Optoelectronics Division
TRW Electronic Components Group

Product Bulletin 5216
January 1985

1987 Cost Saver Product!
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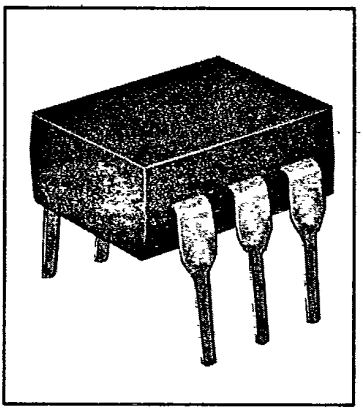
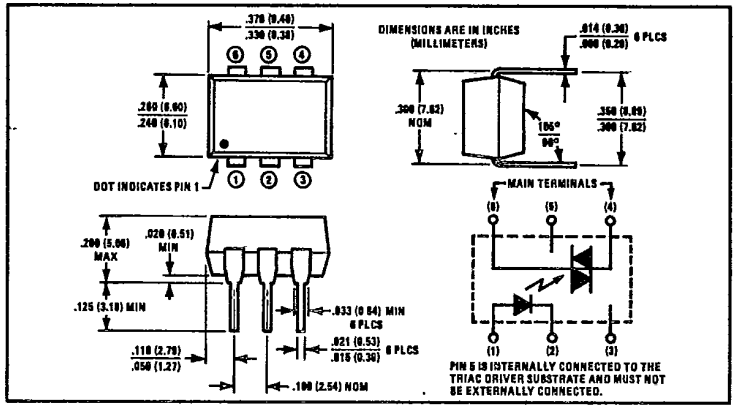
Zero Voltage Crossing Optically Coupled Triac Drivers
Types OPI3030, OPI3031, OPI3032, OPI3033





Features

- For 120 VAC operation
- 2500 VDC minimum electrical isolation
- Low LED trigger current to latch output
- Zero voltage crossing for reduced EMI and line noise, and improved static dV/dt
- UL recognized File No. E68730

Description

The OPI3030, OPI3031, OPI3032, and OPI3033 each contain a gallium arsenide or gallium aluminum arsenide infrared emitting diode and a monolithic integrated circuit containing a photodiode and a zero voltage bidirectional triac driver, mounted in a standard plastic six pin dual-in-line package. Required LED drive currents are 30 mA, 15 mA, 10 mA, and 5 mA, respectively. This series is intended to be used for low power DC controlling of power triacs which in turn control resistive, inductive, or capacitance loads powered from 120 VAC. Zero voltage crossing ensures that the devices will not turn on until the line voltage reduces to 15 volts, typical.

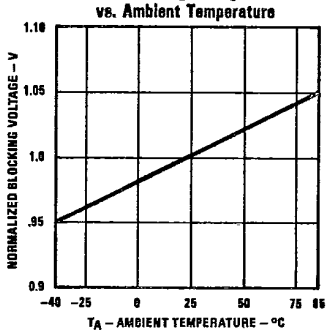
Absolute Maximum Ratings (T_A = 25°C unless otherwise noted)

Input-to-Output Isolation Voltage		±2500 VDC[1]
Storage Temperature Range		−40°C to +150°C
Operating Temperature Range		−40°C to +85°C
Lead Soldering Temperature (1/16 inch [1.6 mm] from case for 5 sec. with soldering iron)[2]		260°C
Total Device Power Dissipation		400 mW[3]
Input Diode		
Forward DC Current	I_F	60 mA
Reverse DC Voltage	V_R	3.0 V
Power Dissipation	P_D	100 mW[4]
Output Photosensor		
Off-State Terminal Voltage	V_{DRM}	250 V
On-State RMS Current $I_{T(RMS)}$ [Full Cycle, 50-60 Hz]	T_A = 25°C	100 mA
	T_A = 70°C	50 mA
Peak Non-Repetitive Surge Current (PW = 10 ms, duty cycle = 10%)	I_{TSM}	1.20 A
Power Dissipation	P_D	350 mW[5]

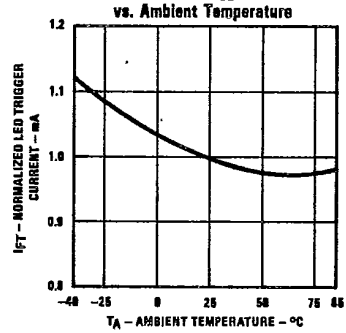
Notes: **(1)** Measured with input diode leads shorted together and output leads shorted together. **(2)** RMA flux is recommended. Duration can be extended to 10 sec. max. when flow soldering. **(3)** Derate 6.67 mW/°C above 25°C. **(4)** Derate 1.67 mW/°C above 25°C. **(5)** Derate 5.83 mW/°C above 25°C.

Typical Performance Curves

Blocking Voltage vs. Ambient Temperature



Normalized Trigger Level vs. Ambient Temperature

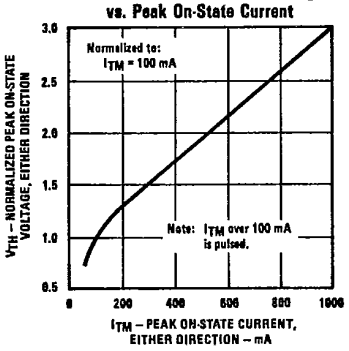


Electrical Characteristics (T_A = 25°C unless otherwise noted)

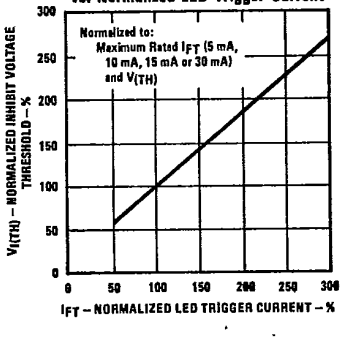
Symbol	Parameter		Min.	Typ.	Max.	Units	Test Conditions
Input Diode							
V_F	Forward Voltage			1.20	1.60	V	I_F = 10.0 mA
I_R	Reverse Current				100	μA	V_R = 6.0 V
Output Photosensor							
I_{DRM}	Peak Blocking Current, Either Direction			10.0	100	nA	V_{DRM} = 250 V. Must be applied within dV/dt rating.
V_{TM}	Peak On-State Voltage, Either Direction			1.76	3.0	V	I_{TM} = 100 mA Peak
dV/dt	Critical Rate of Rise of Off-State Voltage			100		V/μs	
Coupled							
I_{FT}	LED Trigger Current Required to Latch Output in Either Direction (Rated I_{FT})	OPI3030		15.0	30	mA	Main Terminal Voltage = 3.0 V
		OPI3031		10.0	15.0	mA	Main Terminal Voltage = 3.0 V
		OPI3032		7.5	10.0	mA	R_L = 150 kΩ
		OPI3033		3.5	5.0	mA	R_L = 150 kΩ
I_H	Holding Current, Either Direction			200		μA	
V_{ISO}	Isolation Voltage		2500			VDC	See Note (1)
$V_{I(TH)}$	Zero Voltage Crossing Inhibit Voltage Threshold			15.0	25	V	I_{FT} = Rated I_{FT}. MT1, MT2 voltage above which the device will not trigger.
$I_{R(I)}$	Leakage Current in Inhibit State	OPI3030 & OPI3031		100	300	μA	I_{FT} and MT1, MT2 voltage as rated. Device in off-state.
		OPI3032 & OPI3033		100	200	μA	

Typical Performance Curves

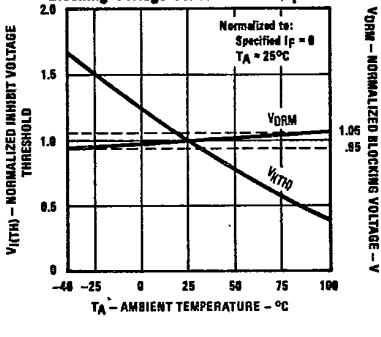
Normalized Peak On-State Voltage vs. Peak On-State Current



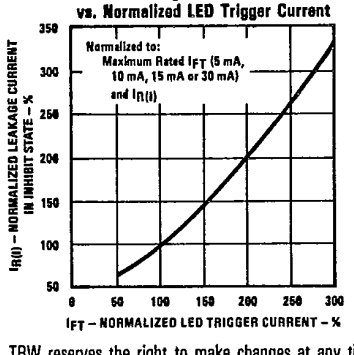
Normalized Inhibit Voltage Threshold vs. Normalized LED Trigger Current



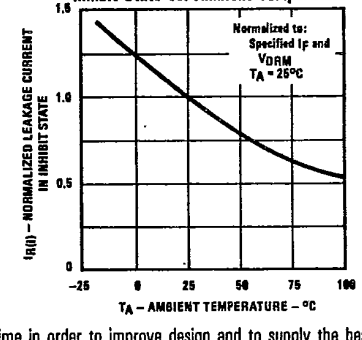
Normalized Inhibit Voltage Threshold and Blocking Voltage vs. Ambient Temperature



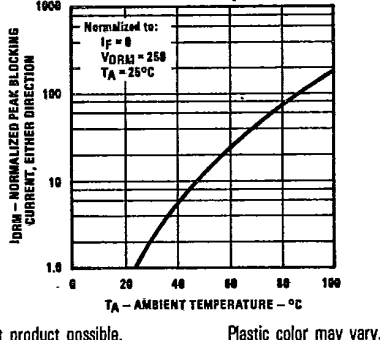
Normalized Leakage Current In Inhibit State vs. Normalized LED Trigger Current



Normalized Leakage Current In Inhibit State vs. Ambient Temperature



Normalized Peak Blocking Current vs. Ambient Temperature



TRW reserves the right to make changes at any time in order to improve design and to supply the best product possible. Plastic color may vary.

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