

8961726 TEXAS INSTR (OPTO)

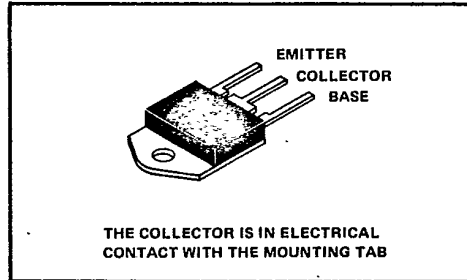
62C 37113 D

TIPL785, TIPL785A, TIPL790, TIPL790A
N-P-N MONOLITHIC DARLINGTON CONNECTED
SILICON POWER TRANSISTORS

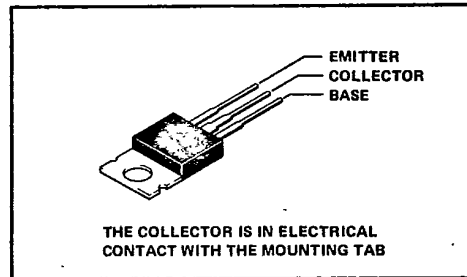
OCTOBER 1982 - REVISED OCTOBER 1984

- Rugged Epitaxial Planar Construction
- Designed For Low-Loss, High-Current, High-Speed Switching Applications
- t_{x0} 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
- $V_{CEO(sus)}$:
 TIPL785, TIPL790 . . . 120 V Min
 TIPL785A, TIPL790A . . . 150 V Min

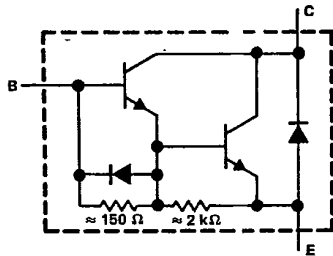
TIPL785, TIPL785A . . . TO-218AA PACKAGE



TIPL790, TIPL790A . . . TO-220AB PACKAGE



device schematic



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

	TIPL785	TIPL785A	TIPL790	TIPL790A
Collector-base voltage	160 V	210 V	160 V	210 V
Collector-emitter voltage ($V_{BE} = 0$)	150 V	200 V	150 V	200 V
Collector-emitter voltage ($I_B = 0$)	120 V	150 V	120 V	150 V
Continuous device dissipation at (or below) 25°C case temperature	80 W		70 W	
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			
Operating collector junction and storage temperature range	-65°C to 150°C			

NOTE 1: This value applies for $t_{pw} = 2$ ms, duty cycle $\leq 2\%$

TIPL Devices



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TIPL785, TIPL785A, TIPL790, TIPL790A
N-P-N MONOLITHIC DARLINGTON-CONNECTED
SILICON POWER TRANSISTORS

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

PARAMETER	TEST CONDITIONS	TIPL785, TIPL785A			TIPL790, TIPL790A			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	
V _(BRICBO)	I _C = 1 mA, See Note 3	160			210			V
V _{CE(sust)}	I _C = 100 mA, L = 25 mH, See Note 2	120			150			V
I _{CEV}	V _{CE} = 150 V, V _{BE} = -1.5 V to -8 V			50				μA
	V _{CE} = 200 V, V _{BE} = -1.5 V to -8 V					50		μA
I _{CES}	V _{CE} = 150 V, V _{BE} = 0			50				μA
	V _{CE} = 200 V, V _{BE} = 0					50		μA
	V _{CE} = 150 V, V _{BE} = 0, T _C = 100°C			1				mA
	V _{CE} = 200 V, V _{BE} = 0, T _C = 100°C					1		mA
I _{CEO}	V _{CE} = 120 V, I _B = 0			50				μA
	V _{CE} = 150 V, I _B = 0					50		μA
I _{EB0}	V _{EB} = 5 V, I _C = 0			4			4	mA
h _{FE}	V _{CE} = 5 V, I _C = 500 mA, See Notes 3 and 4	60		500	60		500	
V _{CE(sat)}	I _C = 4 A, I _B = 0.02 A, See Notes 3 and 4			1.2			1.2	V
	I _C = 7 A, I _B = 0.03 A, See Notes 3 and 4			1.5			1.5	
	I _C = 10 A, I _B = 0.05 A, See Notes 3 and 4			2			2	
	I _C = 10 A, I _B = 0.05 A, T _C = 100°C, See Notes 3 and 4			2			2	
V _{BE(sat)}	I _C = 4 A, I _B = 0.02 A, See Notes 3 and 4			1.8			1.8	V
	I _C = 7 A, I _B = 0.03 A, See Notes 3 and 4			1.9			1.9	
	I _C = 10 A, I _B = 0.05 A, See Notes 3 and 4			2.2			2.2	
	I _C = 10 A, I _B = 0.05 A, T _C = 100°C, See Notes 3 and 4			2.1			2.1	
V _F	I _F = 10 A, See Notes 3 and 4			3			3	V
C _{obo}	V _{CB} = 20 V, I _E = 0, f = 0.1 MHz			90			90	pF
f _t	I _C = 500 mA, V _{CE} = 10 V, See Note 5			10			10	MHz

- NOTES: 2. Inductive loop switching measurement.
 3. These parameters are measured using pulse techniques pulse width = 300 μs, duty cycle = 2 %.
 4. These parameters are measured with voltage-sensing contacts separated from the current-carrying contacts located within 3,2 mm (0.125 inches) 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

thermal characteristics

PARAMETER	TIPL785, TIPL785A		TIPL790, TIPL790A		UNIT
	MIN	TYP MAX	MIN	TYP MAX	
R _{θJC}		1.56		1.79	°C/W

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TIPL785, TIPL785A, TIPL790, TIPL790A
N-P-N MONOLITHIC DARLINGTON-CONNECTED
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inductive-load switching characteristics

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PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{si}	$I_C = 10\text{ A}, I_{B1} = 0.05\text{ A}, I_{B2} = -2.5\text{ A}$ $V_{BE(off)} = -5\text{ V},$ See Figures 1, 2, 3 and 4	450	700		ns
t_{rv}		160	750		ns
t_{fi}		250	400		ns
t_{ti}		280	450		ns
t_{xo}		320	500		ns

PARAMETER MEASUREMENT INFORMATION

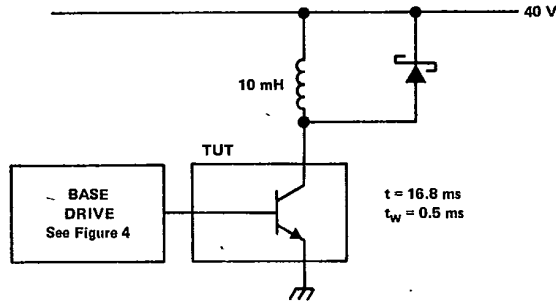


FIGURE 1. INDUCTIVE-LOAD SWITCHING - Collector Test Circuit

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TYPICAL CHARACTERISTICS

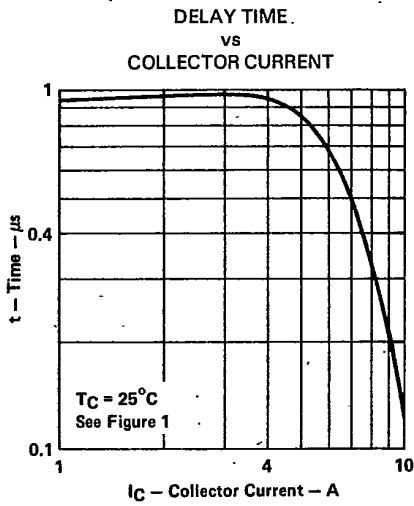


FIGURE 2

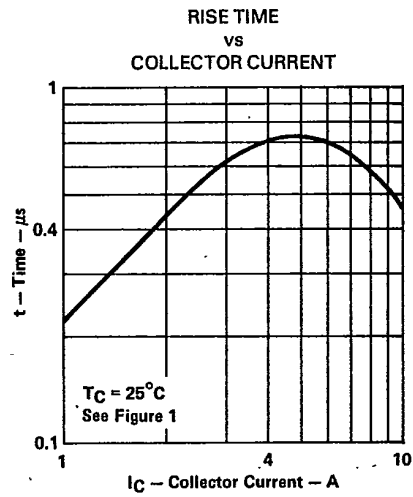


FIGURE 3

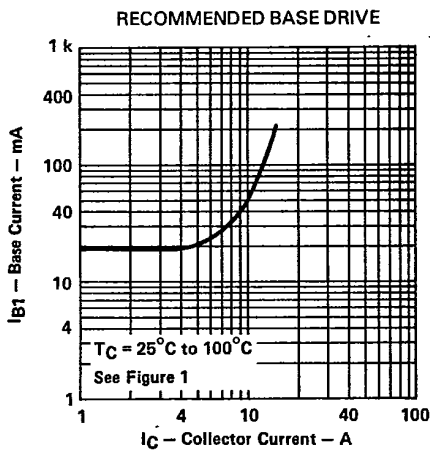


FIGURE 4

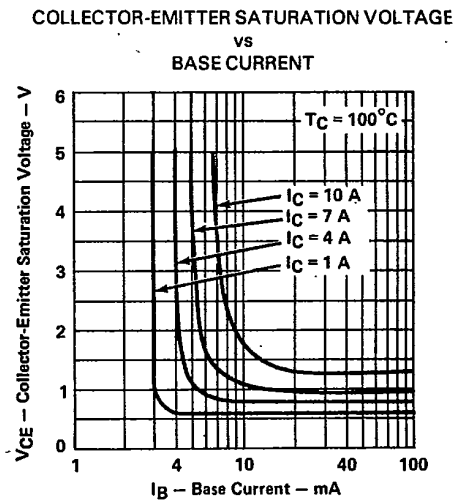


FIGURE 5

TIPL Devices



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TYPICAL CHARACTERISTICS

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BASE-EMITTER SATURATION VOLTAGE
vs
BASE CURRENT

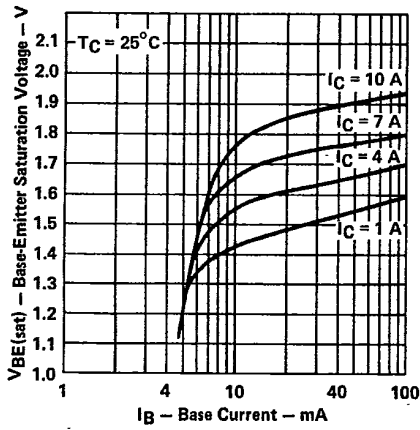


FIGURE 6

STATIC FORWARD CURRENT TRANSFER RATIO
vs
COLLECTOR CURRENT

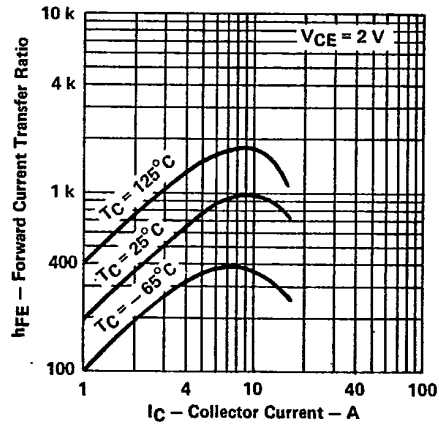


FIGURE 7

COLLECTOR CUTOFF CURRENT
vs
TEMPERATURE

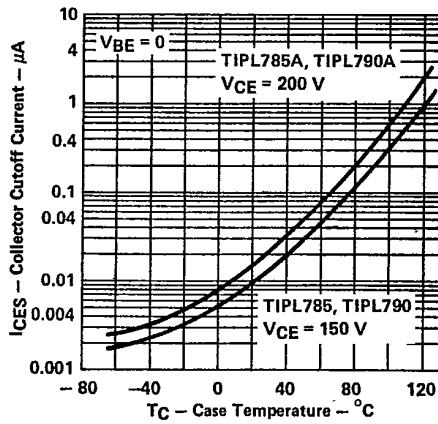


FIGURE 8

TIPL Devices



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MAXIMUM SAFE OPERATING AREA

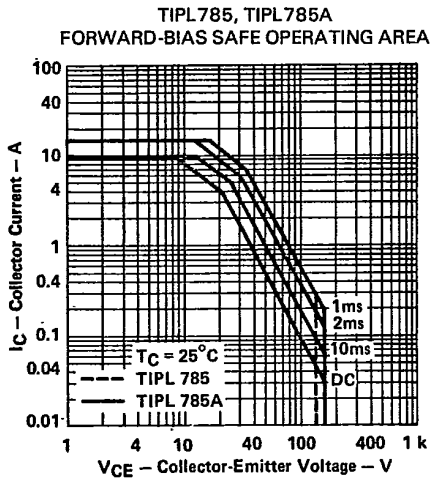


FIGURE 9

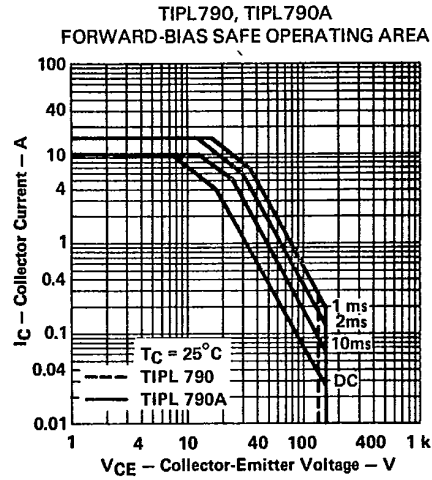


FIGURE 10

THERMAL INFORMATION

DISSIPATION DERATING CURVE

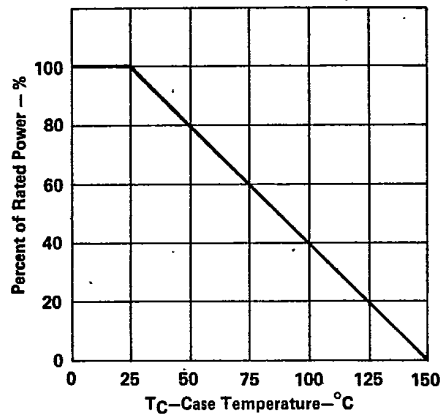


FIGURE 11

TIPL Devices

