IXYS
INTEGRATED CIRCUITS DIVISION



PM1204
AC Power Switch

Parameter	Rating	Units
AC Operating Voltage	120	V_{rms}
Load Current	500	mA_{rms}
On-State Voltage Drop (I_L=500mA_{rms})	1.4	V_{rms}

Features
- Load Current up to 0.5A_{rms}
- Blocking Voltages up to 400V_P
- 5mA Sensitivity
- Zero-Crossing Detection
- DC Control, AC Output
- Optically Isolated
- TTL and CMOS Compatible
- Low EMI and RFI Generation
- High Noise Immunity
- VDE compatible
- Machine Insertable, Wave Solderable

Applications
- Programmable Control
- Process Control
- Power Control Panels
- Remote Switching
- Gas Pump Electronics
- Contactors
- Large Relays
- Solenoids
- Motors
- Heaters

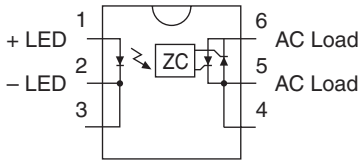
Description
The PM1204 is an AC Solid State Switch using optical coupling with dual power SCR outputs to produce an alternative to optocoupler and Triac circuits. The PM1204 switches are robust enough to provide a blocking voltage of up to 400V_P. In addition, tightly controlled zero-cross circuitry ensures switching of AC loads without the generation of transients. The input and output circuits are optically coupled to provide 3750V_{rms} of isolation and noise immunity between control and load circuits. As a result, the PM1204 is well suited for industrial environments where electromagnetic interference could disrupt the operation of electromechanical relays.

Approvals
- UL Recognized Component: UL 508 File E69938
- CSA Certified Component: File 043639

Ordering Information

Part #	Description
PM1204	6-Lead DIP (50/Tube)
PM1204S	6-Lead Surface Mount (50/Tube)
PM1204STR	6-Lead Surface Mount (1000/Reel)

Pin Configuration



Absolute Maximum Ratings @ 25ºC

Parameter	Min	Max	Units
Blocking Voltage	-	400	V_P
Reverse Input Voltage	-	5	V
Input Control Current	-	100	mA
Peak (10ms)	-	1	A
Input Power Dissipation [1]	-	150	mW
Total Package Dissipation [2]	-	800	mW
Isolation Voltage, Input to Output	3750	-	V_{rms}
Operational Temperature	-40	+85	ºC
Storage Temperature	-40	+125	ºC

[1] Derate linearly 1.33 mW / ºC

[2] Derate linearly 6.67 mW / ºC

Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at conditions beyond those indicated in the operational sections of this data sheet is not implied.

Electrical Characteristics @ 25ºC

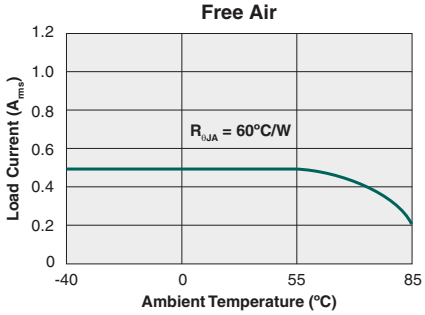
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
AC Operating Voltage	I_F=5mA	V_{OP}	20	-	120	V_{rms}
Load Current (Continuous)	V_L=120-240VAC	I_L	0.005	-	0.5	A_{rms}
Maximum Surge Current	t≤16ms	I_{PEAK}	-	-	12	A
Off-State Leakage Current	V_L=400V_{DC}	I_{LEAK}	-	-	1	mA
On-State Voltage Drop	I_L=0.5A_{rms}	-	-	-	1.4	V_{rms}
Critical Rate of Rise	-	dV/dt	1000	1200	-	V/µs
Switching Speeds						
Turn-On	I_F=5mA	t_{on}	-	-	0.5	Cycles
Turn-Off		t_{off}	-	-	0.5	
Zero-Cross Turn-On Voltage [1]	1st half-cycle	-	-	2	5	V
	Subsequent half-cycle		-	-	1	V
Operating Frequency	-	-	20	-	500	Hz
Load Power Factor for Guaranteed Turn-On [2]	-	PF	0.25	-	-	-
Capacitance Input-To-Output	-	$C_{I/O}$	-	3	-	pF
Input Characteristics						
Input Control Current						
For Normal Environment	-	I_F	-	-	5	mA
For High Noise Environment	-		-	-	10	
Input Voltage Drop	I_F=5mA	V_F	0.9	1.2	1.4	V
Input Dropout Voltage	-	-	0.8	-	-	V
Reverse Input Current	V_R=5V	I_R	-	-	10	µA

[1] Zero Cross 1st half-cycle @ < 100Hz.

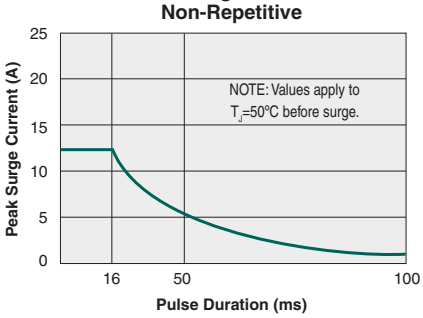
[2] Snubber circuits may be required at low power factors.

PERFORMANCE DATA*

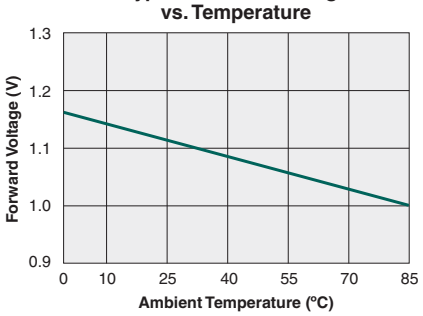
Load Current Free Air



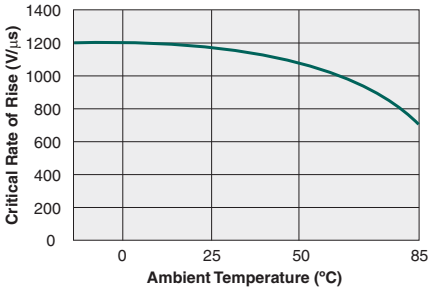
Max Surge Current Non-Repetitive



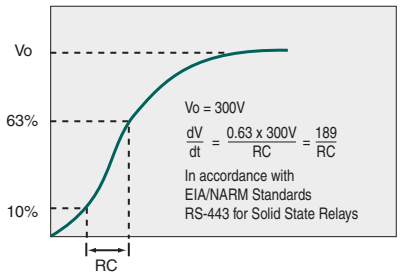
Typical Forward Voltage vs. Temperature



Typical dV/dt vs. Temperature



dV/dt Method



*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

Manufacturing Information

Moisture Sensitivity

All plastic encapsulated semiconductor packages are susceptible to moisture ingression. IXYS Integrated Circuits Division classified all of its plastic encapsulated devices for moisture sensitivity according to the latest version of the joint industry standard, **IPC/JEDEC J-STD-020**, in force at the time of product evaluation. We test all of our products to the maximum conditions set forth in the standard, and guarantee proper operation of our devices when handled according to the limitations and information in that standard as well as to any limitations set forth in the information or standards referenced below.

Failure to adhere to the warnings or limitations as established by the listed specifications could result in reduced product performance, reduction of operable life, and/or reduction of overall reliability.

This product carries a **Moisture Sensitivity Level (MSL) rating** as shown below, and should be handled according to the requirements of the latest version of the joint industry standard **IPC/JEDEC J-STD-033**.

Device	Moisture Sensitivity Level (MSL) Rating
PM1204	MSL 1

ESD Sensitivity

This product is **ESD Sensitive**, and should be handled according to the industry standard **JESD-625**.

Reflow Profile

This product has a maximum body temperature and time rating as shown below. All other guidelines of **J-STD-020** must be observed.

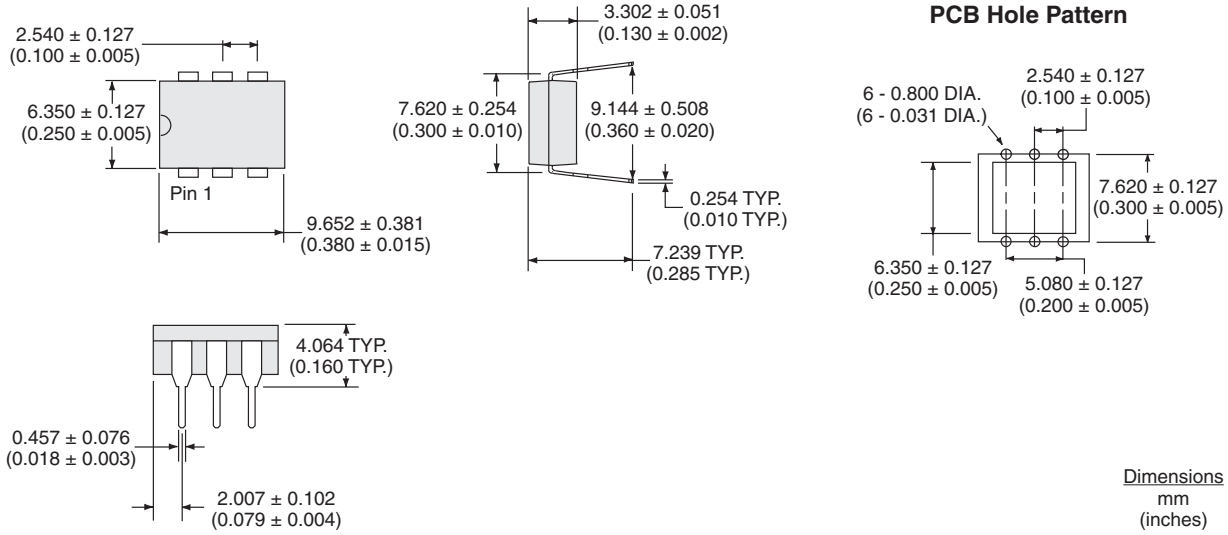
Device	Maximum Temperature x Time
PM1204	250°C for 30 seconds

Board Wash

IXYS Integrated Circuits Division recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. Since IXYS Integrated Circuits Division employs the use of silicone coating as an optical waveguide in many of its optically isolated products, the use of a short drying bake could be necessary if a wash is used after solder reflow processes. Chlorine- or Fluorine-based solvents or fluxes should not be used. Cleaning methods that employ ultrasonic energy should not be used.

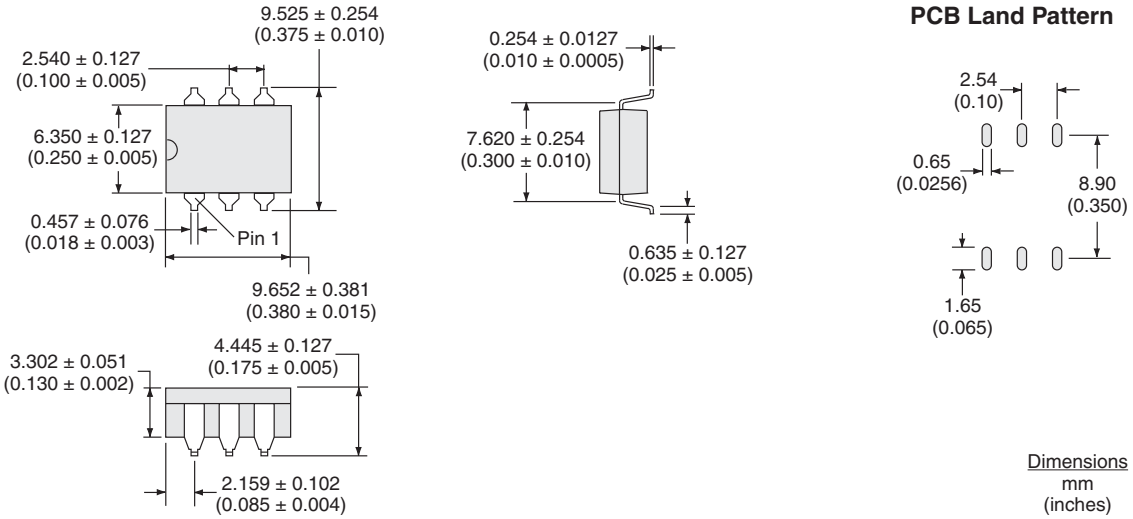
Mechanical Dimensions

PM1204



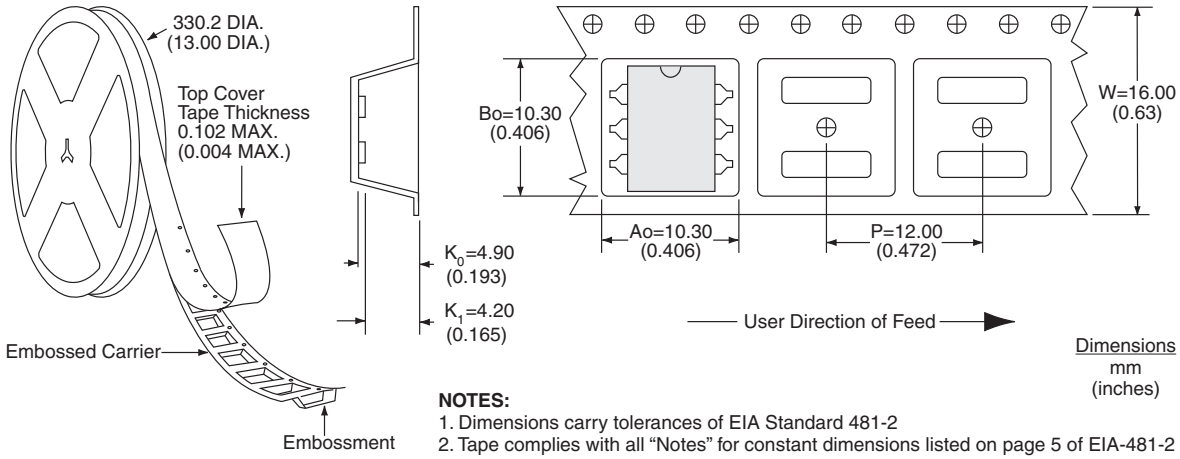
Dimensions
mm
(inches)

PM1204S



Dimensions
mm
(inches)

PM1204STR Tape & Reel



NOTES:
1. Dimensions carry tolerances of EIA Standard 481-2
2. Tape complies with all "Notes" for constant dimensions listed on page 5 of EIA-481-2

For additional information please visit our website at: www.ixysic.com

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Specification: DS-PM1204-R11
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