Hermetic TO-18 Silicon Phototransistors

Optoelectronic Products

FPT500, FPT500A
FPT520, FPT520A
FPT540, FPT540A

General Description

FPT500/FPT520/FPT540 are nitride-passivated npn Planar silicon phototransistors. These devices are packaged in a TO-18 style, hermetically sealed package with lens cap. For most applications two pins are used (collector and emitter pins). The availability of the base pin gives wide latitude for flexible circuit design. Phototransistors can be used as photodiodes (collector-base) which have excellent photo current linearity (for analog applications).

High Illumination Sensitivity
Exceptionally Stable Characteristics
Large Range of Controlled Sensitivities
Hermetic Metal Package
High Operating Temperature

Absolute Maximum Ratings

Maximum Temperature and Humidity

Storage Temperature	−65°C to +200°C
Operating Temperature	−55°C to +150°C
Pin Temperature (Soldering, 5 s)	260°C
Relative Humidity at 65°C	85%

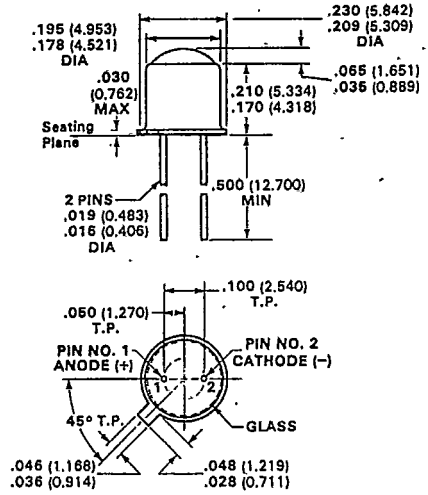
Maximum Power Dissipation

Total Dissipation at T_C = 25°C	600 mW
Derate Linearly from 25°C	4.8 mW/°C
Total Dissipation at T_A = 25°C	300 mW
Derate Linearly from 25°C	2.4 mW/°C

Maximum Voltages and Currents

V_{CB}	Collector-to-Base Voltage	
	FPT500/FPT500A	60 V
	FPT520/FPT520A	50 V
	FPT540/FPT540A	30 V
$V_{CE(sus)}$	Collector-to-Emitter Sustaining Voltage	
	FPT500/FPT500A	45 V
	FPT520/FPT520A	30 V
	FPT540/FPT540A	12 V
I_C	Collector Current	50 mA

Package Outline



Notes
All dimensions in inches bold and millimeters (parentheses)
Tolerance unless specified = ±.015 (±.381)

Typical Electrical Characteristics

FPT500, FPT500A
FPT520, FPT520A
FPT540, FPT540A

Electrical Characteristics $T_A = 25°C$

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
$V_{CEO(sus)}$	Collector-to-Emitter Sustaining Voltage				V	I_C = 1.0 mA
	FPT500/FPT500A	45	60			(Note 3)
	FPT520/FPT520A	30	60			
	FPT540/FPT540A	12	30			
V_{CBO}	Collector-to-Base Voltage				V	I_C = 100 μA
	FPT500/FPT500A	60	100			(Note 3)
	FPT520/FPT520A	50	80			
	FPT540/FPT540A	30	50			
V_{EBO}	Emitter-to-Collector Voltage				V	I_E = 100 μA
	FPT500/FPT500A		10			(Note 3)
	FPT520/FPT520A		10			
	FPT540/FPT540A		7.0			
$V_{CE(sat)}$	Collector-to-Emitter Saturation Voltage				V	I_C = 500 μA
	FPT500/FPT500A		0.16	0.33		(Note 1)
	FPT520/FPT520A		0.16	0.33		H = 2.0 mW/cm²
	FPT540/FPT540A		0.25	0.55		I_C = 1.0 mA
						(Note 1)
						H = 2.0 mW/cm²
I_{CEO}	Collector Dark Current		10	100	nA	V_{CE} = 5.0 V
						(Note 3)
I_{CBO}	Collector Dark Current		0.25	25	nA	V_{CB} = 10 V
						(Note 3)
$I_{CB(lt)}$	Photo Current		10		μA	V_{CB} = 5.0 V
						(Note 6)
						H = 1.0 mW/cm²
θ_{50}	50% Angular Response		15		degrees	
t_r	Light Current Rise Time					
	FPT500/FPT500A		3.0		μs	(Note 4)
	FPT520/FPT520A		8.0			
	FPT540/FPT540A		18			
t_f	Light Current Fall Time					
	FPT500/FPT500A		3.0		μs	(Note 4)
	FPT520/FPT520A		8.0			
	FPT540/FPT540A		18			
$I_{CE(lt)}$	Photo Current (Tungsten)				mA	V_{CE} = 5.0 V
	FPT500	1.0	3.0			H = 1.0 mW/cm²
	FPT500A	2.0		6.0		(Notes 1, 5)
	FPT520	5.0	8.0			
	FPT520A	6.0		18		
	FPT540	8.0	15			
	FPT540A	10		30		
$I_{CE(lt)}$	Photo Current (GaAs)				mA	V_{CE} = 5.0 V
	FPT500	3.0	6.0			H = 1.0 mW/cm²
	FPT520	10	24			(Notes 2, 5)
	FPT540	16	30			

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.

DIMENSIONAL DRAWINGS