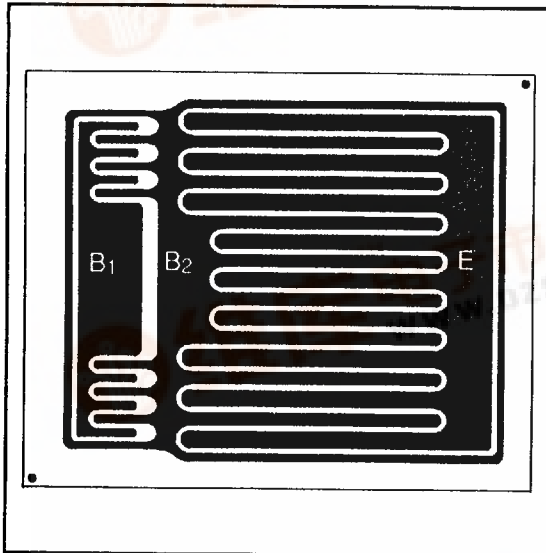


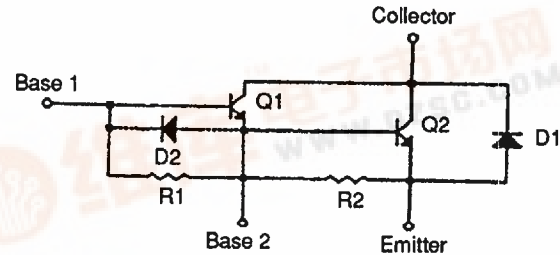
# NPN Power Darlington Die

## Types OTC1015, OTC6030, OTC6050 450V, 20A

T-33-29



Schematic  
(Note 7)



### Features

- Monolithic Planar Die
- Contact Metallization  
Base and Emitter: Aluminum  
Collector: Titanium, Nickel, Silver
- Dimensions  
Die Size: .220 x .185 x .010 inch  
Emitter Bond Area (E): .143 x .018 inch  
Base Driver Bond Area (B1): .065 x .025 inch  
Base Output Bond Area (B2): .051 x .020 inch

### Electrical Characteristics at 25°C

Symbol	Parameter	OTC1015		OTC6030		OTC6050		Units	Test Conditions
		Min	Max	Min	Max	Min	Max		
BV <sub>CEO</sub>	Collector Emitter <sup>(2)</sup>	400		350		350		V	I <sub>C</sub> = 2A, L = 1mh, I <sub>B</sub> = 100mA
BV <sub>CEO</sub>	Collector Emitter	400		450		450		V	I <sub>C</sub> = 30mA
I <sub>CEO</sub>	Collector Emitter Cutoff <sup>(1)</sup>		1.0		1.0		1.0	mA	V <sub>CE</sub> = Rated Value
I <sub>EBO</sub>	Emitter Base Cutoff		60		60		60	mA	V <sub>EB</sub> = 2V
V <sub>EBO</sub>	Emitter Base Voltage <sup>(6)</sup>	7		7		7		V	I <sub>EB</sub> = 180mA
h <sub>FE1</sub>	DC Current Gain <sup>(1)</sup>	75		15		20			I <sub>C</sub> = 1A, V <sub>C</sub> = 5V
h <sub>FE2</sub>	DC Current Gain <sup>(1)</sup>	300	1000	60	200	100	300		I <sub>C</sub> = 5A, V <sub>C</sub> = 5V
h <sub>FE3</sub>	DC Current Gain <sup>(1)(2)</sup>	150		50		90			I <sub>C</sub> = 10A, V <sub>C</sub> = 5V
h <sub>FE4</sub>	DC Current Gain <sup>(1)(2)</sup>			20		30			I <sub>C</sub> = 20A, V <sub>C</sub> = 5V
V <sub>CE(sat)</sub>	Collector Saturation <sup>(1)(2)</sup>		1.5		1.6		1.5	V	I <sub>C</sub> = 10A, I <sub>B</sub> = 0.5A
V <sub>CE(sat)</sub>	Collector Saturation <sup>(1)(2)</sup>		2.5				3.0	V	I <sub>C</sub> = 20A, I <sub>B</sub> = 1A
V <sub>BE(sat)</sub>	Emitter Base Saturation <sup>(1)(2)</sup>		2.5		2.5		2.2	V	I <sub>C</sub> = 10A, I <sub>B</sub> = 0.5A
t <sub>on</sub>	Turn-on Time <sup>(2)</sup>		0.4		0.4		0.4	μs	V <sub>CC</sub> = 300V, I <sub>C</sub> = 10A, I <sub>B1</sub> = 0.5A,
t <sub>s</sub>	Storage Time <sup>(2)(3)</sup>		2.0		1.0		1.2	μs	V <sub>BE(off)</sub> = -5V, t <sub>p</sub> = 50μs
t <sub>f</sub>	Fall Time <sup>(2)(3)</sup>		0.4		0.2		0.1	μs	
C <sub>OB</sub>	Output Capacitance <sup>(5)</sup>	150	350	150	350	150	350	pf	V <sub>C</sub> = 10V, f = 1MHz

(1) Pulse width 300 μsec 2% duty cycle.

(2) These parameters are verified on assembled devices. Data available upon request.

(3) This test is performed using D<sub>2</sub> in the schematic above.

(4) The OTC6030 is used in the Optek SVT6000 series and the OTC6050 device type in the SVT6060 series device type.

(5) This parameter is guaranteed by design.

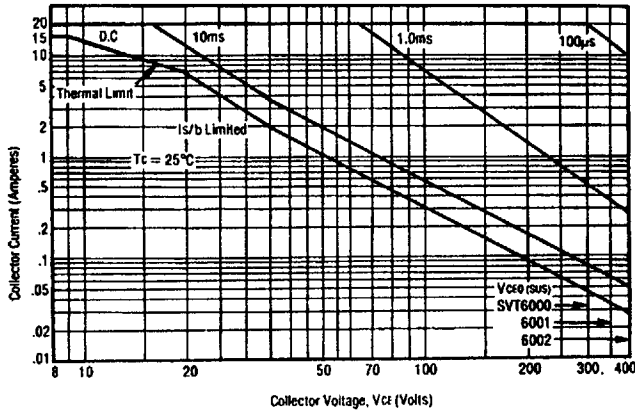
(6) The V<sub>EBO</sub> test is not a breakdown voltage test due to the presence of the base resistors.

(7) D<sub>2</sub> is not part of the die but is a recommended addition when a faster switching time is required. All Optek standard darlington utilize a D<sub>2</sub> internal to the package.

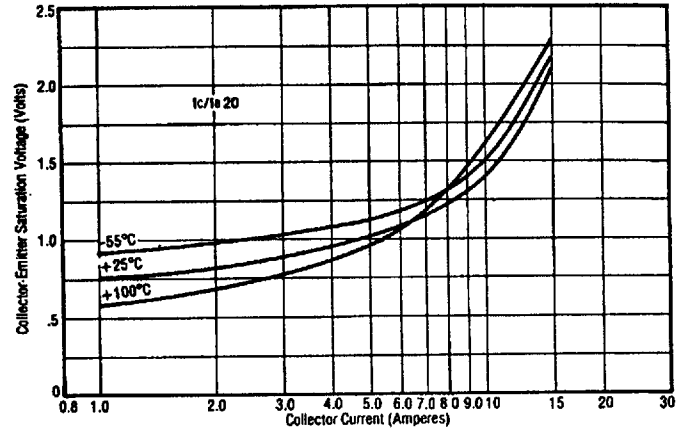


Typical curves for chips mounted in TO-3 packages.

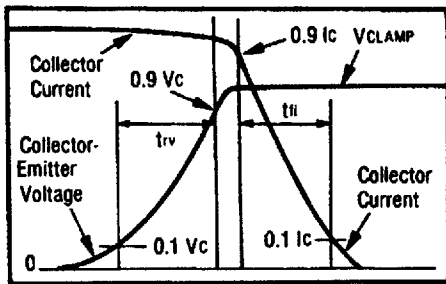
**SOA Curve Forward Bias**



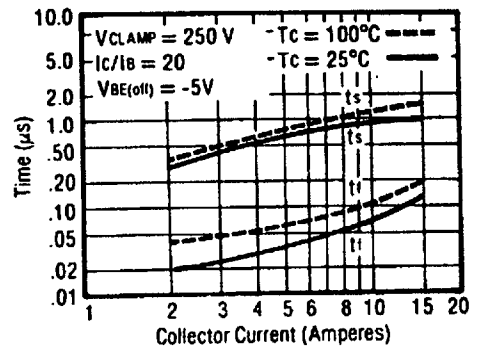
**Collector Emitter Saturation Voltage**



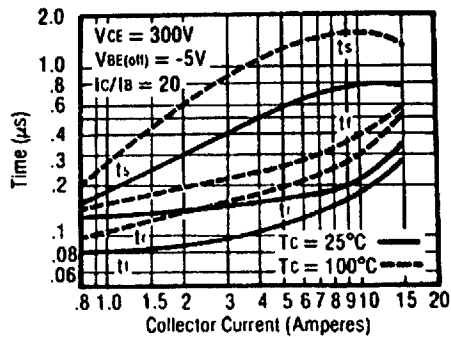
**Inductive Turn-off Waveform**



**Inductive Switching Performance**



**Resistive Switching Performance**



**Switchtime Test Circuit**

