IS-201X, IS-202X, IS-203X,

OPTICALLY COUPLED ISOLATOR TRANSISTOR OUTPUT

DESCRIPTION

The IS201X,IS202X,IS203X 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

0884 V DE

FEATURES

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

Insulation Test Voltage (Partial Discharge Test)
Vpd = 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

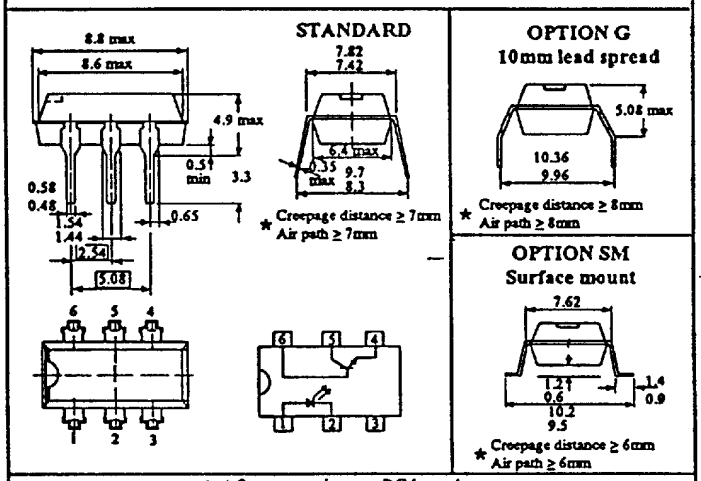
Creeping Current Resistance according to VDE 0303 / IEC 112

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



★ After mounting on PC board

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 ≤300V. Application class I-III at mains voltage ≤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 RelatedApparatus 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.
BS 7002/ 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	3V
Peak Forward Current (p.w. ≤ 100μs, duty ratio 0.001)	1A
Power Dissipation (derate linearly 1.33mW/°C above 25°C)	100mW

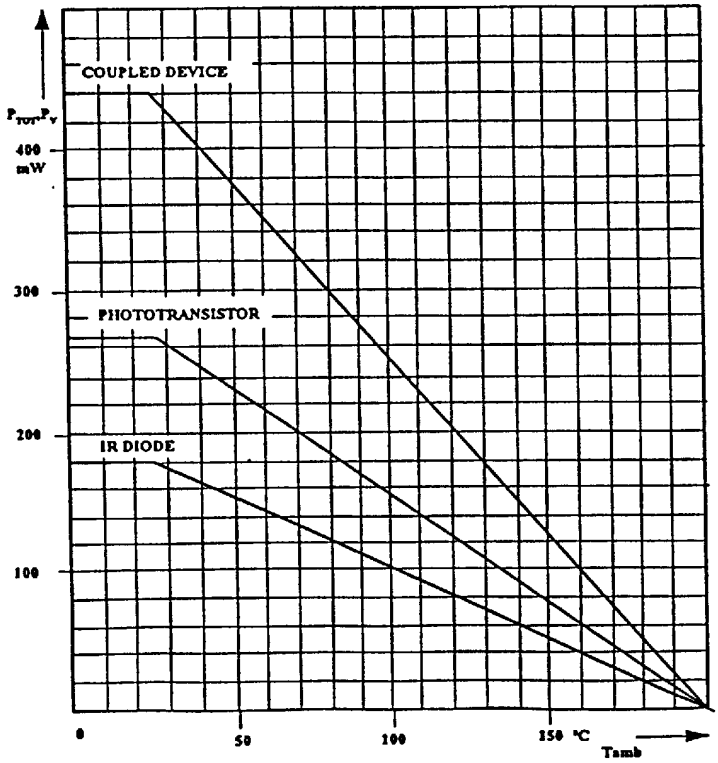
OUTPUT TRANSISTOR

Collector-emitter Voltage BV_{CEO}	30V
Emitter-base Voltage BV_{EBO}	7V
Power Dissipation (derate linearly 2.00mW/°C above 25°C)	150mW

PACKAGE

Total Power Dissipation (derate linearly 2.67 W/°C above 25°C)	200mW

MAXIMUM SAFETY DERATING CURVE



0884 VDE

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.

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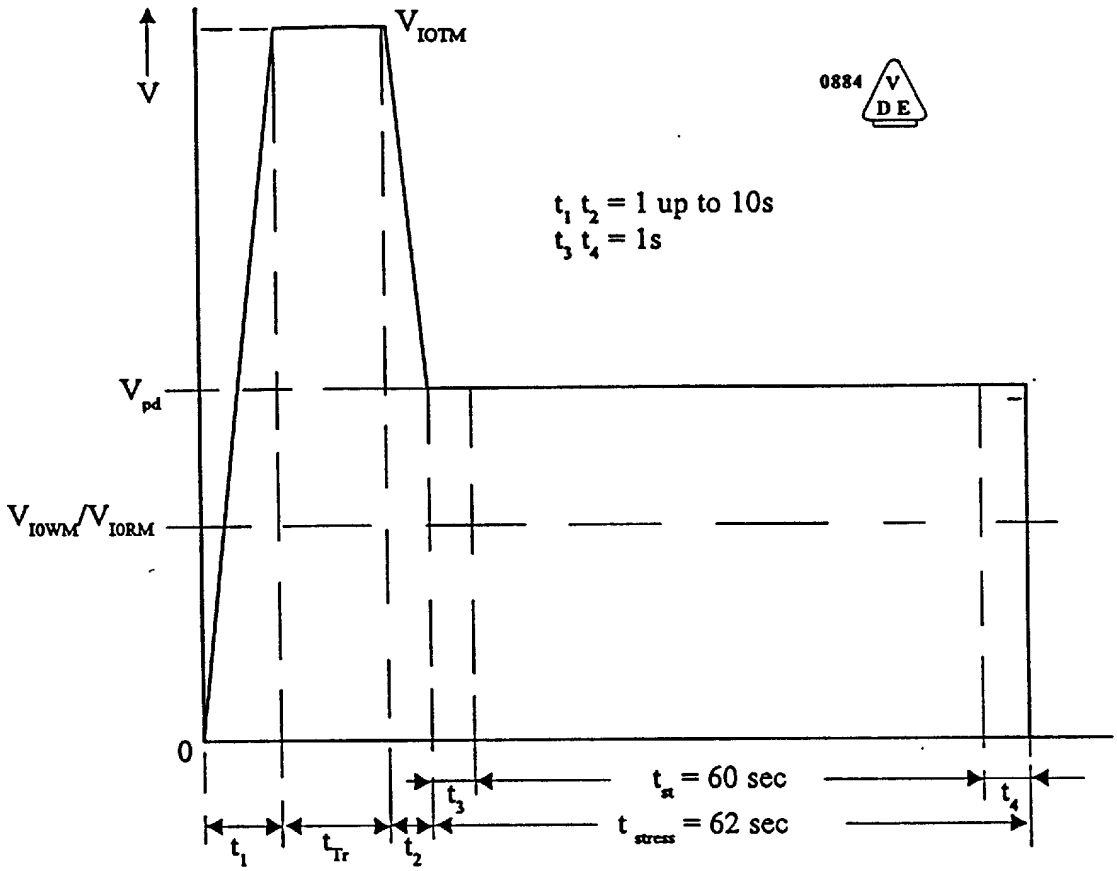
TEST PULSE DIAGRAM FOR SAMPLE TESTS acc. DIN VDE 0884



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_{st} = 60 s see Test Pulse Diagram	V_{IOTM}	6		kV
			V_{pd}	1.05		kV
Insulation Resistance		V_{IO} = 500V, T_{amb} = 25°C	R_{IS}	10^{12}		OHM
		V_{IO} = 500V, T_{amb} = 100°C	R_{IS}	10^{11}		OHM
		V_{IO} = 500V, T_{si} = 200°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 = 20 mA
	Forward Voltage (V_F)		1.0	1.2	Volt	I_F = 1mA
	Reverse Current (I_R)			10	µA	V_R = 3V
Output	HFE	100	200			I_C = 100 µA, V_{CE} = 5 V
	Collector-emitter Voltage (BV_{CEO})	30	50		Volt	I_C = 1mA
	Emitter-collector Voltage (BV_{ECO})	7	9		Volt	I_E = 0.1 mA
	Collector-emitter Dark Current (I_{CEO})			50	nA	V_{CE} = 10 V
Coupled	DC Current Transfer Ratio (CTR) IS-201X	75			%	I_F = 10 mA, V_{CE} = 10V
	DC Current Transfer Ratio (CTR) IS-201X	10			%	I_F = 1 mA, V_{CE} = 10V
	DC Current Transfer Ratio (CTR) IS-202X	125		250	%	I_F = 10 mA, V_{CE} = 10V
	DC Current Transfer Ratio (CTR) IS-202X	30			%	I_F = 1 mA, V_{CE} = 10V
	DC Current Transfer Ratio (CTR) IS-203X	225		450	%	I_F = 10 mA, V_{CE} = 10V
	DC Current Transfer Ratio (CTR) IS-203X	50			%	I_F = 1 mA, V_{CE} = 10V
	Collector-emitter Saturation Voltage V_{CE}(Sat)		0.2	0.4	Volt	I_F = 10 mA, I_C = 2 mA
	Floating Capacitance (C_F)		0.6	10	pf	V = 0 f = 1 mhz
	Input-to-Output Isolation Resistance Riso	10^{11}			ohm	V_{IO} = 500V (see note 1)
	Output Rise Time (t_r)		2.0		µS	I_F = 10mA, V_{CC} = 5V
	Output Turn - on Time (t_{on})		3.0		µS	R_L = 75R,
	Output Fall Time (t_f)		2.0		µS	Fig 1
	Output Turn - off Time (t_{off})		2.5		µS	

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

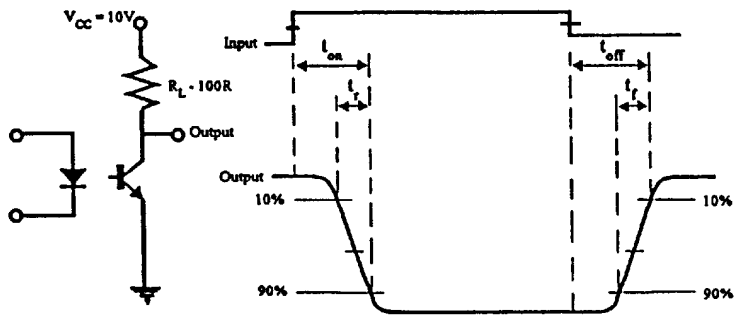


FIG 1