

MOC 8101X, MOC 8102X, MOC 8103X, MOC 8104X

OPTICALLY COUPLED ISOLATOR NON - BASE LEAD TRANSISTOR OUTPUT

**DESCRIPTION**

The MOC 8101X, 8102X, 8103X, 8104X are optically coupled isolators consisting of a Gallium Arsenide infrared emitting diode and a NPN silicon phototransistor mounted in a standard 6-pin dual-in-line package.

NOTES

- 1 a. The product type number consists of the basic product type followed by the letter "X" which indicates VDE 0884 approval of the basic part.
- b. Letter "X" supercedes letter "V" which denoted the now obsolete VDE 0883 approval.
2. For 10mm lead spread requirements add suffix G.
3. For surface mount requirements add suffix SM.

APPROVALS

DIN VDE 0884. Marks Licence No. 70910
UL 1577 File No. E91231
BSI 415 Certificate No. 7209

**FEATURES**

Rated Impulse Voltage (Transient Overvoltage)
 $V_{IOTM} = 6kV$ peak

Insulation Test Voltage (Partial Discharge Test)
 $V_{pd} = 1.4kV$ peak

Rated Insulation Voltage (RMS includes d.c.)
 $V_{IOWM} = 600 V_{RMS}$ (848V peak)

Rated Recurring Peak Voltage (repetitive)
 $V_{IORM} = 600 V_{RMS}$

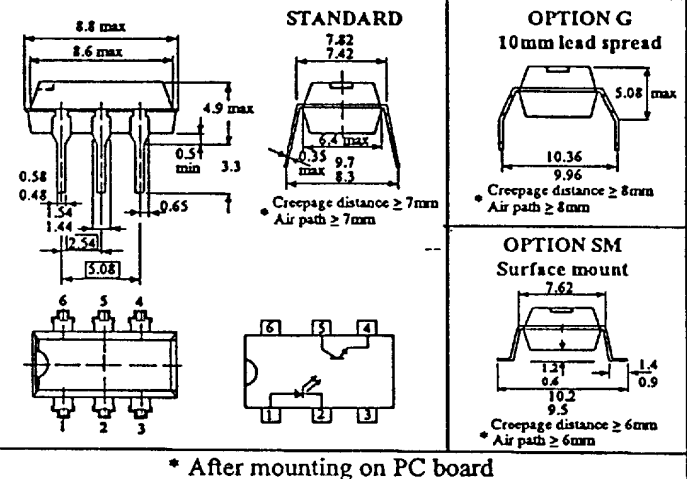
Isolation Materials according to UL 94

Creeping Current Resistance according to VDE 0303 / IEC 112

Comparative Tracking Index CTI 275 (VDE 0109)

Climatic Classification 55/100/21 (IEC 68 Part 1)

Pollution Degree 2 (VDE 0109)

PACKAGE DIMENSIONS IN MM**APPLICATIONS**

These couplers meet the requirements of the following Equipment Standards

- | | |
|----------------------|---|
| VDE 0109
0110 | Circuits for safe protective separation against electrical shock according to safety class II (reinforced isolation).
Application class I-IV at mains voltages $\leq 300V$.
Application class I-III at mains voltage $\leq 600V$. |
| VDE 0804 | Telecommunication Apparatus and Data Processing |
| VDE 0805/
IEC 435 | Data Processing Equipment (Option G only). |
| VDE 0806/
IEC 950 | Office Machines (Option G only). |
| VDE 0860/
IEC 65 | Safety for Mains Operated Electronic and Related Apparatus for Household. |
| UL 1577 | Standard for Safety. Optical isolated switch systems. Package type K. |
| BS 415/
IEC 65 | Safety requirements for mains operated electronic and related apparatus for household and similar general use. Class II applications. |
| BS7002/
IEC 950 | Specification for safety of information technology equipment including electrical business equipment (Option G only). |

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ABSOLUTE MAXIMUM RATINGS (25°C UNLESS OTHERWISE NOTED)

Storage Temperature _____ -55°C to +125°C
 Operating Temperature _____ -55°C to +100°C
 Lead Soldering Temperature
 (2mm from case for 10 seconds) _____ 260°C
 Input-to-Output Isolation Voltage _____ ± 5300 Vdc

INPUT DIODE

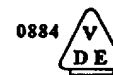
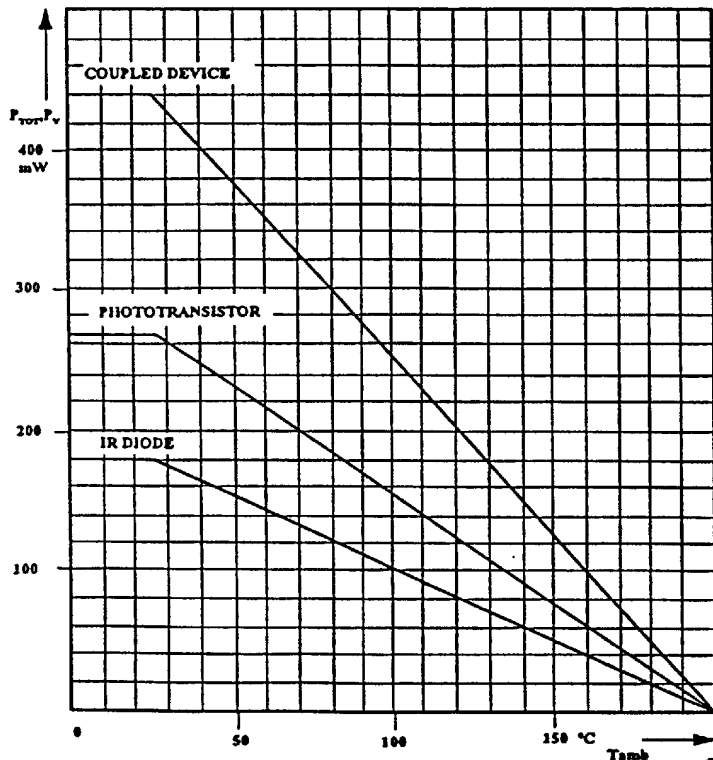
Forward D.C. Current _____ 60mA
 Reverse D.C. Voltage _____ 6V
 Peak Forward Current (PW = 100 μ s 120 pps) _____ 1A
 Power Dissipation
 (derate linearly 1.33mW/°C above 25°C) _____ 100mW

OUTPUT TRANSISTOR

Collector-emitter Voltage BV_{CE0} _____ 30V
 Emitter-Collector Voltage BV_{EC0} _____ 7V
 Collector Current _____ 50mA
 Collector Current ($t_p \leq 10$ ms, Duty Ratio 0.5) _____ 100mA
 Power Dissipation
 (derate linearly 2.00mW/°C above 25°C) _____ 150mW

PACKAGE

Total Power Dissipation
 (derate linearly 3.3mW/°C above 25°C) _____ 250mW

MAXIMUM SAFETY DERATING CURVE

MAXIMUM SAFETY RATINGS

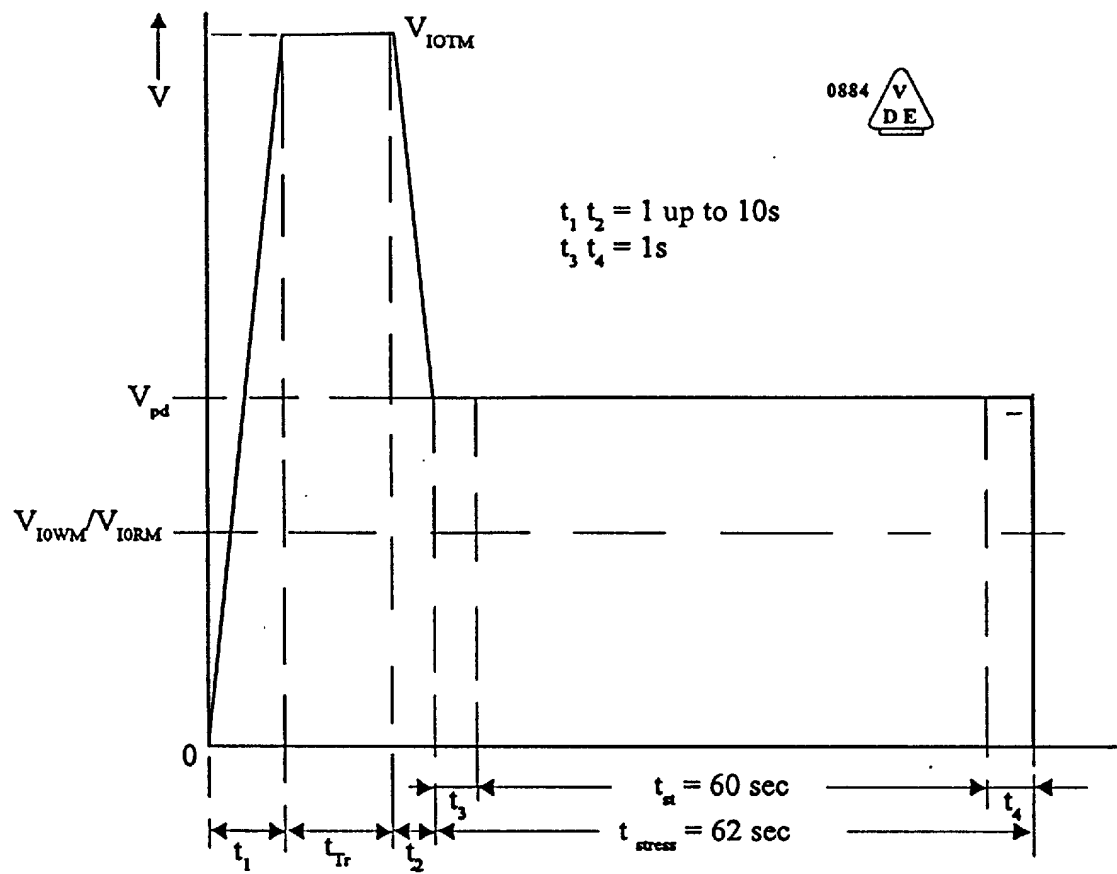
Input Diode I_{si} 130 mA max
 Output Transistor P_{si} 265 mW max

Coupled Device
 Impulse Voltage V_{IOTM} 6 KV max
 Safety Temperature T_{si} 200°C max

Note

This device is suitable for safe electrical isolation only within the maximum safety ratings. This must be ensured by protective circuits in the applications.

TEST PULSE DIAGRAM FOR SAMPLE TESTS acc. DIN VDE 0884



INSULATION RATED PARAMETERS

PARAMETER		TEST CONDITIONS	SYMBOL	MIN	MAX	UNIT
Partial Discharge Test Voltage	routine test	100% $t_m = 1s$	V_{pd}	1.4		kV
	lot test (sample test)	$t_{Tr} = 10 s$ $t_m = 60 s$ see Test Pulse Diagram	V_{IOTM}	6		kV
			V_{pd}	1.05		kV
Insulation Resistance		$V_{io} = 500V, T_{amb} = 25^{\circ}C$	R_{is}	10^{12}		OHM
		$V_{io} = 500V, T_{amb} = 100^{\circ}C$	R_{is}	10^{11}		OHM
		$V_{io} = 500V, T_a = 200^{\circ}C$ (only construction test)	R_{is}	10^9		OHM

ELECTRICAL CHARACTERISTICS (25°C unless otherwise noted)

Parameter		Min.	Typ	Max.	Units	Test Condition
Input	Forward Voltage (V_F)		1.2	1.5	Volt	$I_F = 10 \text{ mA}$
	Capacitance		30		pf	$V_R = 0, f = 1 \text{ Mhz}$
	Reverse Current (I_R)			10	μA	$V_R = 6 \text{ V}$
	Reverse Breakdown Voltage (V_R)	6.0			Volt	$I_R = 100 \mu\text{A}$
Output	Collector-emitter Voltage (BV_{CE0})	30			Volt	$I_C = 1 \text{ mA}$
	Emitter-collector Voltage (BV_{EC0})	7			Volt	$I_E = 100 \mu\text{A}, I_C = 0$
	Collector-emitter Dark Current (I_{CE0})		5	50	nA	$V_{CE} = 10 \text{ V}$
Coupled	Output Collector Current (I_C)					$I_F = 10 \text{ mA}, V_{CE} = 10 \text{ V}$
	MOC 8101X	5.0		8.0	mA	
	MOC 8102X	7.3		11.7	mA	
	MOC 8103X	10.8		17.3	mA	
	MOC 8104X	16		25.6	mA	
	Collector - emitter Saturation Voltage $V_{CE}(\text{SAT})$		0.2	0.4	Volt	$I_F = 5 \text{ mA}, I_C = 500 \mu\text{A}$
	Capacitance Input to Output (C_{IO})		0.3		pf	$F = 1 \text{ Mhz (note 1)}$
	Input - to - Output Isolation Resistance (R_{IO})	10^{11}			ohm	$V_{IO} = 500 \text{ V, (note 1)}$
	Output Turn - on Time (t_{on})		7.5	20	μS	$I_C = 2 \text{ mA}, V_{CC} = 10 \text{ V}$
	Output Turn - off Time (t_{off})		5.7	20	μS	$R_L = 100 \Omega, T_A = 25^\circ\text{C}$
	Output Rise Time (t_r)		3.2		μS	Fig 1
	Output Fall Time (t_f)		4.7		μS	

Note 1. Measured with input leads shorted together and output leads shorted together.

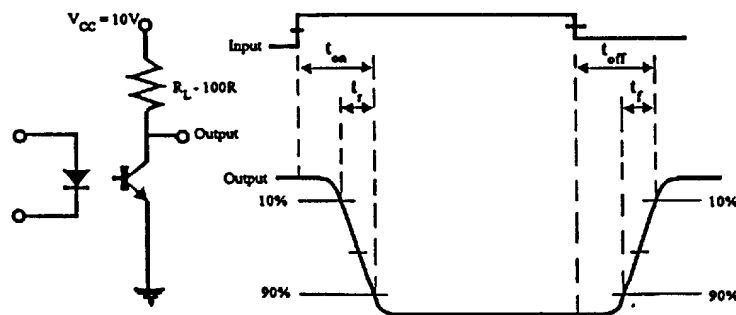


FIG 1