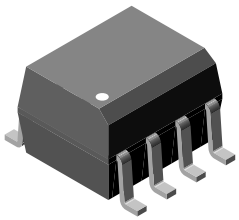
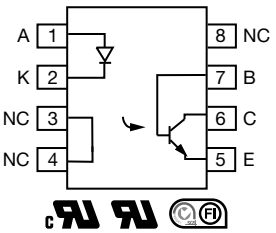
Optocoupler, Phototransistor Output, With Base Connection in SOIC-8 Package, 110 °C Rated





FEATURES

- Operating temperature from -55 °C to +110 °C
- High BV_{CEO}, 70 V
- Isolation test voltage, 4000 V_{RMS}
- Industry standard SOIC-8 surface mountable package
- Compatible with dual wave, vapor phase and IR reflow soldering
- Lead (Pb)-free component
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

LINKS TO ADDITIONAL RESOURCES

Related Documents

DESCRIPTION

The 110 °C 1206AT, 1207AT, 1208AT are optically coupled pairs with a gallium arsenide infrared LED and a silicon NPN phototransistor. Signal information, including a DC level, can be transmitted by the device while maintaining a high degree of electrical isolation between input and output. This family comes in a standard SOIC-8 small outline package for surface mounting which makes them ideally suited for high density application with limited space. In addition to eliminating through-hole requirements, this package conforms to standards for surface mounted devices. A specified minimum and maximum CTR allows a narrow tolerance in the electrical design of the adjacent circuits. The high BV_{CEO} of 70 V gives a higher safety margin compared to the industry standard 30 V.

APPLICATIONS

- AC adapters
- PLCs
- Switch mode power supplies
- DC/DC converters
- Microprocessor I/O interfaces
- General impedance matching circuits

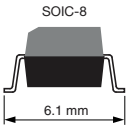
AGENCY APPROVALS

- UL
- cUL
- DIN EN 60747-5-5 (VDE 0884) available with option 1
- FIMKO

ORDERING INFORMATION

I	L	1	2	0	6	A	T

PART NUMBER — TAPE AND REEL



AGENCY CERTIFIED / PACKAGE	CTR (%)		
	1 mA		
UL, cUL, FIMKO	**63 to 125**	**100 to 200**	**160 to 320**
SOIC-8	IL1206AT	IL1207AT	IL1208AT

Note

- Additional options may be possible, please contact sales office

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ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
INPUT				
Continuous forward current		I_F	60	mA
Peak reverse voltage		V_R	6.0	V
Power dissipation		P_{diss}	90	mW
Derate linearly from 25 °C			0.9	mW/°C
OUTPUT				
Collector emitter voltage		V_{CEO}	70	V
Collector current		I_C	50	mA
	t < 1.0 ms	I_C	100	mA
Power dissipation		P_{diss}	150	mW
Derate linearly from 25 °C			1.5	mW/°C
COUPLER				
Isolation test voltage		V_{ISO}	4000	V_{RMS}
Operating temperature		T_{amb}	-55 to +110	°C
Total package dissipation (LED and detector)		P_{tot}	240	mW
Storage temperature		T_{stg}	-55 to +150	°C
Soldering temperature [1]	Max. 10 s, dip soldering distance to seating plane ³ 1.5 mm	T_{sld}	260	°C
Derate linearly from 25 °C			2.4	mW/°C

Notes

- Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability.

(1) Refer to reflow profile for soldering conditions for surface mounted devices (SOP / SOIC)

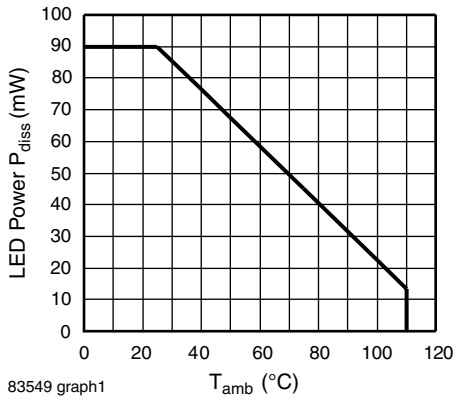


Fig. 1 - Input Power Dissipation (LED) vs. Ambient Temperature

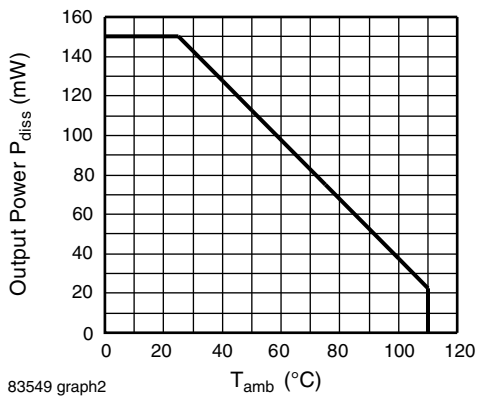


Fig. 2 - Output Power Dissipation vs. Ambient Temperature

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ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
INPUT						
Forward voltage	I_F = 10 mA	V_F	-	1.3	1.5	V
Reverse current	V_R = 6 V	I_R	-	0.1	100	µA
Capacitance	V_R = 0 V	C_I	-	13	-	pF
OUTPUT						
Collector emitter leakage current	V_{CE} = 10 V	I_{CEO}	-	5.0	50	nA
Collector emitter breakdown voltage	I_C = 100 µA	BV_{CEO}	70	-	-	V
Emitter collector breakdown voltage	I_E = 100 µA	BV_{ECO}	7.0	10	-	V
Collector base breakdown current		BV_{CBO}	70	-	-	V
Saturation voltage, collector emitter	I_C = 2 mA, I_F = 10 mA	V_{CEsat}	-	-	0.4	V
COUPLER						
Capacitance (input to output)		C_{IO}	-	0.5	-	pF

Note

- Minimum and maximum values were tested requirements. Typical values are characteristics of the device and are the result of engineering evaluations. Typical values are for information only and are not part of the testing requirements.

CURRENT TRANSFER RATIO (T_{amb} = 25 °C, unless otherwise specified)							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
I_C/I_F	I_F = 10 mA, V_{CE} = 5.0 V	IL1206AT	CTR	63	-	125	%
		IL1207AT	CTR	100	-	200	%
		IL1208AT	CTR	100	-	320	%
	I_F = 1.0 mA, V_{CE} = 5.0 V	IL1206AT	CTR	22	40	-	%
		IL1207AT	CTR	34	60	-	%
		IL1208AT	CTR	56	95	-	%

SWITCHING CHARACTERISTICS						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Turn-on time	I_C = 2 mA, R_L = 100 Ω, V_{CC} = 10 V	t_{on}	-	3.0	-	µs
Turn-off time	I_C = 2 mA, R_L = 100 Ω, V_{CC} = 10 V	t_{off}	-	3.0	-	µs

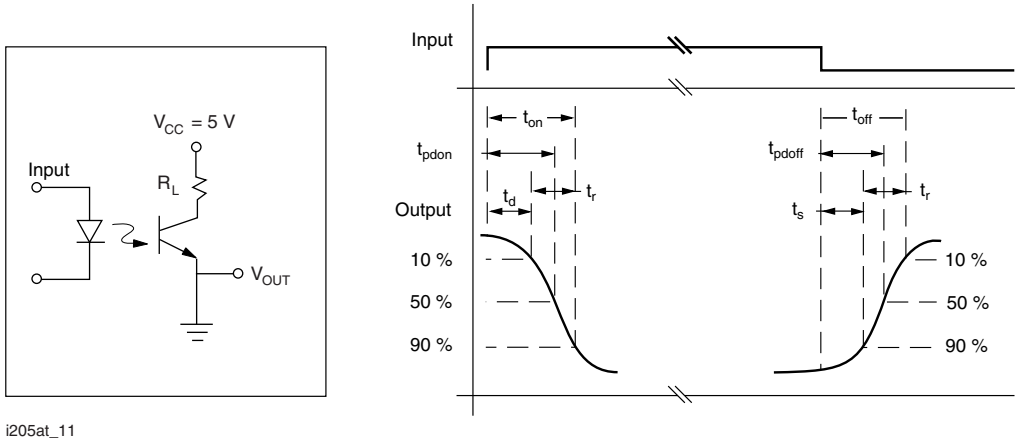


Fig. 1 - Switching Test Circuit

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SAFETY AND INSULATION RATINGS						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Climatic classification	According to IEC 68 part 1		-	55 / 110 / 21	-	
Pollution degree (DIN VDE 0109)			-	2.0	-	
Comparative tracking index		CTI	175	-	399	
V_{IOTM}	DIN IEC 112 / VDE 0303 part 1, group IIIa per DIN VDE 6110 175 399	V_{IOTM}	6000	-	-	V
V_{IORM}		V_{IORM}	560	-	-	V
Resistance (input to output)		R_{IO}	-	10^{12}	-	Ω
P_{SI}			-	-	350	mW
I_{SI}			-	-	150	mA
T_{SI}			-	-	165	°C
Creepage distance			4.0	-	-	mm
Clearance distance			4.0	-	-	mm

Note

- As per IEC 60747-5-2, §7.4.3.8.1, this optocoupler is suitable for “safe electrical insulation” only within the safety ratings. Compliance with the safety ratings shall be ensured by means of protective circuits.

TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

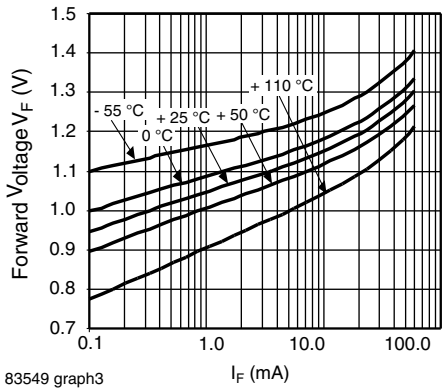


Fig. 2 - Diode Forward Voltage V_F vs. Forward Current

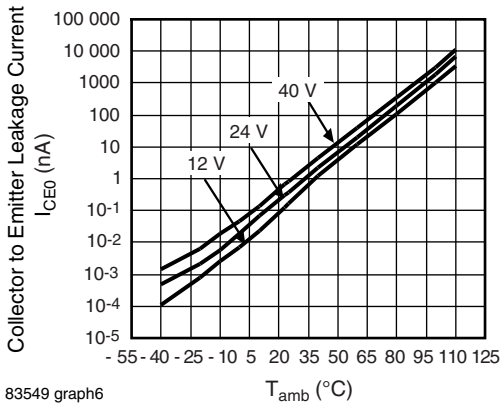


Fig. 4 - Collector to Emitter Current vs. Ambient Temperature

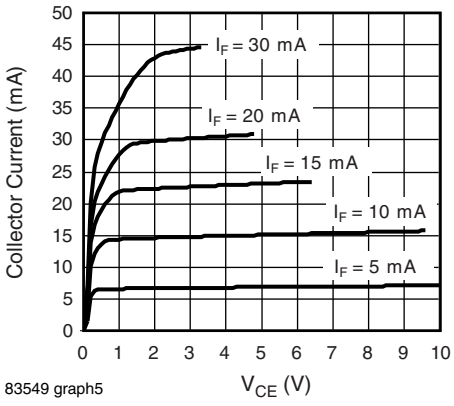


Fig. 3 - I_C (non-saturated) vs. V_{CE}

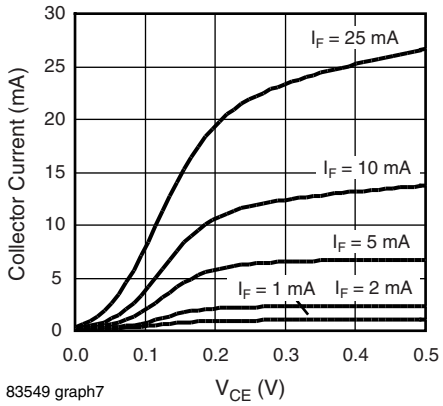


Fig. 5 - I_C (saturated) vs. V_{CE}

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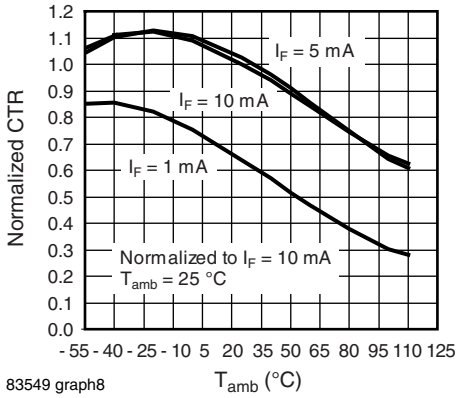


Fig. 6 - CTR Normalized to I_F = 10 mA vs. Ambient Temperature, (Saturated, V_{CE} = 0.4 V)

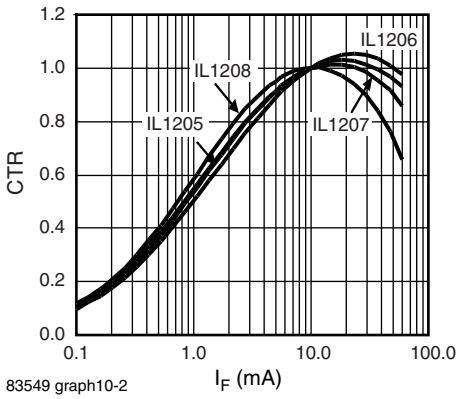


Fig. 9 - CTR vs. I_F, (V_{CE} = 5 V, T_{amb} = 25 °C) Normalized to I_F = 10 mA, T_{amb} = 25 °C

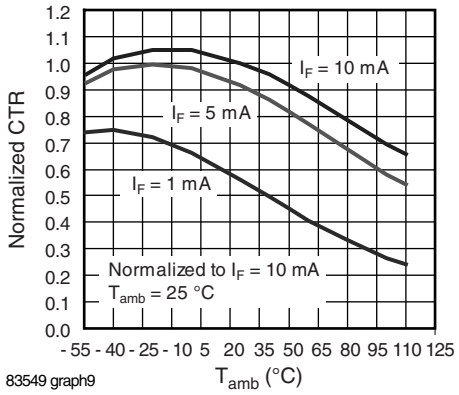


Fig. 7 - CTR Normalized to I_F = 10 mA vs. Ambient Temperature, (Non-Saturated, V_{CE} = 5 V)

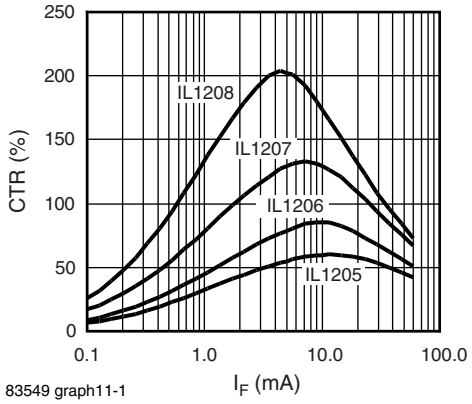


Fig. 10 - CTR vs. I_F Saturated, (V_{CE} = 0.4 V, T_{amb} = 25 °C)

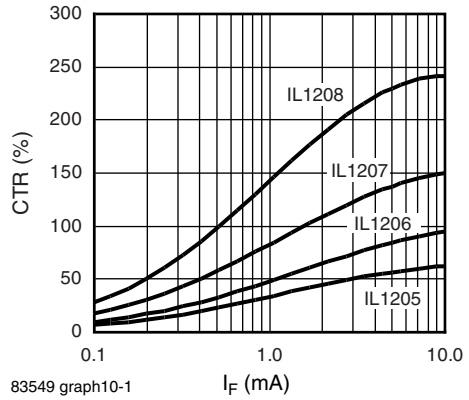


Fig. 8 - CTR vs. I_F, (V_{CE} = 5 V, T_{amb} = 25 °C) (Not Normalized)

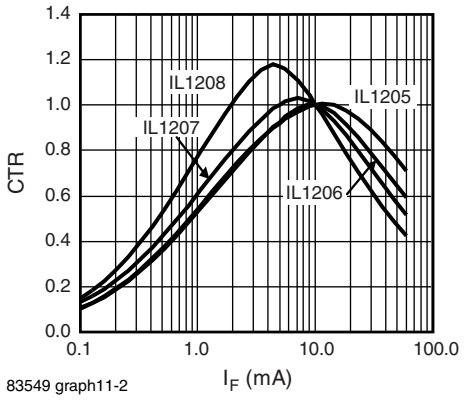


Fig. 11 - CTR vs. I_F Saturated, Normalized to I_F = 10 mA, T_{amb} = 25 °C

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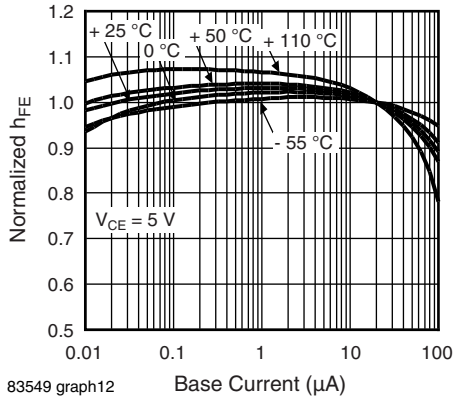


Fig. 12 - Normalized h_{FE} vs. Base Current and T_{amb} (Non-Saturated Condition)

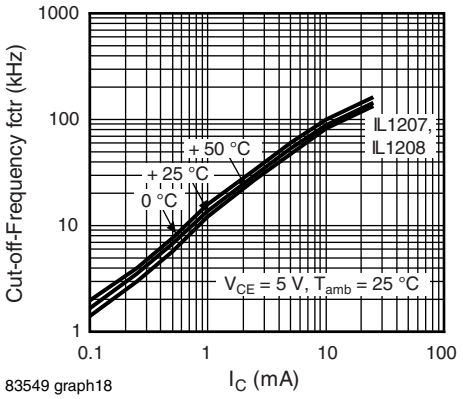


Fig. 15 - Cut-Off-Frequency (- 3 dB) vs. Collector Current

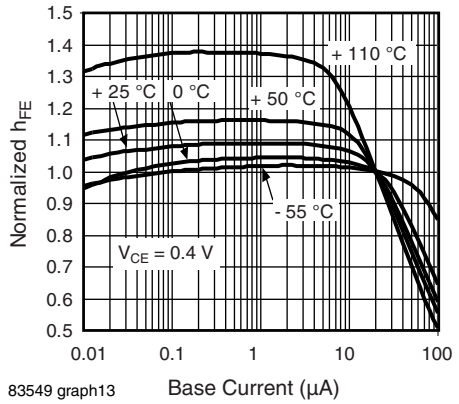


Fig. 13 - Normalized h_{FE} vs. Base Current and T_{amb} (Saturated Condition)

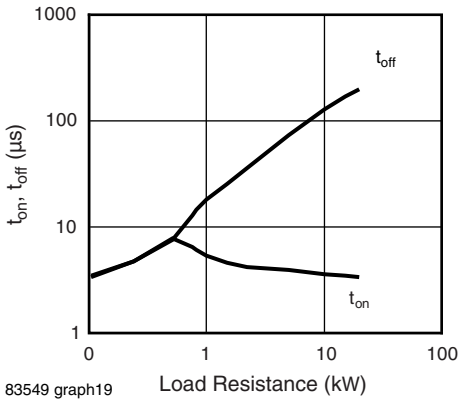


Fig. 16 - Switching Time t_{on}, t_{off} vs. Load Resistance

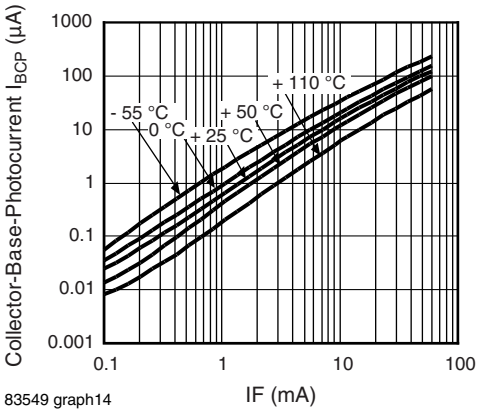


Fig. 14 - Collector Base Photocurrent vs. I_F

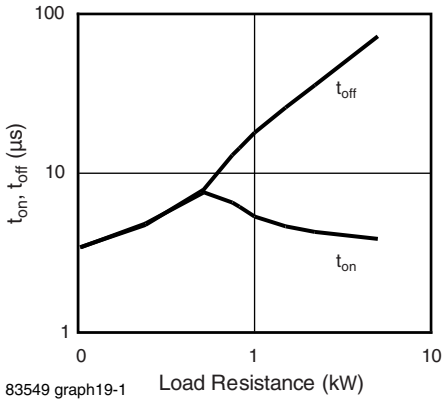


Fig. 17 - Switching Time t_{on}, t_{off} vs. Load Resistance (100 Ω to 5000 Ω)

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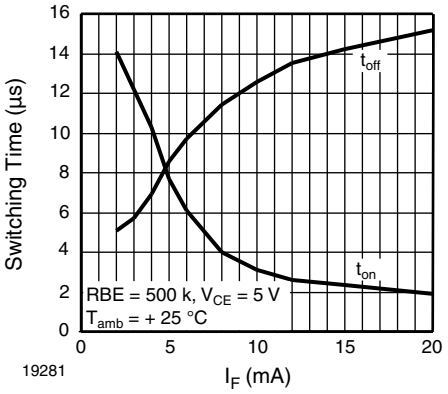


Fig. 18 - Switching Time vs. I_F

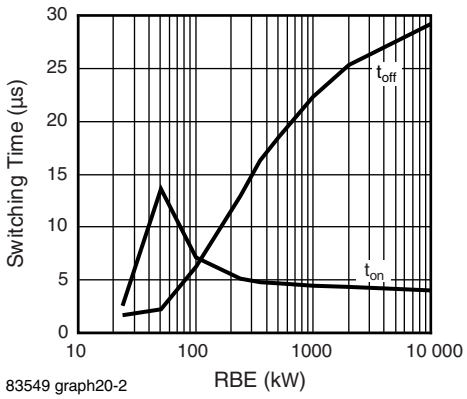
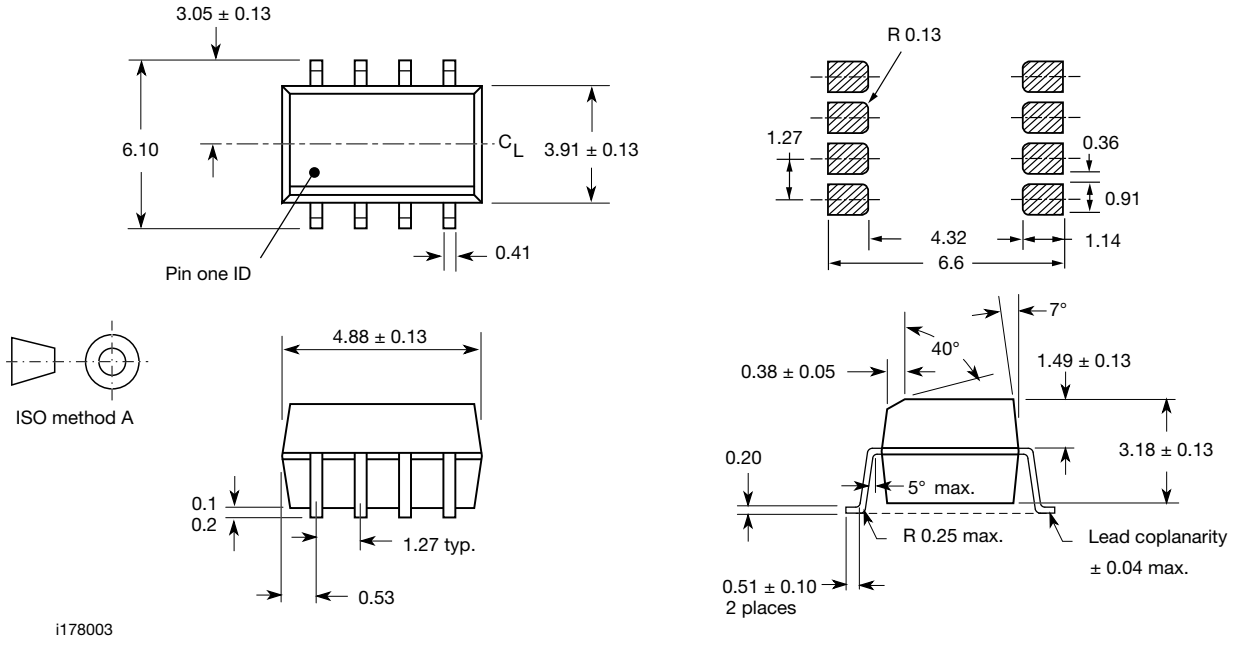


Fig. 19 - Switching Time vs. RBE, I_F = 10 mA

PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING

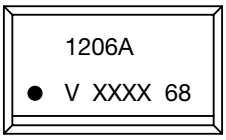


Fig. 20 - Example of IL1206AT

Notes

- XXXX = LMC (lot marking code)
- Tape and reel suffix (T) is not part of the package marking

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