ISD20x, ISQ20x

DESCRIPTION

The ISD20x dual channel series and ISQ20x quad channel series 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}
- BV_{CEO} 70V min
- Wide Operating Temperature Range −40°C to +105°C
- RoHS Compliant
- UL File E91231 Model “FF”
- VDE Approval 40028086

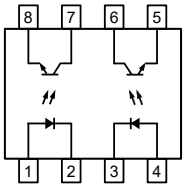
APPLICATIONS

- Programmable Controllers
- Hybrid substrates require high density mounting.

ORDER INFORMATION

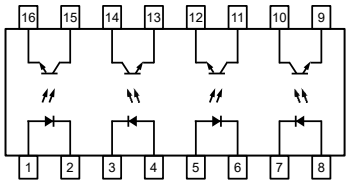
- Add Suffix “X” for VDE Approval
- Add G after PN for 10mm lead spacing
- Add SM after PN for Surface Mount
- Add SMT&R after PN for Surface Mount

ISD20x



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

ISQ20x



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 adversly 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

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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 = 20mA		1.2	1.4	V
Reverse Current	I_R	V_R = 4V			10	µA
Terminal Capacitance	C_t	V = 0V, f = 1KHz		30	250	pF

OUTPUT

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

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

COUPLED

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Current Transfer Ratio	CTR	I_F = 10mA, V_{CE} = 10V				%
		ISD201, ISQ201	75			
		ISD202, ISQ202	125		250	
		ISD203, ISQ203	225		450	
		ISD204, ISQ204	200		400	
		I_F = 1mA, V_{CE} = 10V				
		ISD201, ISQ201	10			
		ISD202, ISQ202	30			
		ISD203, ISQ203	50			
		ISD204, ISQ204	100			
Collector−Emitter Saturation Voltage	$V_{CE(sat)}$	I_F = 20mA, I_C = 1mA		0.1	0.2	V
Floating Capacitance	C_f	V = 0V, f = 1MHz		0.6	1	pF
Cut-Off Frequency	fc	V_{CE} = 5V, I_C = 2mA R_L = 100Ω -3dB		80		kHz
Output Rise Time	t_r	V_{CE} = 2V Ic = 2mA R_L = 100Ω		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}= 500V, RH = 40% to 60% Note 1	$5x10^{10}$	$1x10^{11}$		Ω

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

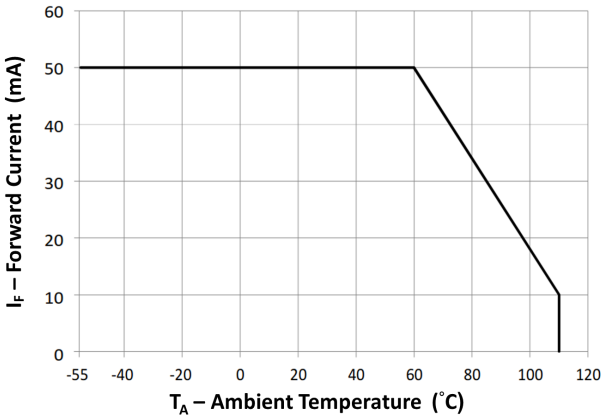


Fig 1 Forward Current vs Ambient Temperature

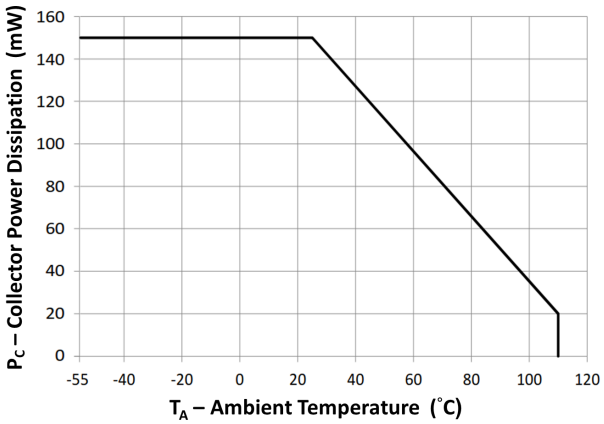


Fig 2 Collector Power Dissipation vs Ambient Temperature

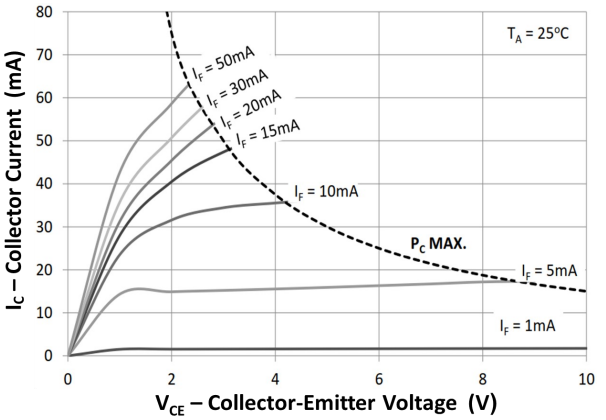


Fig 3 Collector Current vs Collector-Emitter Voltage (1)

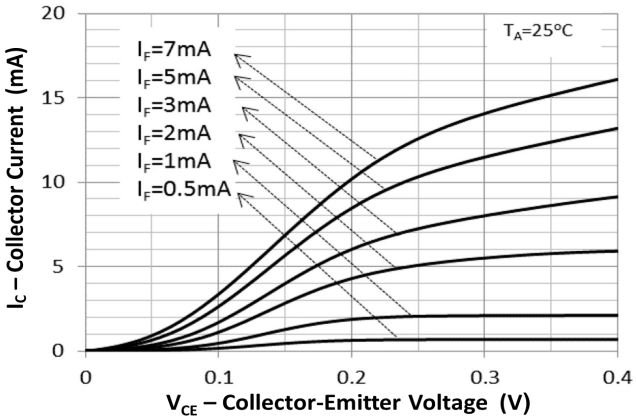


Fig 4 Collector Current vs Collector-Emitter Voltage (2)

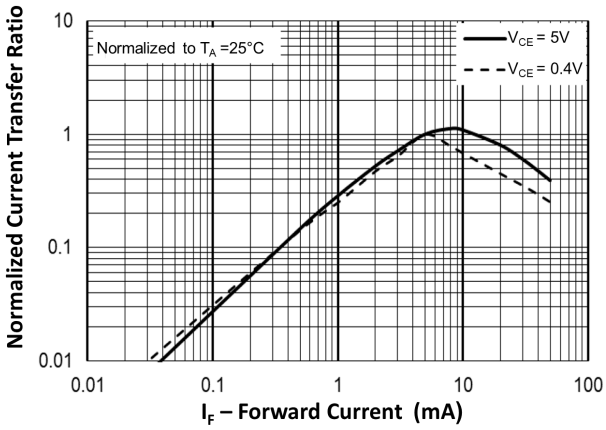


Fig 5 Current Transfer Ratio vs Forward Current

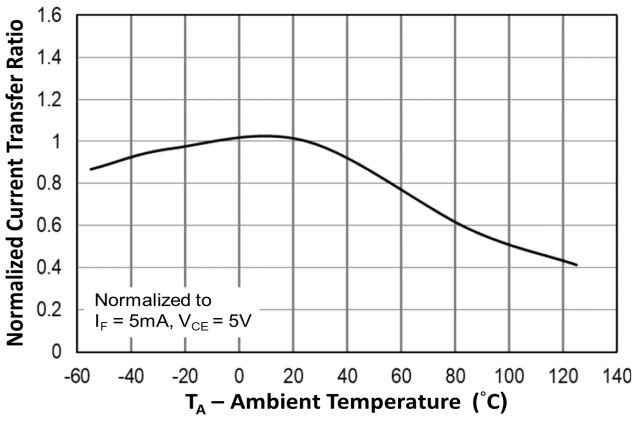


Fig 6 Normalized Current Transfer Ratio vs Ambient Temperature

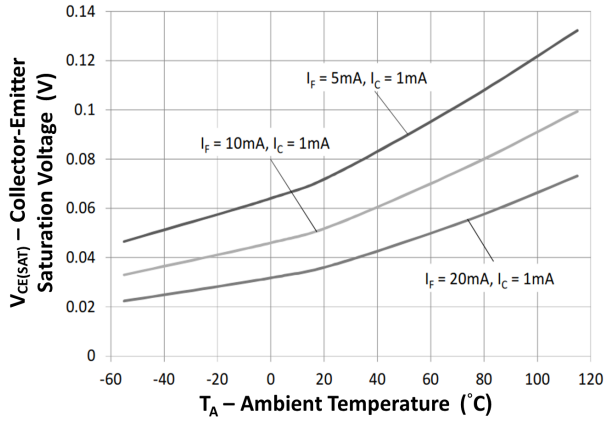


Fig 7 Collector-Emitter Saturation Voltage vs Ambient Temperature

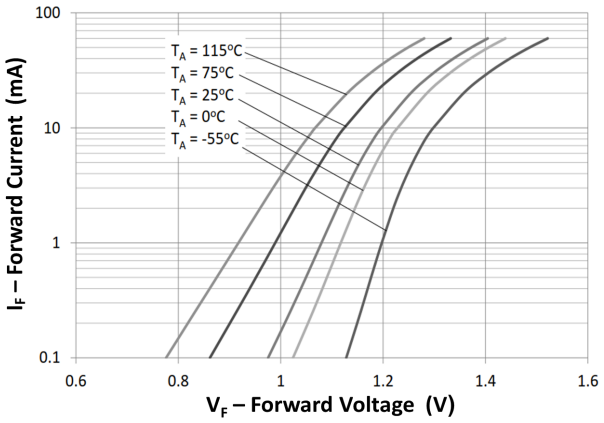


Fig 8 Forward Current vs Forward Voltage

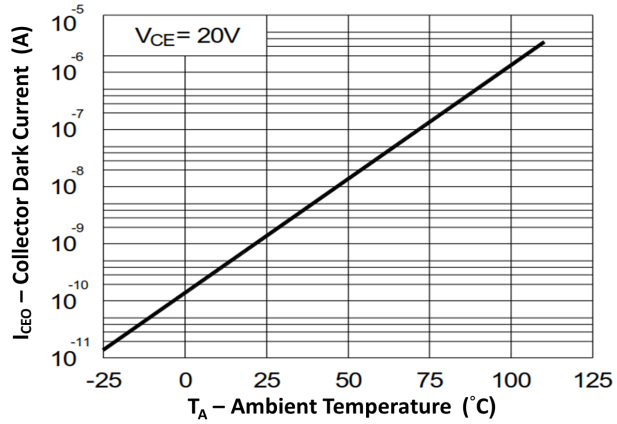


Fig 9 Collector Dark Current vs Ambient Temperature

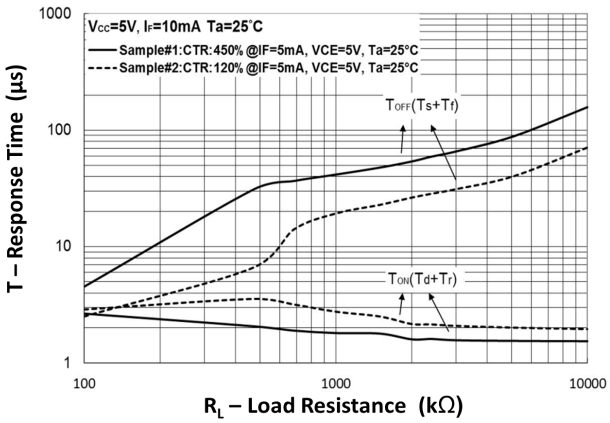


Fig 10 Response Time vs Load Resistance

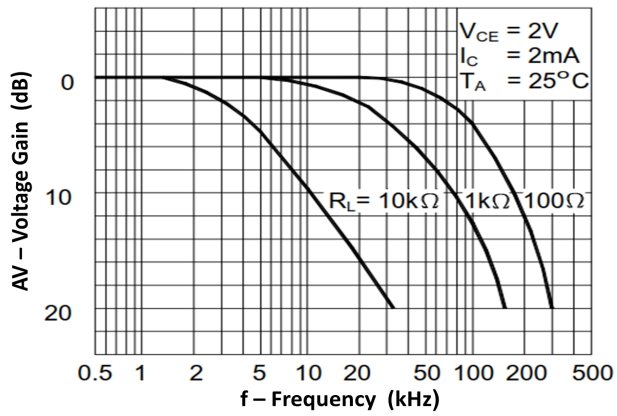
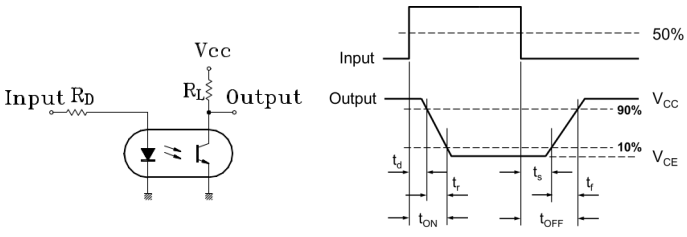
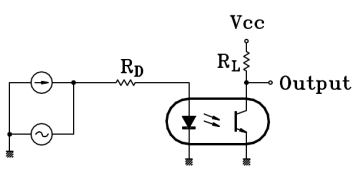


Fig 11 Frequency Response



Response Time Test Circuit



Frequency Response Test Circuit

ORDER INFORMATION

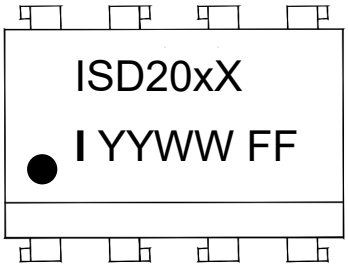
ISDx Series (UL Approval)			
After PN	**PN**	**Description**	**Packing quantity**
None	ISD201, ISD202, ISD203, ISD204	Standard DIP8	50 pcs per tube
G	ISD201G, ISD202G, ISD203G, ISD204G	10mm Lead Spacing	50 pcs per tube
SM	ISD201SM, ISD202SM ISD203SM, ISD204SM	Surface Mount	50 pcs per tube
SMT&R	ISD201SMT&R, ISD202SMT&R ISD203SMT&R, ISD204SMT&R	Surface Mount Tape & Reel	1000 pcs per reel

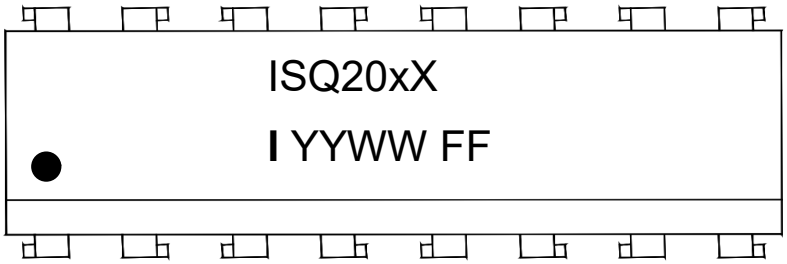
ISD20x Series (UL and VDE Approvals)			
After PN	**PN**	**Description**	**Packing quantity**
None	ISD201X, ISD202X, ISD203X, ISD204X	Standard DIP8	50 pcs per tube
G	ISD201XG, ISD202XG ISD203XG, ISD204XG	10mm Lead Spacing	50 pcs per tube
SM	ISD201XSM, ISD202XSM ISD203XSM, ISD204XSM	Surface Mount	50 pcs per tube
SMT&R	ISD201XSMT&R, ISD202SMXT&R ISD203XSMT&R, ISD204XSMT&R	Surface Mount Tape & Reel	1000 pcs per reel

ISQ20x Series (UL Approval)			
After PN	**PN**	**Description**	**Packing quantity**
None	ISQ201, ISQ202, ISQ203, ISQ204	Standard DIP8	25pcs per tube
G	ISQ201G, ISQ202G, ISQ203G, ISQ204G	10mm Lead Spacing	25 pcs per tube
SM	ISQ201SM, ISQ202SM ISQ203SM, ISQ204SM	Surface Mount	25 pcs per tube

ISQ20X Series (UL and VDE Approvals)			
After PN	**PN**	**Description**	**Packing quantity**
None	ISQ201X, ISQ202X, ISQ203X, ISQ204X	Standard DIP8	25pcs per tube
G	ISQ201XG, ISQ202XG ISQ203XG, ISQ204XG	10mm Lead Spacing	25 pcs per tube
SM	ISQ201XSM, ISQ202XSM ISQ203XSM, ISQ204XSM	Surface Mount	25 pcs per tube

DEVICE MARKING



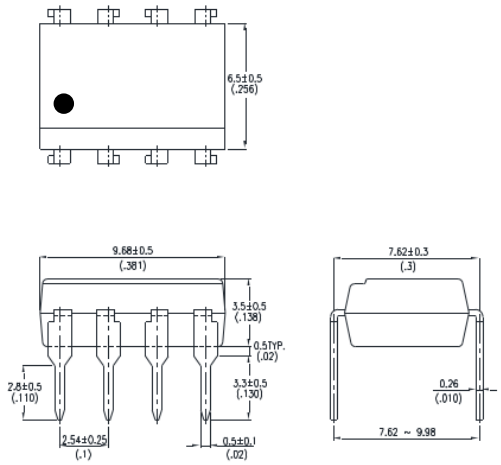


ISD20x / ISQ20x	Device Part Number where x is “1”, “2” “3” or “4”
X	VDE version
I	Isocom
YY	Year code
WW	Week code
FF	UL Model

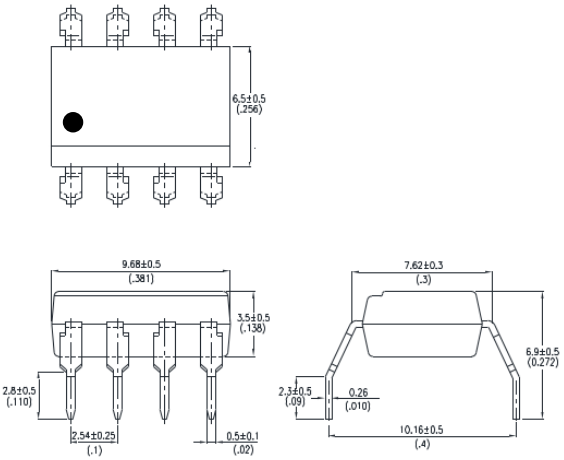
PACKAGE DIMENSIONS in mm (inch)

ISD20x

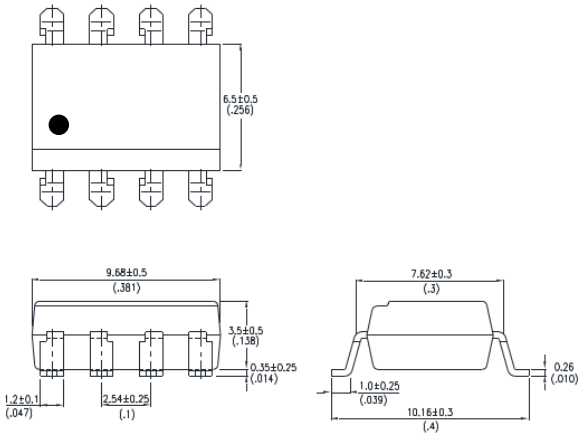
DIP



G Form



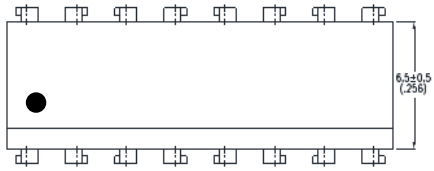
SMD

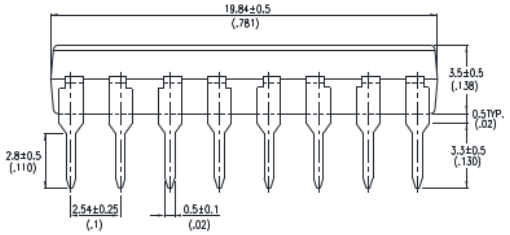


PACKAGE DIMENSIONS in mm (inch)

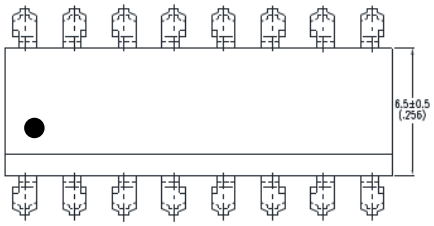
ISQ20x

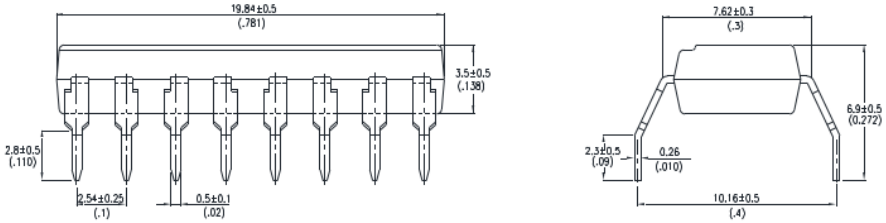
DIP



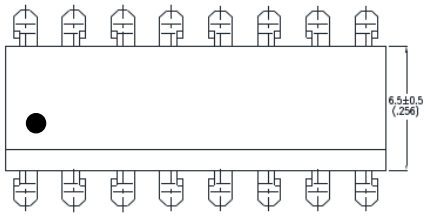


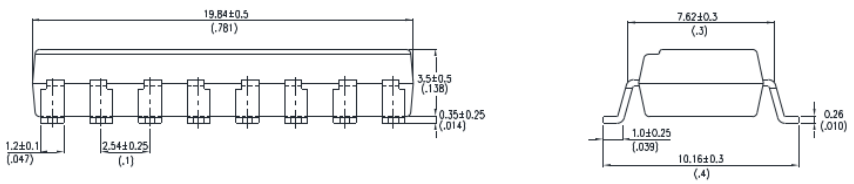
G Form





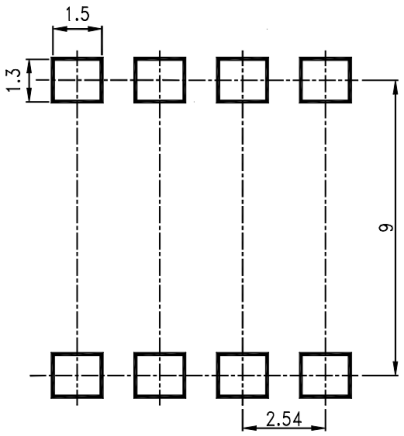
SMD



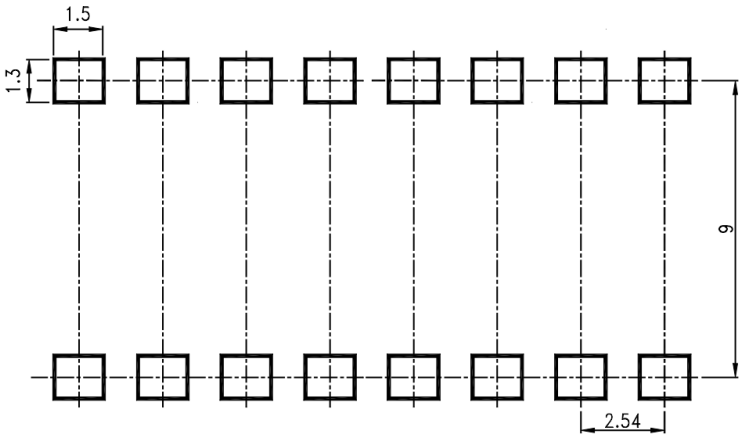


RECOMMENDED PAD LAYOUT FOR SMD (mm)

ISD20xSM

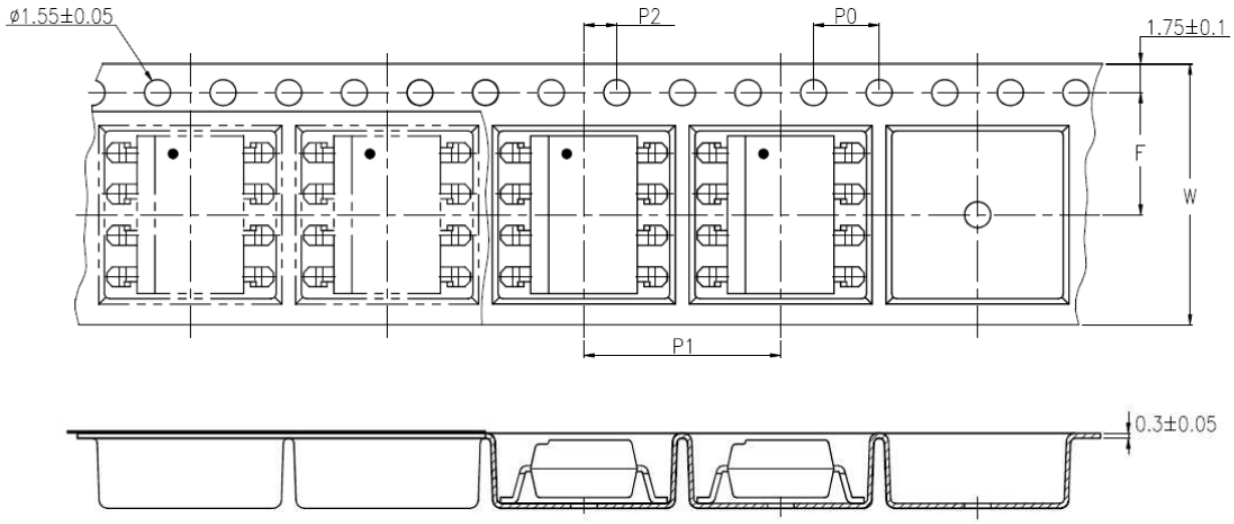


ISQ20xSM



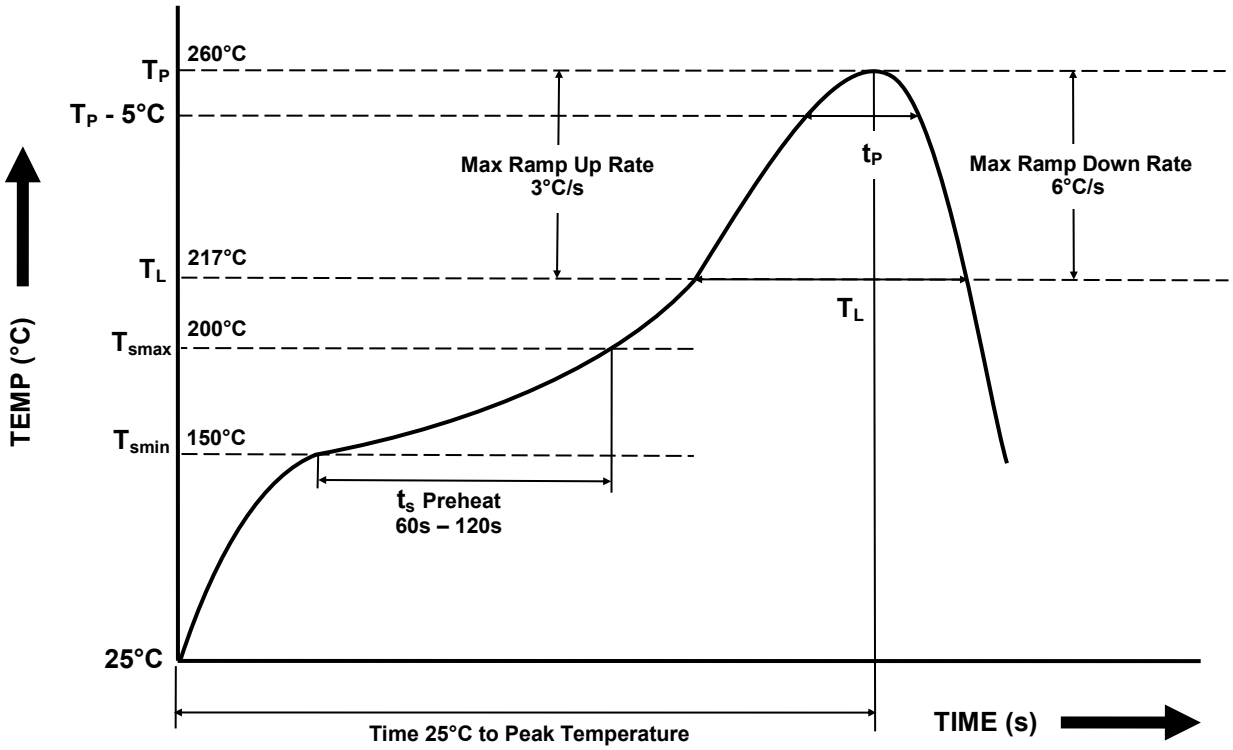
TAPE AND REEL PACKAGING

ISD20xSMT&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)

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

ISOCOM COMPONENTS

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