

ISD2, ISQ2



DESCRIPTION

The ISD2 dual channel and ISQ2 quad channel optically coupled isolators consist of an infrared light emitting diode and an NPN silicon photo transistor mounted in a space efficient Dual In Line Plastic Package.

FEATURES

- AC Isolation Voltage 5000V_{RMS}
- CTR 100% to 500% at I_F 10mA V_{CE} 10V
- Wide Operating Temperature Range -40°C to +105°C
- RoHS Compliant
- UL File E91231 Model "FF"

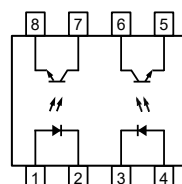
APPLICATIONS

- Programmable Controllers
- Hybrid substrates require high density mounting.

ORDER INFORMATION

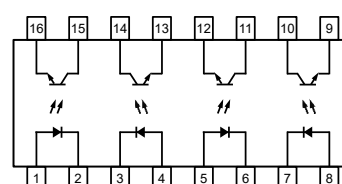
- Add G after PN for 10mm lead spacing
- Add SM after PN for Surface Mount
- Add SMT&R after PN for Surface Mount

ISD2



1, 4 Anode
 2, 3 Cathode
 5, 8 Emitter
 6, 7 Collector

ISQ2



1, 4, 5, 8 Anode
 2, 3, 6, 7 Cathode
 9, 12, 13, 16 Emitter
 10, 11, 14, 15 Collector

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Stresses exceeding the absolute maximum ratings can cause permanent damage to the device. Exposure to absolute maximum ratings for long periods of time can adversely affect reliability.

Input

Forward Current	50mA
Pulse Forward Current (Pulse 100µs Frequency 100Hz)	1A
Reverse Voltage	6V
Power Dissipation	70mW

Output

Collector to Emitter Voltage V _{CEO}	70V
Emitter to Collector Voltage V _{ECO}	6V
Collector Current	50mA
Power Dissipation	150mW

Total Package

Isolation Voltage	5000V _{RMS}
Total Power Dissipation	200mW
Operating Temperature	-40 to +105°C
Storage Temperature	-55 to +125°C
Junction Temperature	125°C
Lead Soldering Temperature (10s)	260°C

ISOCOM COMPONENTS 2004 LTD

Unit 25B, Park View Road West, Park View Industrial Estate
 Hartlepool, Cleveland, TS25 1PE, United Kingdom
 Tel : +44 (0)1429 863 609 Fax : +44 (0)1429 863 581
 e-mail : sales@isocom.co.uk
<http://www.isocom.com>

ISOCOM COMPONENTS ASIA LTD

Hong Kong Office
 Block A, 8/F, Wah Hing Industrial Mansion
 36 Tai Yau Street, San Po Kong, Kowloon, Hong Kong
 Tel : +852 2995 9217 Fax : +852 8161 6292
 e-mail : sales@isocom.com.hk

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ELECTRICAL CHARACTERISTICS (Ambient Temperature = 25°C unless otherwise specified)

INPUT

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Forward Voltage	V_F	$I_F = 20\text{mA}$		1.2	1.4	V
Reverse Current	I_R	$V_R = 4\text{V}$			10	μA
Terminal Capacitance	C_t	$V = 0\text{V}, f = 1\text{KHz}$		30	250	pF

OUTPUT

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector-Emitter Breakdown Voltage	BV_{CEO}	$I_C = 1\text{mA}$	70			V
Emitter-Collector Breakdown Voltage	BV_{ECO}	$I_E = 10\mu\text{A}$	6			V
Collector-Emitter Dark Current	I_{CEO}	$V_{CE} = 20\text{V}$			100	nA

COUPLED

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Current Transfer Ratio	CTR	$I_F = 10\text{mA}, V_{CE} = 10\text{V}$	100		500	%
	Saturated CTR	$I_F = 10\text{mA}, V_{CE} = 0.4\text{V}$		170		
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_F = 20\text{mA}, I_C = 1\text{mA}$		0.1	0.2	V
Floating Capacitance	C_f	$V = 0\text{V}, f = 1\text{MHz}$		0.6	1	pF
Cut-Off Frequency	f_c	$V_{CE} = 5\text{V}, I_C = 2\text{mA}$ $R_L = 100\Omega$ -3dB		80		kHz
Output Rise Time	t_r	$V_{CE} = 2\text{V}$ $I_C = 2\text{mA}$ $R_L = 100\Omega$		4	18	μs
Output Fall Time	t_f			3	18	

ISOLATION

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Input to Output Isolation Voltage	V_{ISO}	AC 1 minute, RH = 40% to 60% Note 1	5000			V_{RMS}
Input to Output Isolation Resistance	R_{ISO}	$V_{IO} = 500\text{V}$, RH = 40% to 60% Note 1	5×10^{10}	1×10^{11}		Ω

Note 1 : Measure with input leads shorted together and output leads shorted together.



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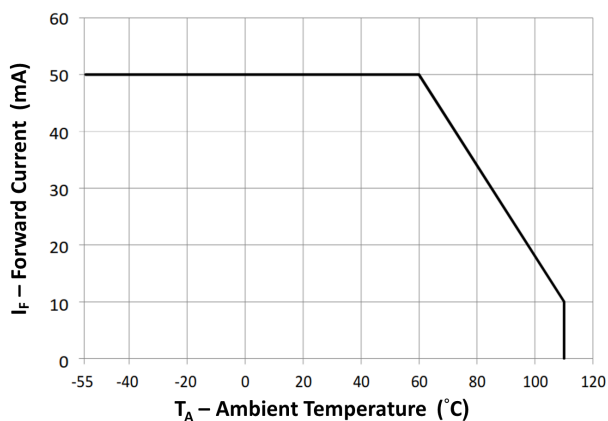


Fig 1 Forward Current vs Ambient Temperature

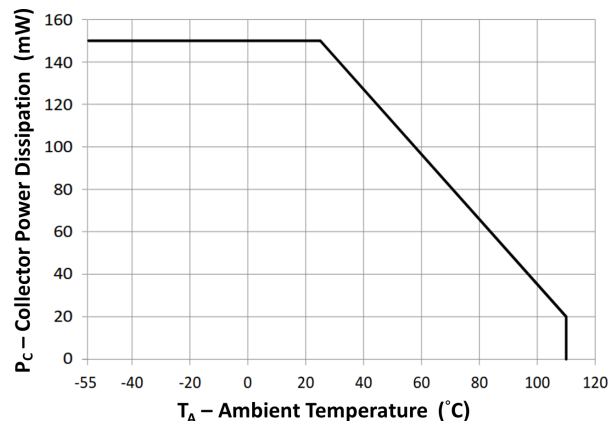


Fig 2 Collector Power Dissipation vs Ambient Temperature

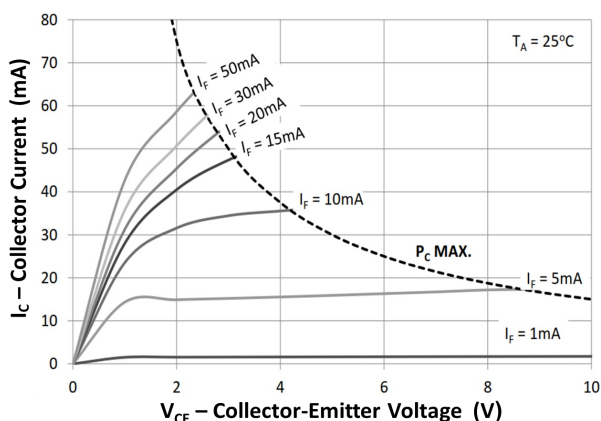


Fig 3 Collector Current vs Collector-Emitter Voltage (1)

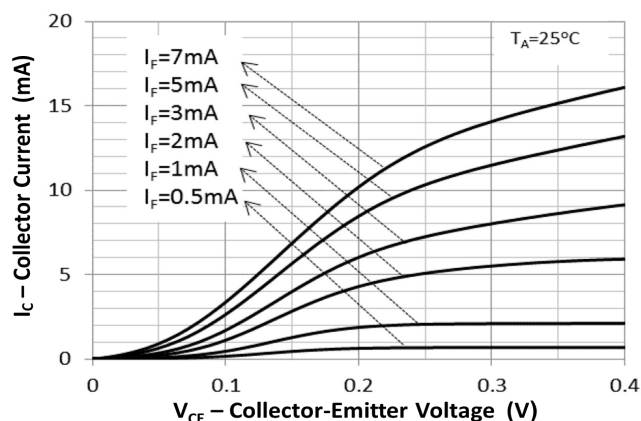


Fig 4 Collector Current vs Collector-Emitter Voltage (2)

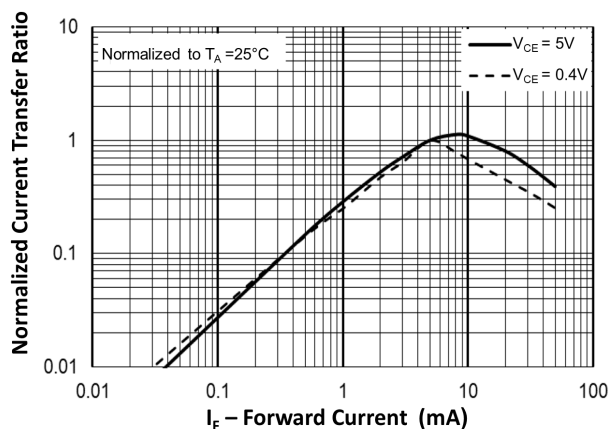


Fig 5 Current Transfer Ratio vs Forward Current

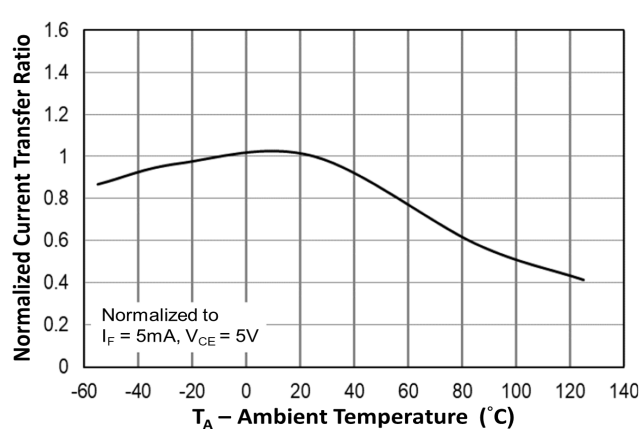


Fig 6 Normalized Current Transfer Ratio vs Ambient Temperature



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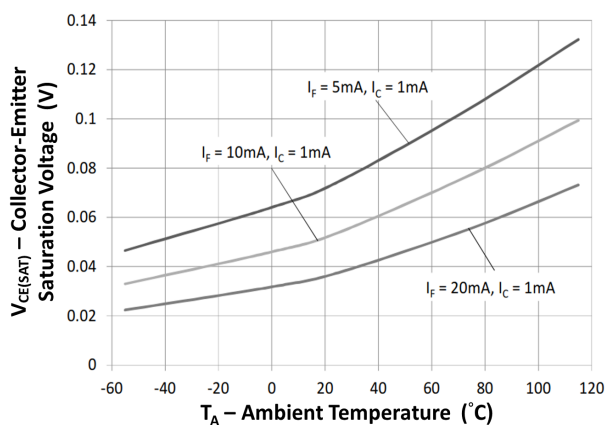


Fig 7 Collector-Emitter Saturation Voltage vs Ambient Temperature

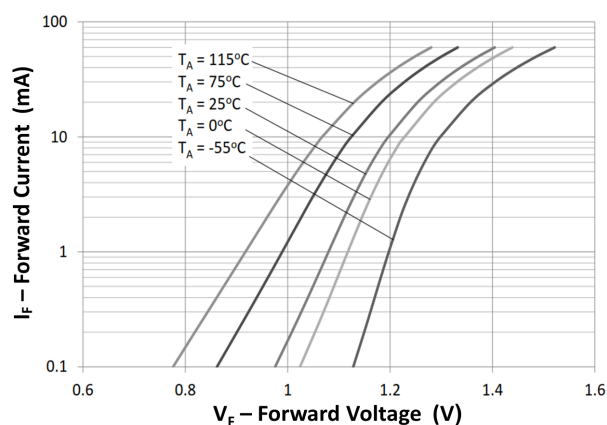


Fig 8 Forward Current vs Forward Voltage

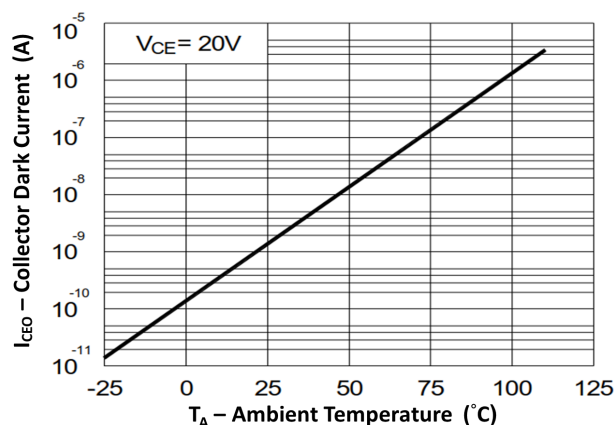


Fig 9 Collector Dark Current vs Ambient Temperature

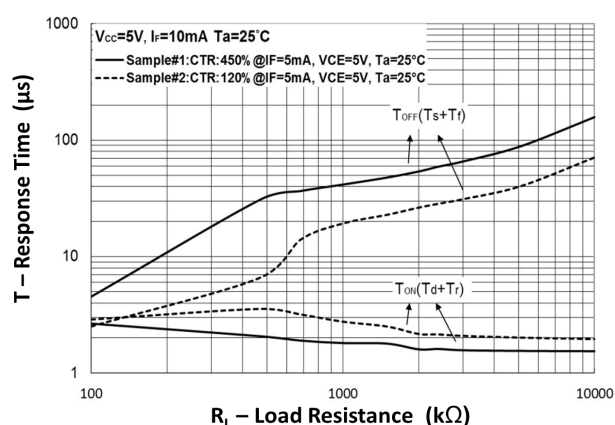


Fig 10 Response Time vs Load Resistance

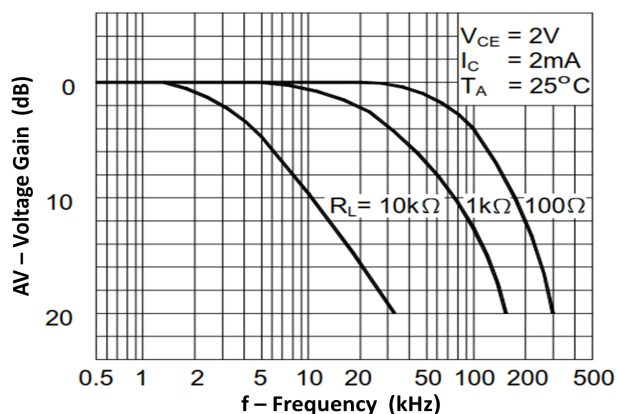
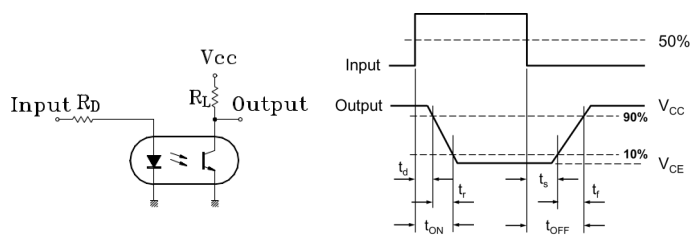
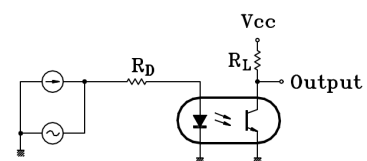


Fig 11 Frequency Response



Response Time Test Circuit



Frequency Response Test Circuit

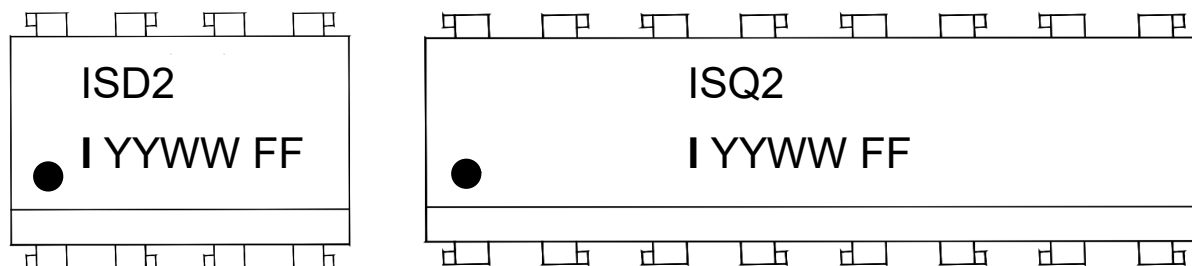
ISD2, ISQ2

ORDER INFORMATION

ISD2 (UL Approval)			
After PN	PN	Description	Packing quantity
None	ISD2	Standard DIP8	50 pcs per tube
G	ISD2G	10mm Lead Spacing	50 pcs per tube
SM	ISD2SM	Surface Mount	50 pcs per tube
SMT&R	ISD2SMT&R	Surface Mount Tape & Reel	1000 pcs per reel

ISQ2 (UL Approval)			
After PN	PN	Description	Packing quantity
None	ISQ2	Standard DIP16	25pcs per tube
G	ISQ2G	10mm Lead Spacing	25 pcs per tube
SM	ISQ2SM	Surface Mount	25 pcs per tube
SMT&R	ISQ2SMT&R	Surface Mount Tape & Reel	750 pcs per reel

DEVICE MARKING



ISD2 / ISQ2	Device Part Number
I	Isocom
YY	Year code
WW	Week code
FF	UL Model

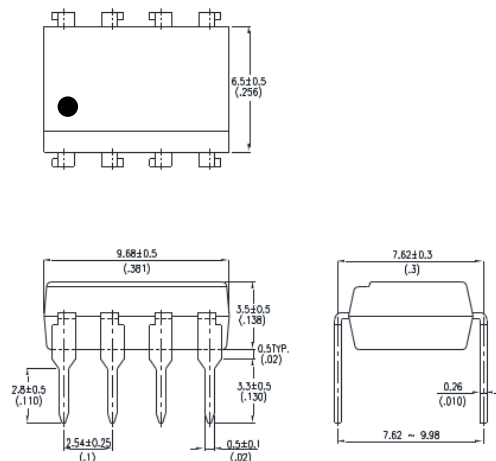


ISD2, ISQ2

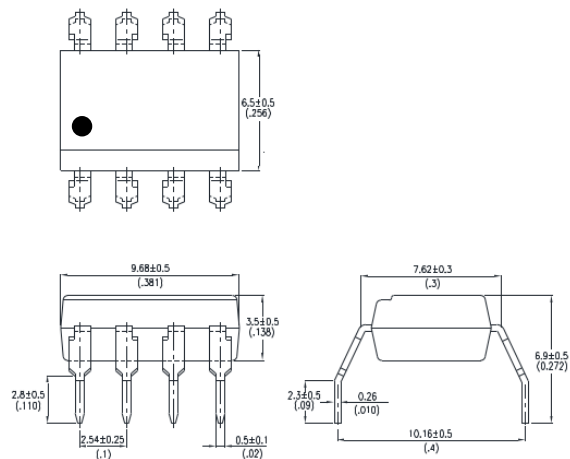
PACKAGE DIMENSIONS in mm (inch)

ISD2

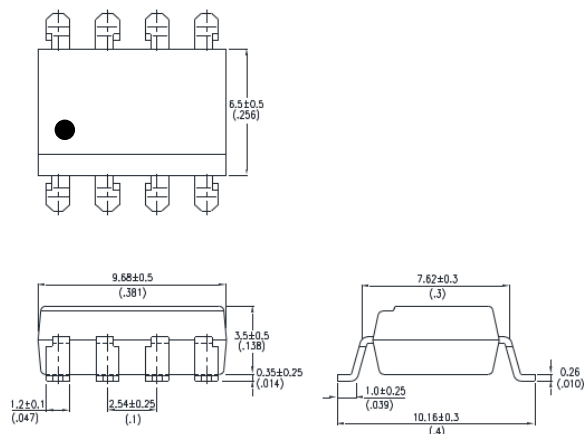
ISD2



ISD2G



ISD2SM



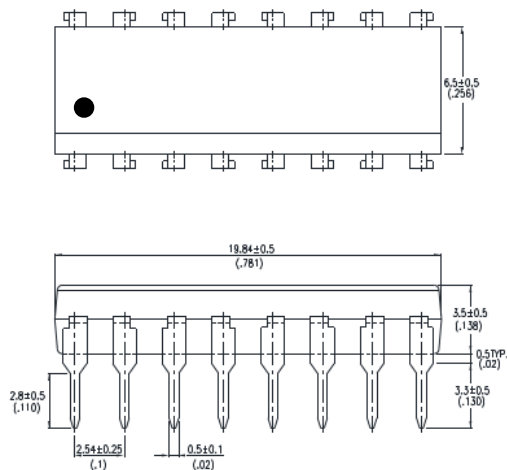


ISD2, ISQ2

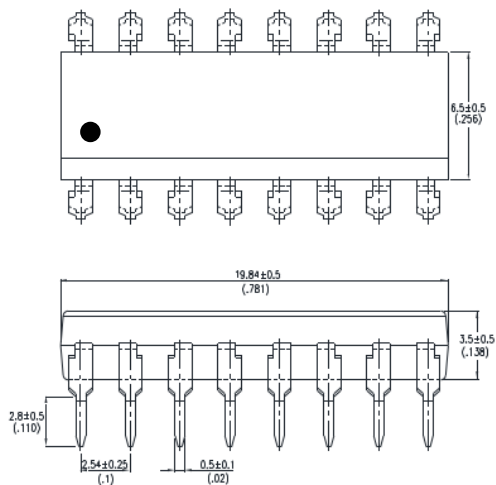
PACKAGE DIMENSIONS in mm (inch)

ISQ2

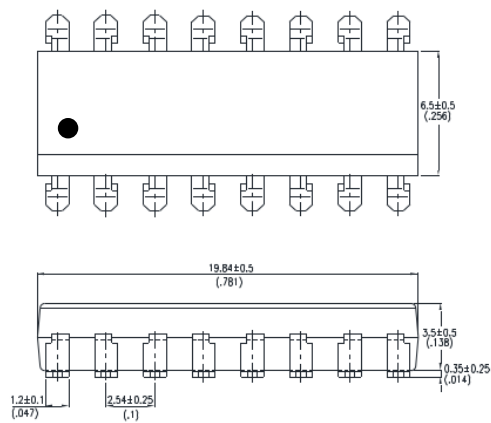
ISQ2



ISQ2G



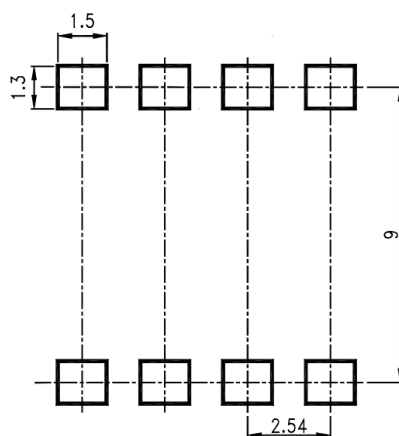
ISQ2SM



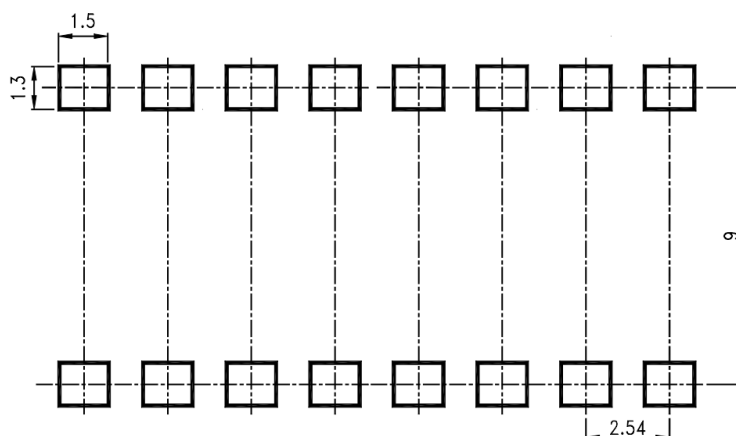
ISD2, ISQ2

RECOMMENDED PAD LAYOUT FOR SMD (mm)

ISD2SM



ISQ2SM

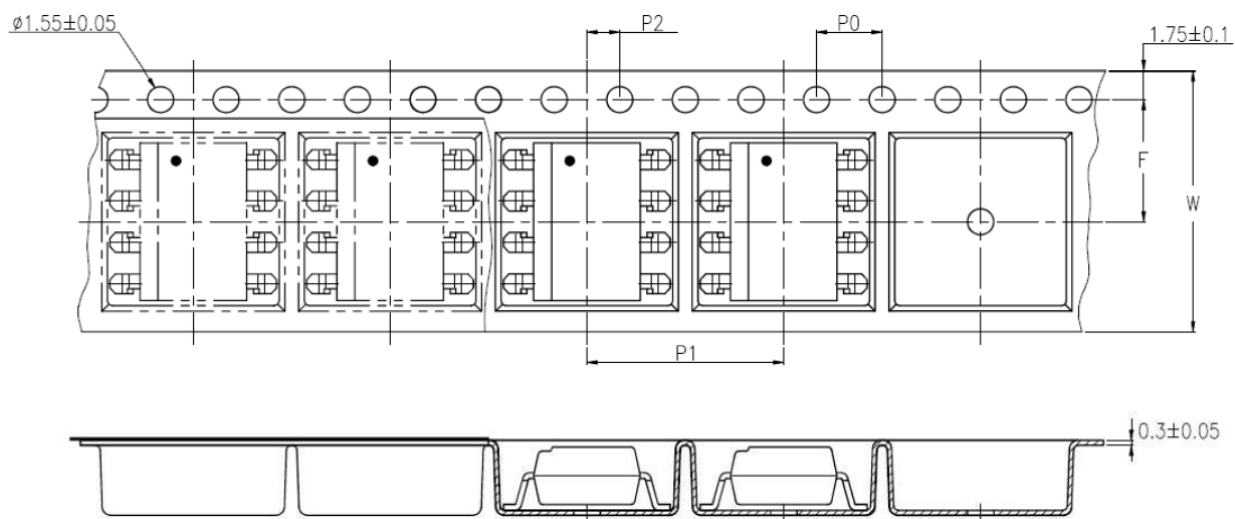




ISD2, ISQ2

TAPE AND REEL PACKAGING

ISD2SMT&R



Description	Symbol	Dimension mm (inch)
Tape Width	W	16 ± 0.3 (0.63)
Pitch of Sprocket Holes	P_0	4 ± 0.1 (0.15)
Distance of Compartment to Sprocket Holes	F	7.5 ± 0.1 (0.295)
	P_2	2 ± 0.1 (0.079)
Distance of Compartment to Compartment	P_1	12 ± 0.1 (0.472)

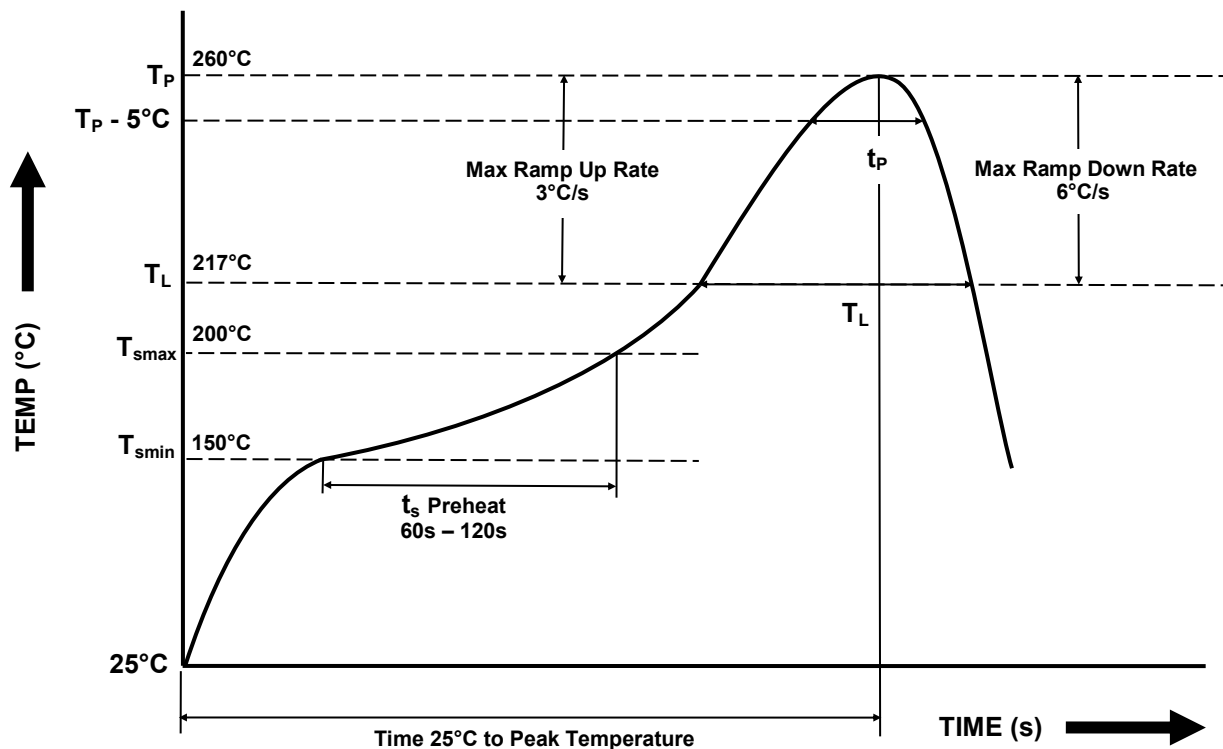


ISD2, ISQ2

IR REFLOW SOLDERING TEMPERATURE PROFILE FOR SMD

One Time Reflow Soldering is Recommended.

Do not immerse device body in solder paste.



Profile Details	Conditions
Preheat - Min Temperature (T_{SMIN}) - Max Temperature (T_{SMAX}) - Time T_{SMIN} to T_{SMAX} (t_s)	150°C 200°C 60s - 120s
Soldering Zone - Peak Temperature (T_P) - Time at Peak Temperature - Liquidous Temperature (T_L) - Time within 5°C of Actual Peak Temperature (T_P - 5°C) - Time maintained above T_L (t_L) - Ramp Up Rate (T_L to T_P) - Ramp Down Rate (T_P to T_L)	260°C 10s max 217°C 30s max 60s - 100s 3°C/s max 6°C/s max
Average Ramp Up Rate (T _{smax} to T _P)	3°C/s max
Time 25°C to Peak Temperature	8 minutes max

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