Very High-Sensitivity Photo Darlingtons

FPT400 FPT410

Optoelectronic Product

General Description
The FPT400 and FPT410 are 3-terminal npn Planar photo-Darlingtons with exceptionally stable characteristics and high illumination sensitivity. The availability of the base pins gives wide latitude for flexible circuit design. The case is a special plastic compound with transparent resin encapsulation that exhibits stable characteristics under high humidity conditions.

Super High Illumination Sensitivity
Exceptionally Stable Characteristics
Excellent For Low Light Level Applications
High Output Current

Absolute Maximum Ratings

Maximum Temperature and Humidity

Storage Temperature	−55°C to +100°C
Operating Temperature	−55°C to +85°C
Relative Humidity at 65°C	85%

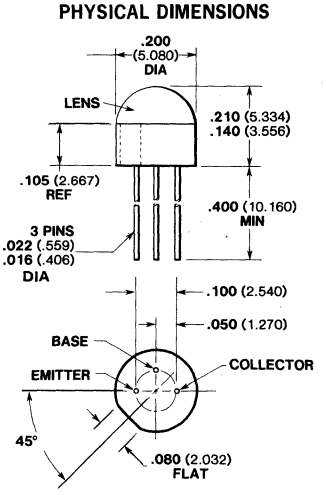
Maximum Power Dissipation (Note 7 and 8)

Total Dissipation at T_C = 25°C	200 mW
Derate Linearly from 25°C	3.3 mW/°C
Total Dissipation at T_A = 25°C	100 mW
Derate Linearly from 25°C	1.67 mW/°C

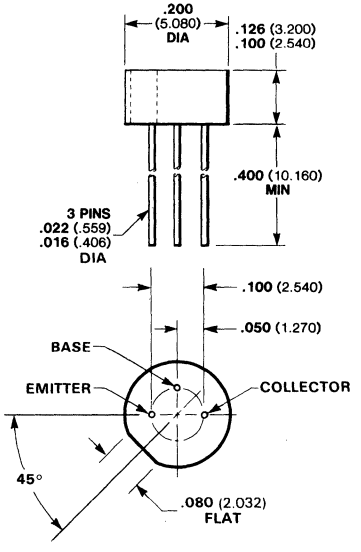
Maximum Voltages and Currents

V_{CB}	Collector-to-Base Voltage	30 V
V_{CE}	Collector-to-Emitter Voltage	30 V
I_C	Collector Current	50 mA

Package Outlines
FPT400



FPT410



Notes
All dimensions in inches **bold** and millimeters (parentheses)
Tolerance unless specified = ±**.015** (0.381)

Typical Electrical Characteristics

FPT400 FPT410

Electrical Characteristics $T_A = 25°C$

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
$V_{CEO(sus)}$	Collector-to-Emitter Sustaining Voltage	30	60		V	I_C = 1.0 mA (Note 3)
V_{CBO}	Collector-to-Base Voltage	30	60		V	I_C = 100 μA (Note 3)
V_{ECO}	Emitter-to-Collector Voltage		10		V	I_E = 100 μA (Note 3)
$V_{CE(sat)}$	Collector-to-Emitter Saturation Voltage		0.9	1.0	V	I_C = 5.0 mA, H = 5.0 mW/cm² (Note 1)
I_{CEO}	Collector Dark Current		10	100	nA	V_{CE} = 5.0 V (Note 3)
$I_{CE(lt)}$	Photo Current (Tungsten)					
	FPT400	3.0	7.5		mA	V_{CE} = 5.0 V
	FPT410	2.0	5.0		mA	H = 1.0 mW/cm² (Notes 1, 5)
$I_{CE(lt)}$	Photo Current (GaAs)					
	FPT400	6.0	15		mA	V_{CE} = 5.0 V,
	FPT410	4.0	10		mA	H = 1.0 mW/cm² (Notes 2, 5)
t_r	Light Current Rise Time		100		μs	(Note 4)
t_f	Light Current Fall Time		100		μs	(Note 4)

Notes

1. Measured at noted irradiance as emitted from a Tungsten filament lamp at a color temperature of 2854°K. The effective photosensitive area is typically 7 mm².
2. These are values obtained at noted irradiance as emitted from a GaAs source at 900 nm.
3. Measured with radiation flux intensity of less than 0.1 μW/cm² over the spectrum from 100-1500 nm.
4. Rise time is defined as the time required for I_{CE} to rise from 10% to 90% of peak value. Fall time is defined as the time required for I_{CE} to decrease from 90% to 10% of peak value. Test conditions are V_{CE} = 10 V, I_{CC} = 10 mA, R_L = 100 Ω GaAs source.
5. No electrical connection to base pin.
6. No electrical connection to emitter pin.
7. These are steady-state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.
8. These ratings give a maximum junction temperature of 85°C and junction-to-case thermal resistance of 300°C/Watt (derating factor of 3.33 mW/°C, and a junction-to-ambient thermal resistance of 600°C/Watt (derating factor of 1.67 mW/°C).