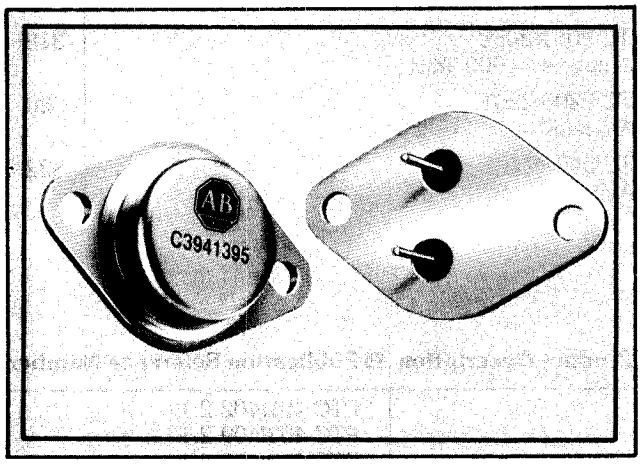
Series PTC 6000, PTC 6001, PTC 6002, PTC 6003

Fast-Switching High Power Darlington Transistors

15 Amperes • 500 Volts



FEATURES

- High Voltage Rating – 500 Volts Sustaining
- Fast-Switching Capabilities/Fast Turn-Off Time
- Glass Passivated Die to Provide Excellent High Temperature Stability
- Thermally Stable Structure for Reliability in Power Cycling
- Overload Short Circuit Rating

APPLICATIONS

- High Voltage Switching Power Supplies
- Inverters/Regulators
- Deflection Circuits
- Pulse-Width-Modulated (PWM) System Control Circuitry

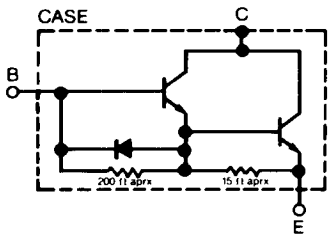
SPECIFICATIONS

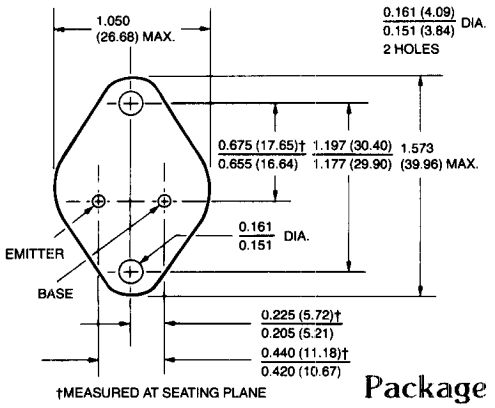
General

Featuring a unique process of manufacturing, Powerlithic series PTC 6000 Darlingtons provide a combination of fast-switching, high-power capabilities, including high safe operating areas (SOA) and are ideally suited for application in switching power supplies, regulators, inverters and off-line systems.

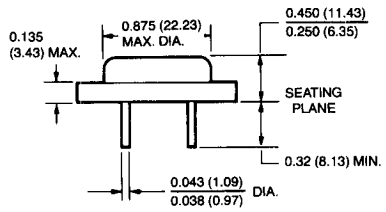
The triple diffused, high temperature glass passivated mesa device exhibits improved secondary breakdown characteristics. An excellent voltage range enables the unit to meet unusually demanding requirements in fast-switching circuitry. An internal diode provides rapid device turn-off.

Electrical





Package outline
JEDEC TO-3



Basic dimensions in inches.

Dimensions shown in PARENTHESES are in millimeters.

SERIES PTC 6000/6001/6002/6003

Fast-Switching, High Power Darlingtons

Absolute maximum ratings

	Description	PTC 6000	PTC 6001	PTC 6002	PTC 6003	Unit	Conditions
V_{CBO}	Collector-Base Voltage	350	400	450	550	V	
V_{CEO}	Collector-Emitter Voltage	350	400	450	550	V	
I_C	Collector Current – Continuous	15				A	
I_C	Collector Current – Peak	30				A	
I_B	Base Current – Continuous	4				A	
I_B	Base Current – Peak	6				A	
P_D	Maximum Power Dissipation	125				W	T_C = 25°C
T_j, T_{stg}	Junction Operating and Storage Temperature Range	−65 to +150				°C	
	Lead Temperature	300				°C	Measured 0.0625 ± 0.0312 in. (1.588 ± 0.794 mm) from case for 10 sec.

Electrical characteristics at T_C = 25°C (unless otherwise specified)

	Description	Type	Min.	Typ.	Max.	Unit	Conditions
$V_{CEO(sus)}$	Collector Emitter Sustaining Voltage	PTC 6000	300			V	I_C = 2A, L = 2mH.
		PTC 6001	350			V	
		PTC 6002	400			V	
		PTC 6003	500			V	
I_{CEO}	Collector Cut-off Current	All		0.1	1.0	mA	At rated collector voltage
I_{EBO}	Emitter Cut-off Current	All		200	300	mA	V_{EB} = 4 V.
FBSOA	Forward Bias Safe Operating Area	All					
h_{FE}	DC Current Gain ■	All	40		160		I_C = 5A, V_{CE} = 5V
			30		120		I_C = 10A, V_{CE} = 5V
			20		60		I_C = 15A, V_{CE} = 5V
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage ■	All		1.8	2.0	V	I_C = 10A, I_B = 500mA
				1.2	1.5	V	I_C = 10A, I_B = 1A
				1.8	2.0	V	I_C = 15A, I_B = 1.5A
$V_{BE(SAT)}$	Base-Emitter Saturation Voltage ■	All		2.2	2.5	V	I_C = 10A, I_B = 1A
				2.4	3.0	V	I_C = 15A, I_B = 1.5A
(h_{fe})	Small Signal Current Gain	All	8				I_C = 500mA, V_{CE} = 10V, f = 1MHz

Switching characteristics resistive load

	Description	Type	Min.	Typ.	Max.	Unit	Conditions	
t_r	Rise Time	All			0.4	μS	V_{CC} = 150V; I_C = 10A	See Figure 1
t_s	Storage Time	All		2.0	2.5	μS	I_{B1} = 1.0A I_{B2} = 1.0A	
t_f	Fall Time	All		0.8	1.0	μS	PW ≥ 25μS	

Thermal and mechanical characteristics

	Description	Type	Typ.	Unit	Conditions
$R_{\theta JC}$	Thermal Resistance Junction-to-Case	All	1.0	°C/W	
	Approximate Weight	All	0.5	oz	
			14	gm	
	Darlington Circuit	All			

■ PULSE TEST: PW = 300 μs, DUTY CYCLE ≤ 2%

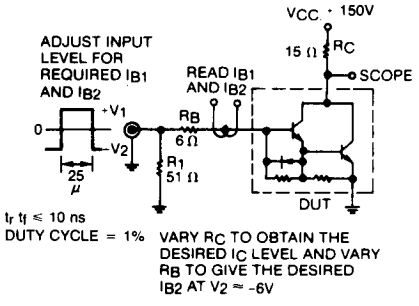


Figure 1 – Switching Circuit

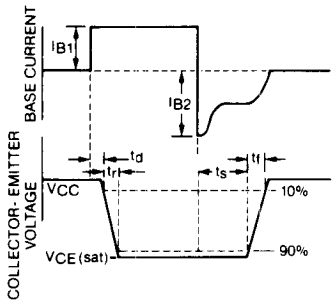


Figure 1a – Switching Waveform

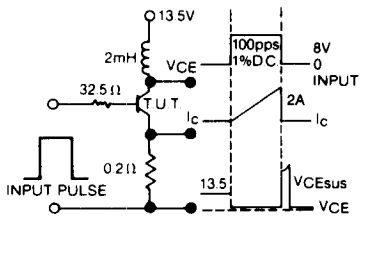


Figure 2 – Sustaining Voltage Test Circuit