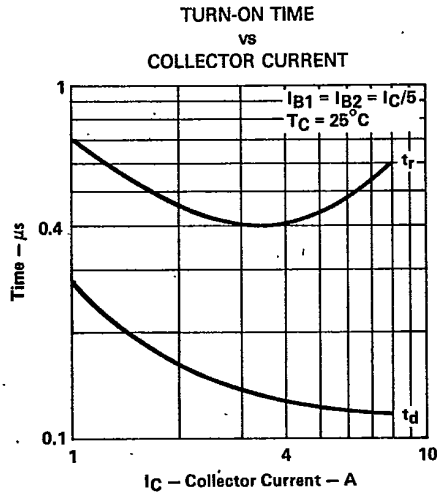


FIGURE 3

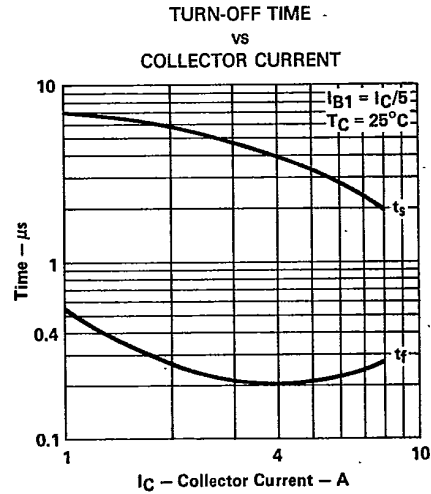


FIGURE 4

COLLECTOR-EMITTER SATURATION VOLTAGE
vs
BASE CURRENT

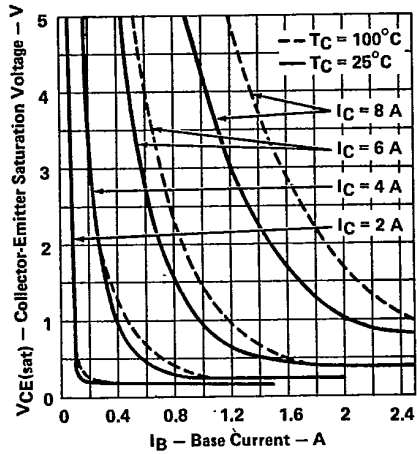


FIGURE 5

BASE-EMITTER SATURATION VOLTAGE
vs
BASE CURRENT

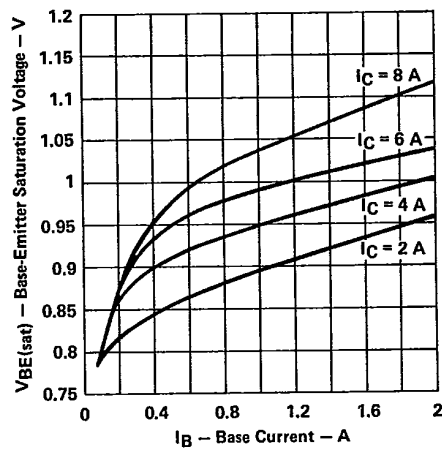


FIGURE 6

TIPL Devices



8961726 TEXAS INSTR (OPTO)

62C 37033 D

T-33-13

TIPL753, TIPL753A
N-P-N SILICON POWER TRANSISTORS

TYPICAL CHARACTERISTICS

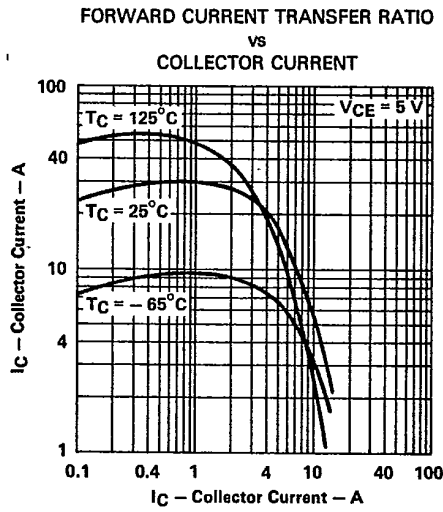


FIGURE 7

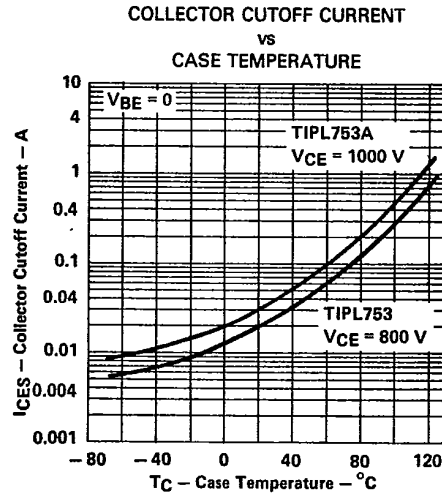


FIGURE 8

MAXIMUM SAFE OPERATING AREA

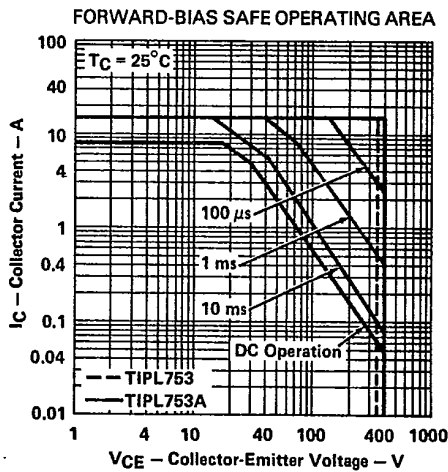


FIGURE 9

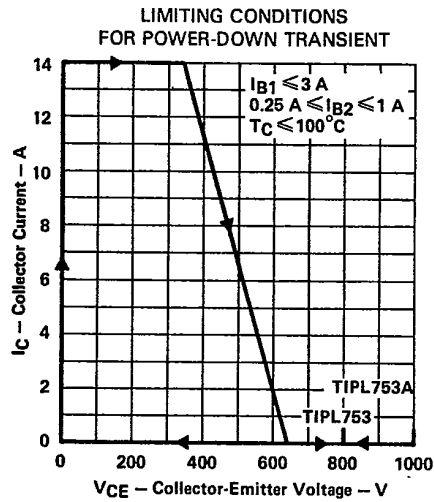


FIGURE 10

TIPL Devices



8961726 TEXAS INSTR (OPTO)

62C 37034 D

T-33-13

TIPL753, TIPL753A
N-P-N SILICON POWER TRANSISTORS

THERMAL INFORMATION

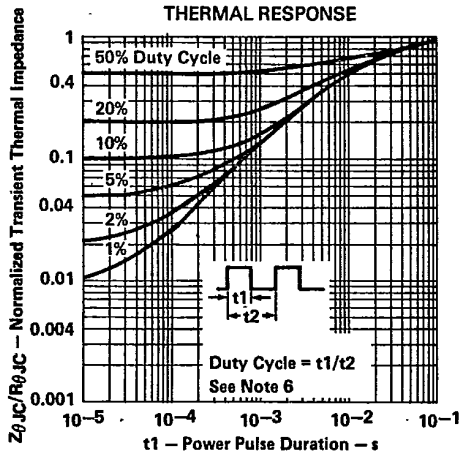


FIGURE 11

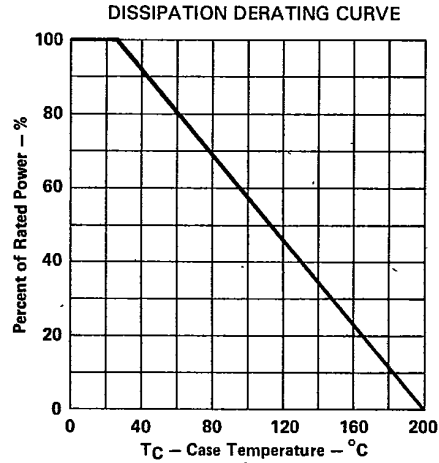


FIGURE 12

NOTE 6: Read time at end of t_1 , $T_{J(max)} - T_C = P_{D(peak)} \cdot \left(\frac{Z_{\theta JC}}{R_{\theta JC}}\right) \cdot R_{\theta JC(max)}$

TIPL Devices

