

8961726 TEXAS INSTR (OPT0)

62C 37099 D

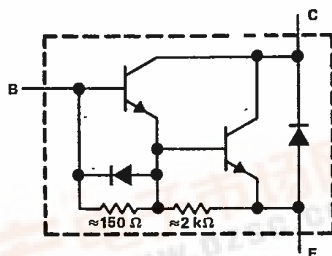
TIPL775, TIPL775A
N-P-N MONOLITHIC DARLINGTON-CONNECTED
SILICON POWER TRANSISTORS

OCTOBER 1982 - REVISED OCTOBER 1984

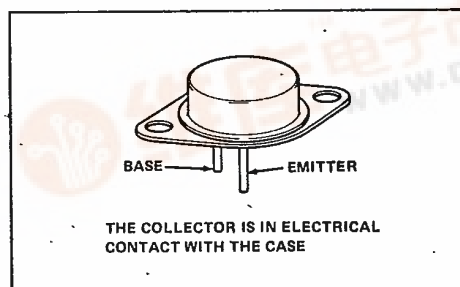
T-33-29

- Specifically Designed For Low-Loss, High-Current, High-Speed Switching Applications
- t_{xo} Typically 320 ns at $I_C = 10$ A
- Operating Characteristics Fully Guaranteed at 100°C
- $I_{CES} < 1$ mA at Maximum Rated V_{CE} at 100°C
- $V_{CEO(sus)}$: TIPL775 ... 120 V Min
TIPL775A ... 150 V Min

device schematic



TO-3 PACKAGE



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

	TIPL775	TIPL775A
Collector-base voltage	160 V	210 V
Collector-emitter voltage ($V_{BE} = 0$)	150 V	200 V
Collector-emitter voltage ($I_B = 0$)	120 V	150 V
Base-emitter voltage	8 V	
Continuous collector current	10 A	
Peak collector current (see Note 1)	15 A	
Peak parallel diode forward current (see Note 1)	10 A	
Continuous device dissipation at 25°C case temperature	100 W	
Operating collector junction and storage temperature range	-65°C to 200°C	

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

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TIPL775, TIPL775A
N-P-N MONOLITHIC DARLINGTON-CONNECTED
SILICON POWER TRANSISTORS

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

PARAMETER	TEST CONDITIONS	TIPL775			TIPL775A			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	
$V_{(BR)CBO}$	$I_C = 1 \text{ mA}$, $I_E = 0$, See Note 3	160			210			V
$V_{CEO(sus)}$	$I_C = 100 \text{ mA}$, $L = 25 \text{ mH}$, See Note 2	120			150			V
I_{CEV}	$V_{CE} = 150 \text{ V}$, $V_{EB} = 1.5 \text{ V to } 8 \text{ V}$ $V_{CE} = 200 \text{ V}$, $V_{EB} = 1.5 \text{ V to } 8 \text{ V}$			50			50	μA
I_{CES}	$V_{CE} = 150 \text{ V}$, $V_{BE} = 0$			50				μA
	$V_{CE} = 200 \text{ V}$, $V_{BE} = 0$						50	μA
	$V_{CE} = 150 \text{ V}$, $V_{BE} = 0$, $T_C = 100^\circ\text{C}$			1				mA
	$V_{CE} = 200 \text{ V}$, $V_{BE} = 0$, $T_C = 100^\circ\text{C}$						1	mA
I_{CEO}	$V_{CE} = 120 \text{ V}$, $I_B = 0$			50				μA
	$V_{CE} = 150 \text{ V}$, $I_B = 0$						50	μA
I_{EBO}	$V_{EB} = 5 \text{ V}$, $I_C = 0$			4			4	mA
$V_{CE(sat)}$	$I_C = 4 \text{ A}$, $I_B = 0.02 \text{ A}$, See Notes 3 and 4			1.2			1.2	V
	$I_C = 7 \text{ A}$, $I_B = 0.03 \text{ A}$, See Notes 3 and 4			1.5			1.5	
	$I_C = 10 \text{ A}$, $I_B = 0.05 \text{ A}$, See Notes 3 and 4			2			2	
	$I_C = 10 \text{ A}$, $I_B = 0.05 \text{ A}$, $T_C = 100^\circ\text{C}$, See Notes 3 and 4			2			2	
$V_{BE(sat)}$	$I_C = 4 \text{ A}$, $I_B = 0.02 \text{ A}$, See Notes 3 and 4			1.8			1.8	V
	$I_C = 7 \text{ A}$, $I_B = 0.03 \text{ A}$, See Notes 3 and 4			1.9			1.9	
	$I_C = 10 \text{ A}$, $I_B = 0.05 \text{ A}$, See Notes 3 and 4			2.2			2.2	
	$I_C = 10 \text{ A}$, $I_B = 0.05 \text{ A}$, $T_C = 100^\circ\text{C}$, See Notes 3 and 4			2.1			2.1	
V_F	$I_F = 10 \text{ A}$, See Notes 3 and 4			3			3	V
h_{FE}	$V_{CE} = 5 \text{ V}$, $I_C = 500 \text{ mA}$, See Notes 3 and 4	60		500	60		500	
f_t	$V_{CE} = 10 \text{ V}$, $I_C = 500 \text{ mA}$, See Note 5		10			10		MHz
C_{obo}	$V_{CB} = 20 \text{ V}$, $I_E = 0$, $f = 0.1 \text{ MHz}$		90			90		pF

- NOTES: 2. Inductive loop switching measurement.
 3. These parameters are 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 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 $f = 1 \text{ MHz}$ to the frequency at which $|h_{fe}| = 1$.

TIPL Devices



thermal characteristics

PARAMETER	TIPL775			TIPL775A			UNIT
	MIN	TYP	MAX	MIN	TYP	MAX	
$R_{\theta JC}$			1.75			1.75	$^\circ\text{C/W}$

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Inductive-load switching characteristics

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PARAMETER	TEST CONDITIONS	TIPL775			TIPL775A			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	
t_{si}	$I_C = 10\text{ A}, \quad I_{B1} = 0.05\text{ A}, \quad I_{B2} = -2.5\text{ A}$ $V_{BE(off)} = -5\text{ V}, \quad \text{See Figure 1}$	450	700		450	700		ns
t_{rv}		160	250		160	250		ns
t_{fl}		250	400		250	400		ns
t_{tl}		280	450		280	450		ns
t_{xo}		320	500		320	500		ns

PARAMETER MEASUREMENT INFORMATION

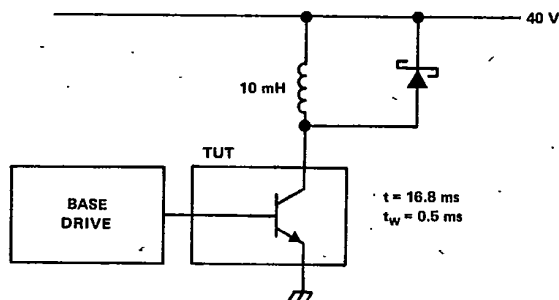


FIGURE 1. INDUCTIVE-LOAD SWITCHING — Collector Test Circuit

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TIPL775, TIPL775A

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TYPICAL CHARACTERISTICS

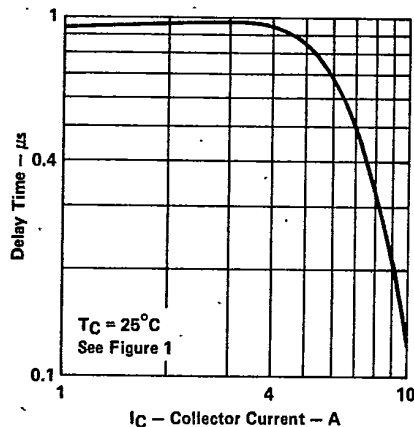
INDUCTIVE-LOAD SWITCHING
DELAY TIME

FIGURE 2

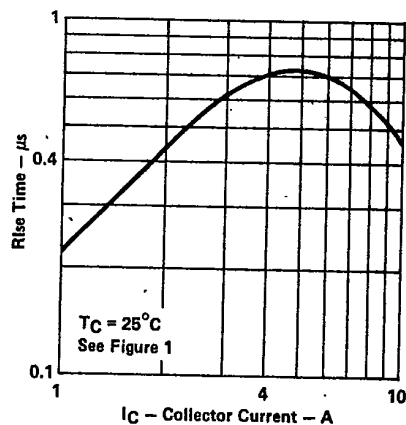
INDUCTIVE-LOAD SWITCHING
RISE TIME

FIGURE 3

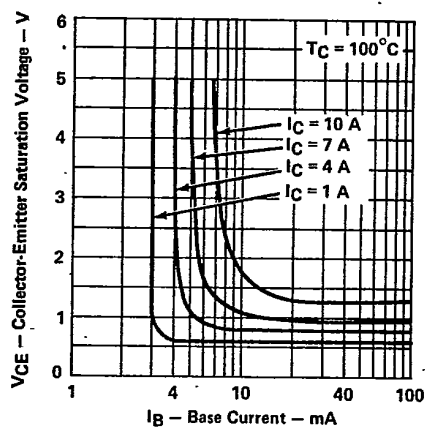
COLLECTOR-EMITTER SATURATION VOLTAGE
vs
BASE CURRENT

FIGURE 4

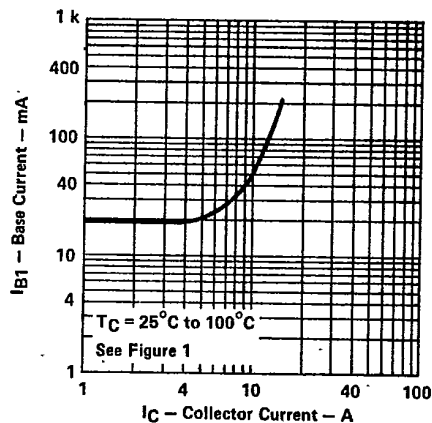
INDUCTIVE-LOAD SWITCHING
RECOMMENDED BASE DRIVE

FIGURE 5

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TYPICAL CHARACTERISTICS

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BASE-EMITTER SATURATION VOLTAGE
vs
BASE CURRENT

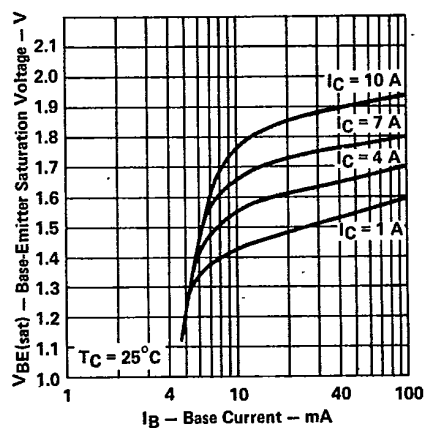


FIGURE 6

STATIC FORWARD CURRENT TRANSFER RATIO
vs
COLLECTOR CURRENT

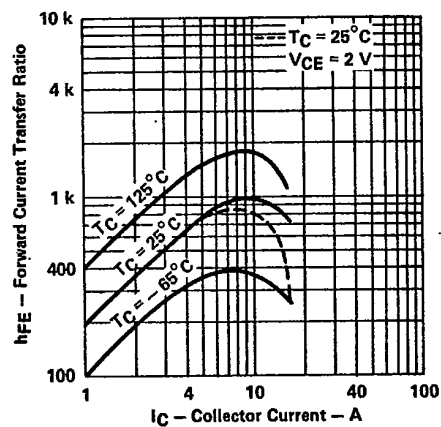


FIGURE 7

COLLECTOR CUTOFF CURRENT
vs
TEMPERATURE

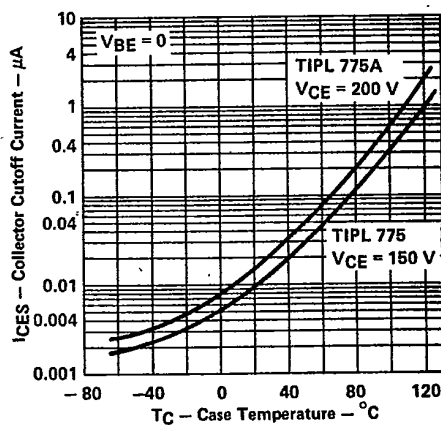


FIGURE 8

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TIPL775, TIPL775A

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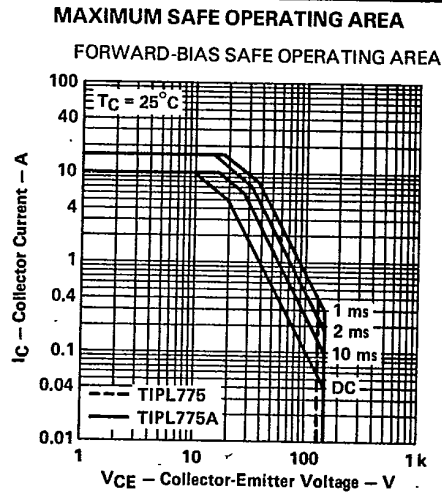
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SILICON POWER TRANSISTORS

FIGURE 9

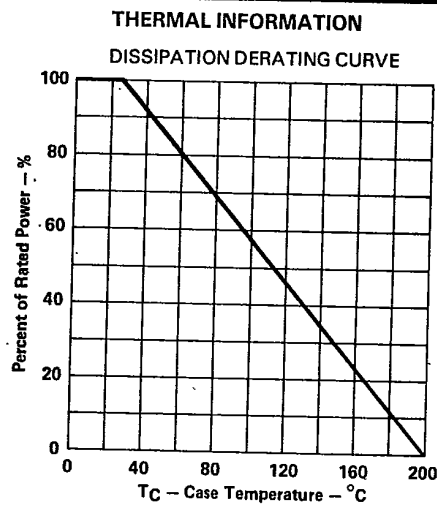


FIGURE 10

TIPL Devices

