

DESCRIPTION:

The JOC816X1 photocoupler consist of an infrared light-emitting diode and a phototransistor. The devices can realize electrical isolation and signal transmission between different circuits. The products are widely used in electric energy meter, etc.

MAIN FEATURES

Current transfer ratio (CTR: 80%-600% @ $I_F=5\text{mA}$, $V_{CE}=5\text{V}$)

High isolation voltage between input and output

($V_{iso}=5,000\text{Vrms}$)

Creepage distance > 7.62mm

Operating temperature up to +110°C

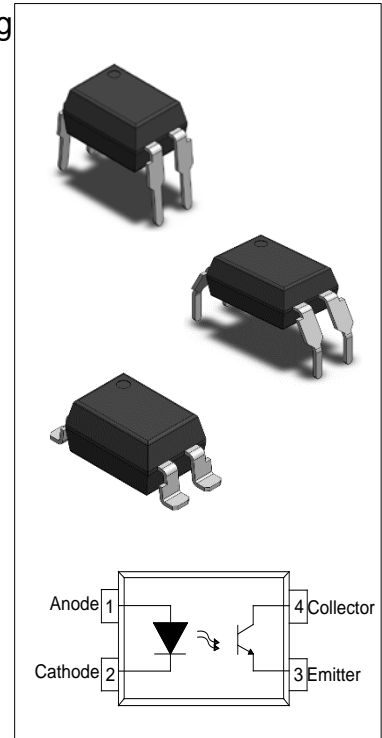
Collector-Emitter voltage $BV_{CEO} \geq 80\text{V}$

CQC approved

VDE approved

UL approved

The products comply with RoHS, REACH and HF



ABSOLUTE MAXIMUM RATINGS (Temperature=25°C)

Parameter		Symbol	Value	Unit
Input	Forward Current	I_F	60	mA
	Peak Forward Current	I_{FP}	1 ^①	A
	Reverse Voltage	V_R	6	V
	Power Dissipation	P_D	100	mW
Output	Collector-emitter Voltage	V_{CEO}	80	V
	Emitter-collector Voltage	V_{ECO}	8	V
	Collector Current	I_C	50	mA
	Power Dissipation	P_C	150	mW
Total Power Dissipation		P_{tot}	200	mW
Isolation Voltage		V_{iso}	5000 ^②	Vrms
Operating Temperature		T_{opr}	-55~+110	°C
Storage Temperature		T_{stg}	-55~+125	°C
Soldering Temperature		T_{sol}	260	°C

NOTE1 : 100us pulse, 100Hz frequency

NOTE2 : AC for 1minute, R.H.=40~60%

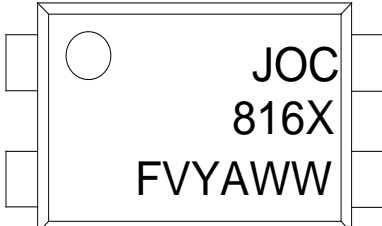
ELECTRICAL CHARACTERISTICS (Temperature=25°C)

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit
Input	Forward Voltage	V_F	$I_F=10mA$	-	1.2	1.3	V
			$I_F=20mA$	-	1.24	1.4	
	Reverse Current	I_R	$V_R=6V$	-	-	1	μA
	Terminal Capacitance	C_t	$V=0, f=1kHz$	-	30	250	pF
Output	Collector-Emitter dark current	I_{CEO}	$V_{CE}=20V, I_F=0$	-	-	50	nA
	Collector-Emitter breakdown voltage	BV_{CEO}	$I_C=0.1mA, I_F=0$	80	-	-	V
	Emitter-Collector breakdown voltage	BV_{ECO}	$I_E=0.1mA, I_F=0$	8	-	-	V
Transfer Characteristics	Current transfer ratio	$CTR^{\text{①}}$	$I_F=5mA, V_{CE}=5V$	80	-	600	%
	Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_F=20mA, I_C=1mA$	-	0.04	0.2	V
	Isolation resistance	R_{IO}	DC500V 40~60%R.H.	5×10^{10}	10^{11}	-	Ω
	Floating Capacitance	C_{IO}	$V=0, f=1MHz$	-	0.4	1	pF
	Cut-off Frequency	f_c	$V_{CE}=5V, I_C=2mA, R_L=100\Omega, -3dB$	-	80	-	kHz
	Rise Time	t_r	$V_{CE}=2V, I_C=2mA, R_L=100\Omega$	-	5	18	μs
	Fall Time	t_f		-	4	18	μs
	Response Time	t_{on}		9	25	μs	
t_{off}		6		25	μs		

NOTE1 : Rank Table of Current Transfer Ratio (Temperature=25°C)

Grade Sign	Min. (%)	Max. (%)
A	80	160
B	130	260
C	200	400
D	300	600
E	100	200
F	150	300

ORDERING AND MARKING INFORMATION

MARKING INFORMATION			
		<p>JOC : Company Abbr. 816 : Part Number X : CTR Rank F : Leadframe Option V : VDE Option Y : Fiscal Year A : Manufacturing Code WW : Work Week</p>	
ORDERING INFORMATION			
JOC816X1(Y)(Z)-FGV			
<p>JOC – Company Abbr. 816 – Part Number X1 – Rank (A1/B1/C1/D1) Y – Lead Form Option (SL/None/M) Z – Tape and Reel Option (T1) F – Leadframe Option (F:Iron, None:Copper) G – Green V – VDE Option (V or None)</p>			
Packing Quantity			
Option	Quantity	Quantity – Inner box	Quantity –Outer box
None/M	100 Units/Tube	32 Tubes/Inner box	10 Inner box/Outer box =32k Units
SL(T1)	1500 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box =22.5k Units

Characteristics Curves

FIG.1: Forward Current vs. Ambient Temperature

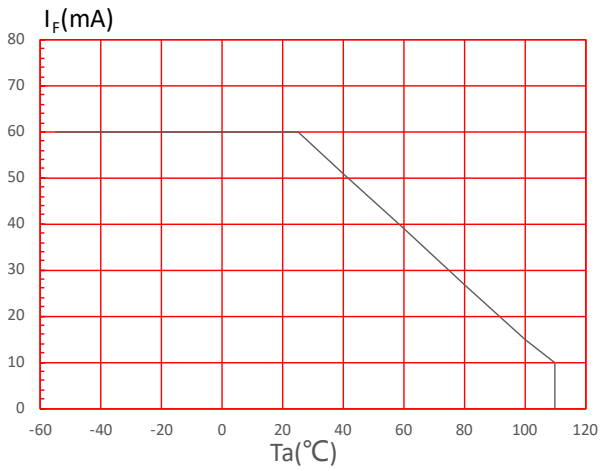


FIG.2: Collector Power Dissipation vs. Ambient Temperature

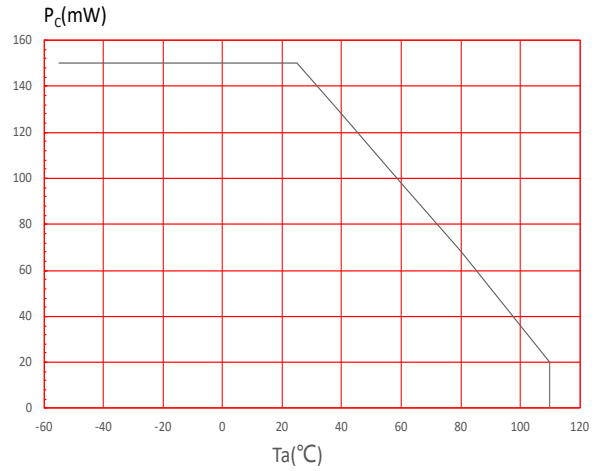


FIG.3: Forward Current vs. Forward Voltage

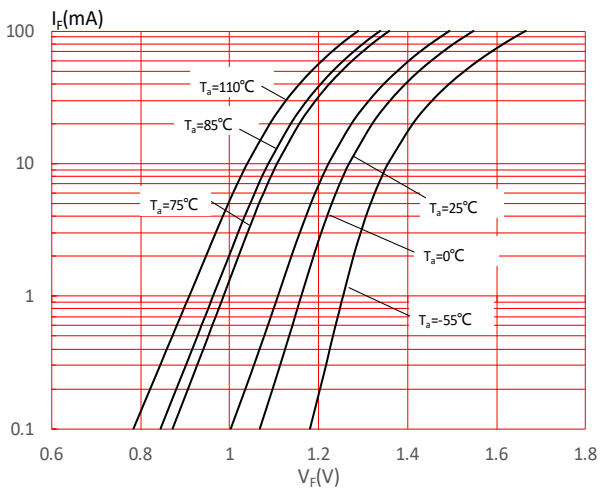


FIG.4: Collector Dark Current vs. Ambient Temperature

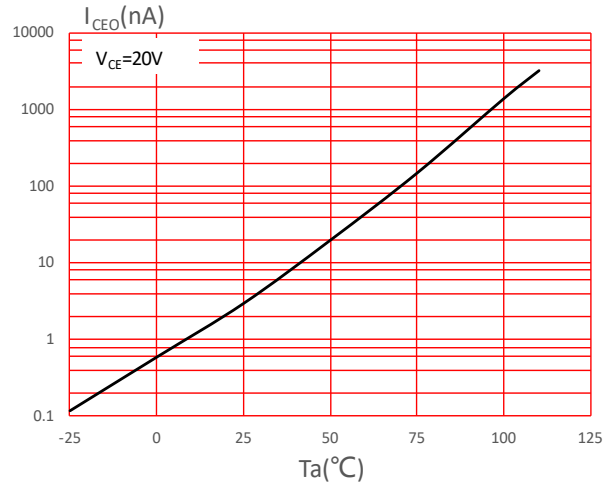


FIG.5: Collector Current vs. Collector-emitter Voltage

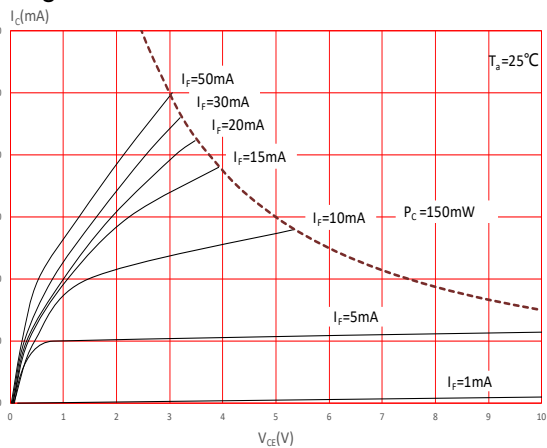


FIG.6: Normalized Current Transfer Ratio vs. Forward Current

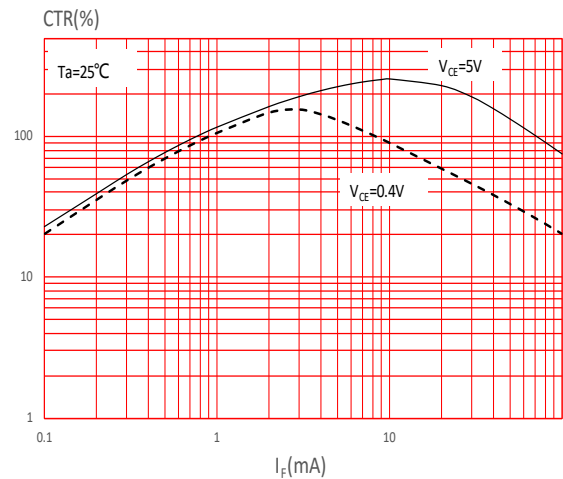


FIG.7: Normalized Current Transfer Ratio vs. Ambient Temperature

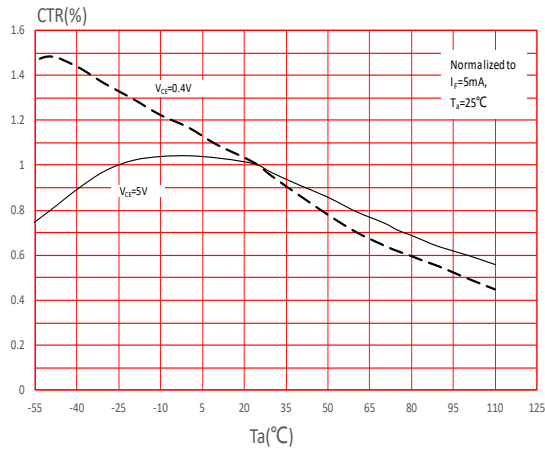


FIG.8: Collector-emitter Saturation Voltage vs. Ambient Temperature

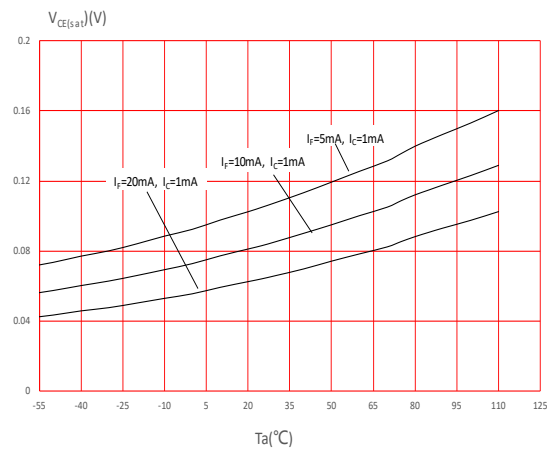


FIG.9: Response Time vs. Load Resistance

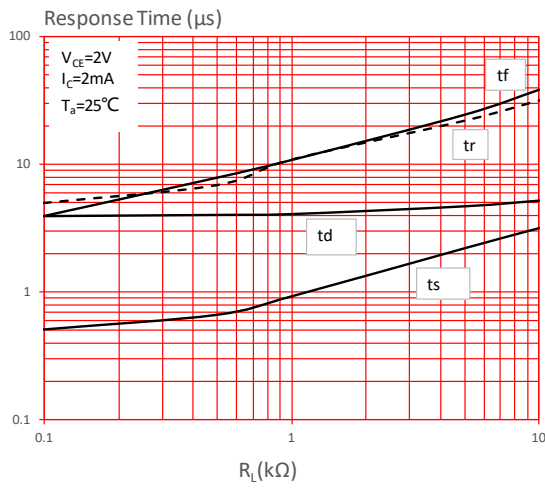
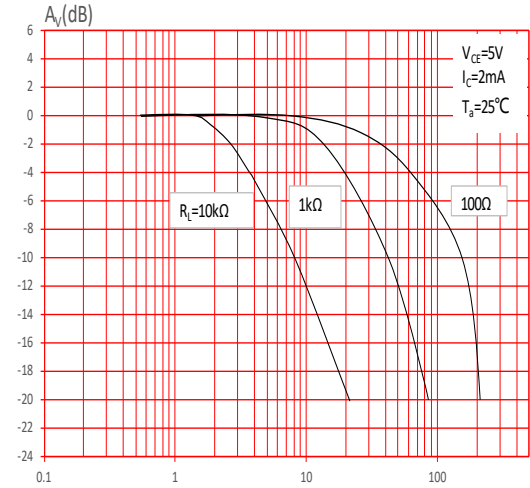


FIG.10: Frequency Response



Test Circuits

FIG.11: Test Circuits of Response Time

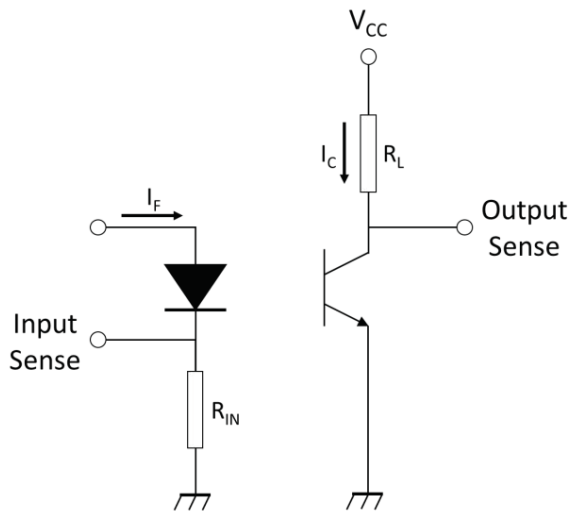


FIG.12: Curves of Response Time

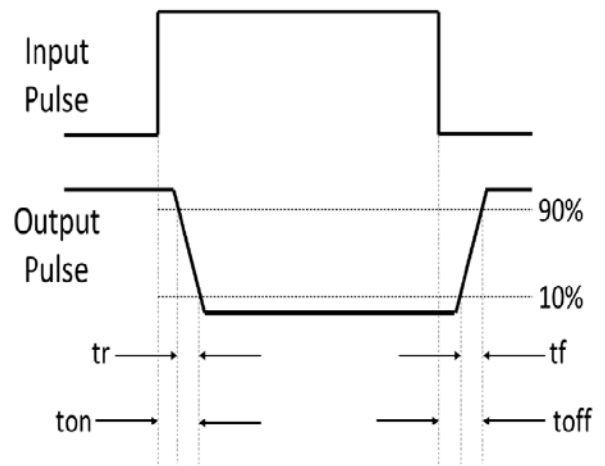
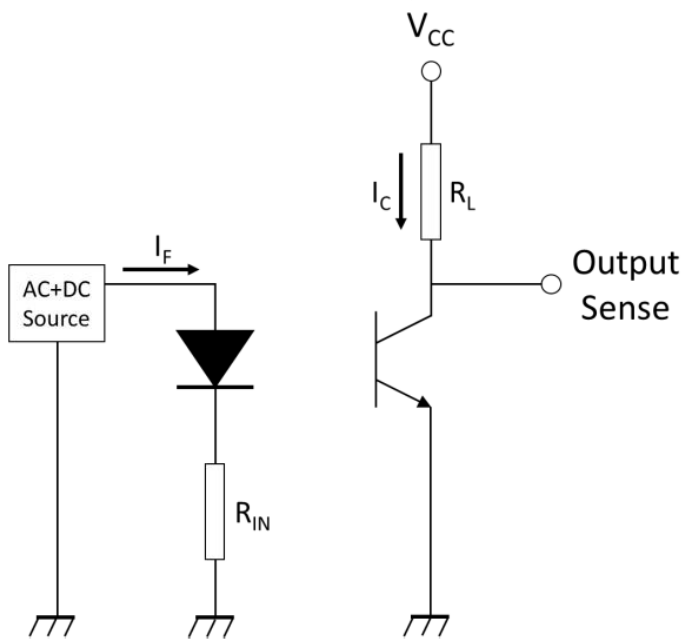
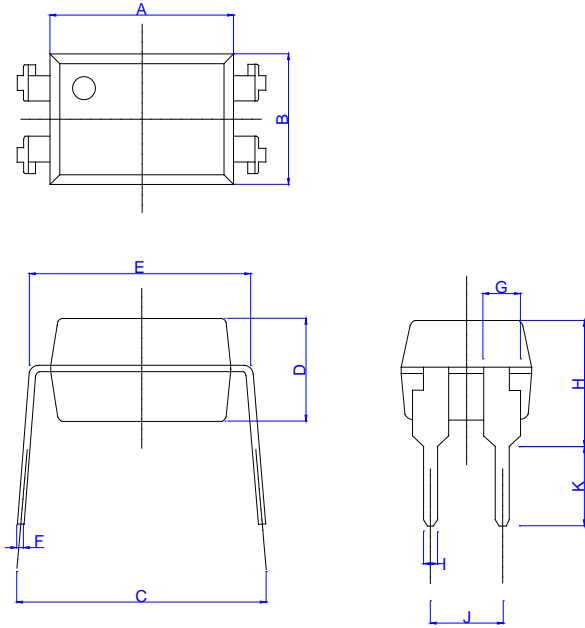


FIG.13: Test Circuits of Frequency Response



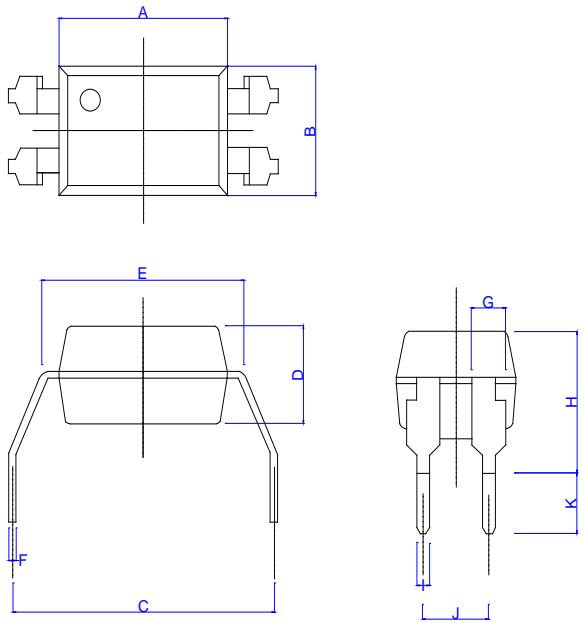
Package Dimension (Unit: mm)

Standard DIP Type:



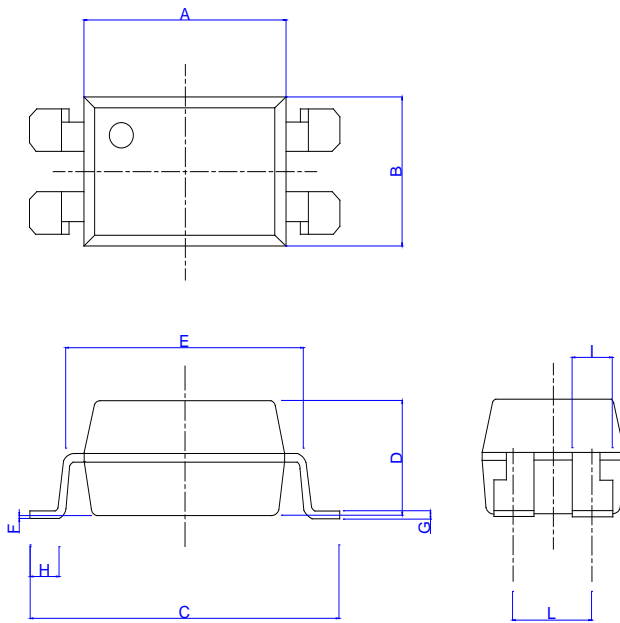
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.20		6.80	0.245		0.269
B	4.30		4.90	0.170		0.194
C	7.62		9.50	0.301		0.375
D	3.20		3.80	0.126		0.150
E	7.37		7.87	0.291		0.311
F	0.24		0.26	0.009		0.010
G	1.10		1.50	0.043		0.059
H	4.20		4.80	0.166		0.190
I	0.40		0.60	0.016		0.024
J	2.44		2.64	0.096		0.104
K	2.45		3.05	0.097		0.121

Option M Type:



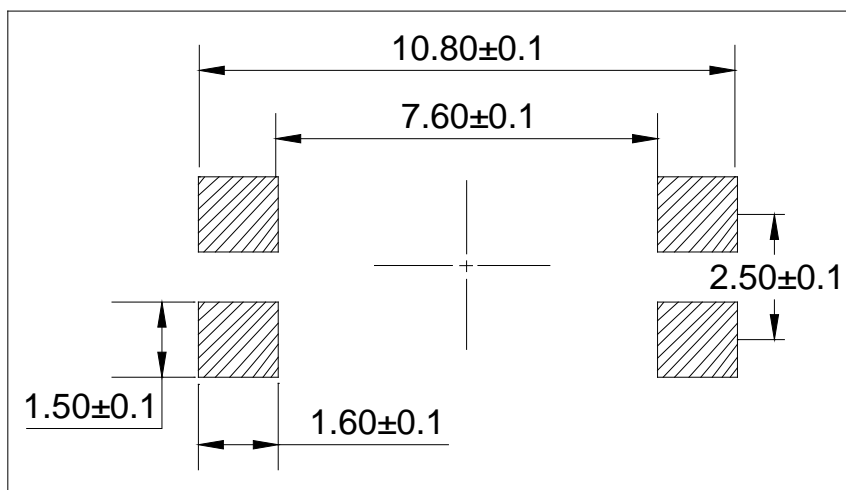
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.20		6.80	0.245		0.269
B	4.30		4.90	0.170		0.194
C	9.90		10.50	0.391		0.415
D	3.20		3.80	0.126		0.150
E	7.37		7.87	0.291		0.311
F	0.24		0.26	0.009		0.010
G	1.10		1.50	0.043		0.059
H	4.20		4.80	0.169		0.193
I	0.40		0.60	0.016		0.024
J	2.44		2.64	0.096		0.104
K	2.00		2.60	0.079		0.103

Option SL Type:



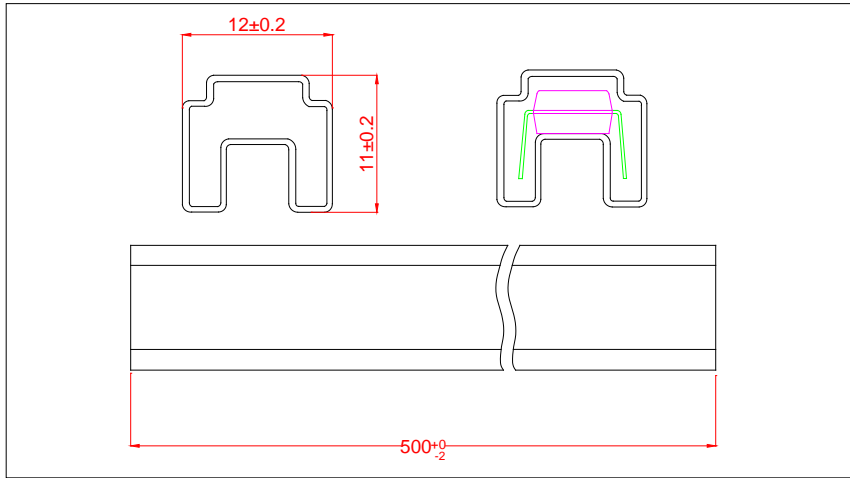
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.20		6.80	0.245		0.269
B	4.30		4.90	0.170		0.194
C	9.90		10.50	0.391		0.415
D	3.20		3.80	0.126		0.150
E	7.37		7.87	0.291		0.311
F	0.00		0.30	0.000		0.012
G	0.15		0.35	0.006		0.014
H	0.50		1.10	0.020		0.043
I	1.10		1.50	0.043		0.059
L	2.44		2.64	0.096		0.104

RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)

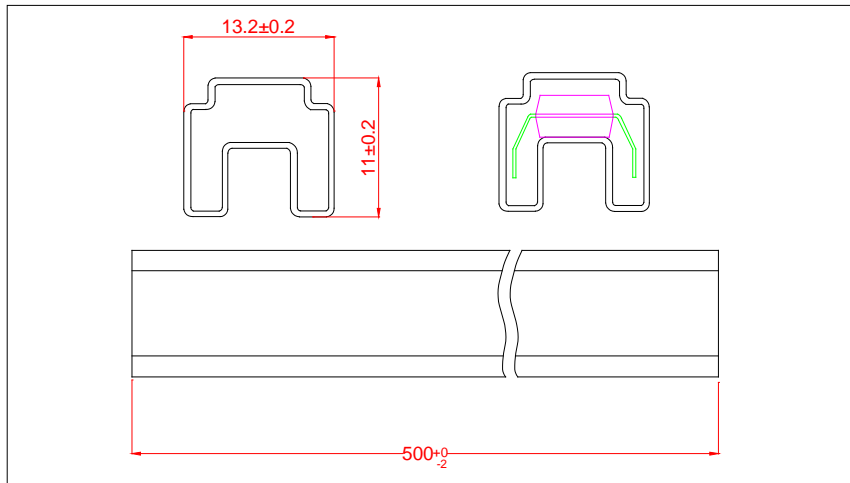


TUBE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Standard DIP

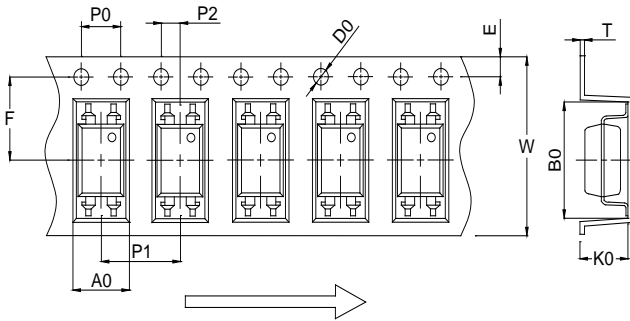


M



CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

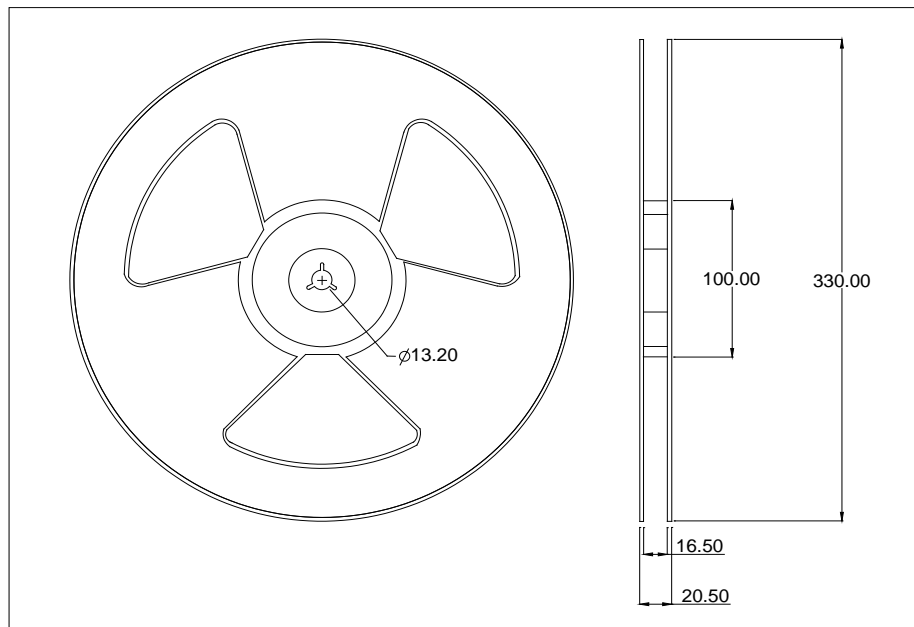
Option SL(T1)



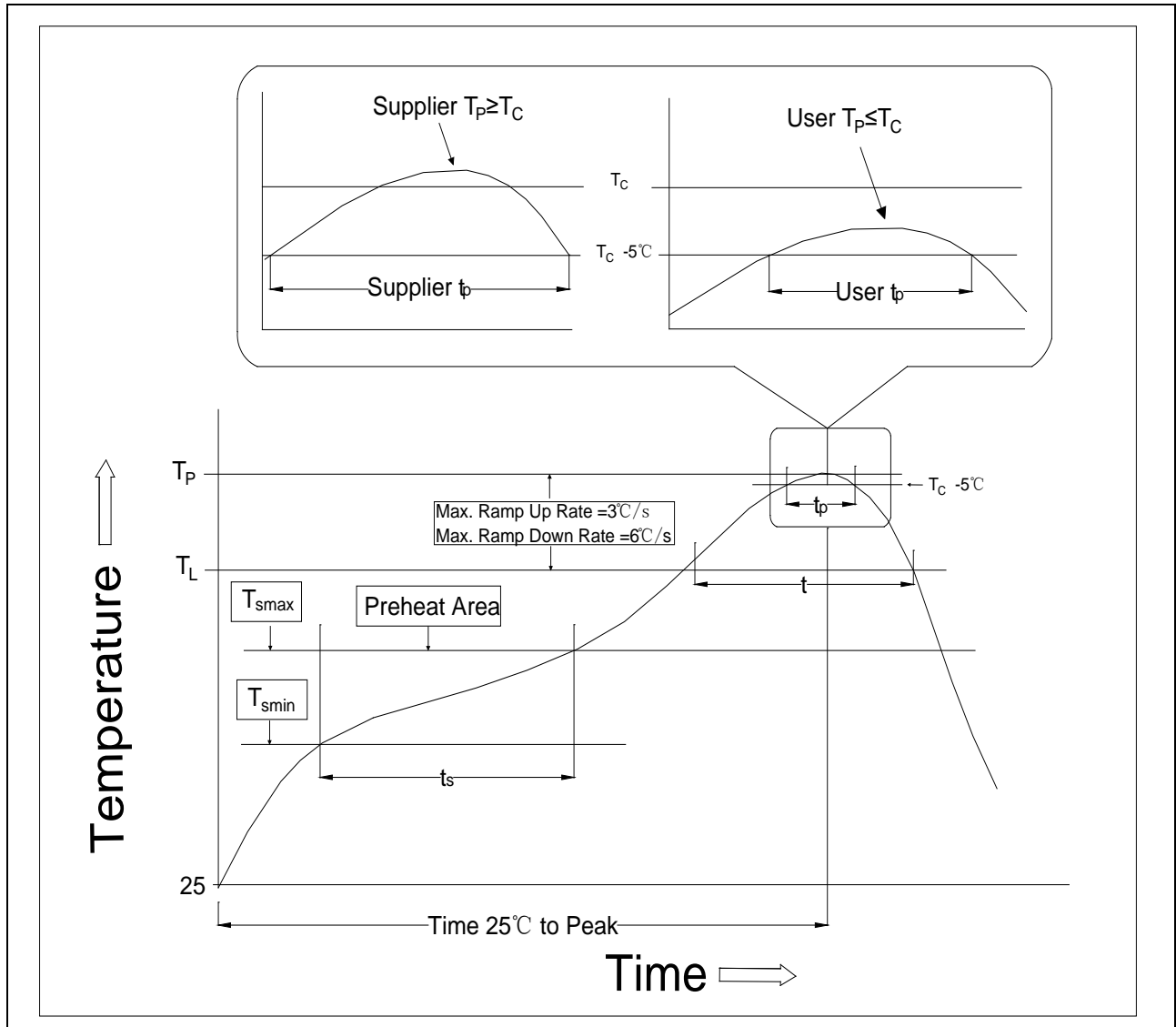
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A0	5.00	5.10	5.20	0.198	0.202	0.206
B0	10.40	10.50	10.60	0.411	0.415	0.419
D0	1.40	1.50	1.60	0.055	0.059	0.063
K0	4.10	4.20	4.30	0.162	0.166	0.170
P0	3.90	4.00	4.10	0.154	0.158	0.162
P1	7.90	8.00	8.10	0.312	0.316	0.320
P2	1.90	2.00	2.10	0.075	0.079	0.083
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.292	0.296	0.300
T	0.35	0.40	0.45	0.014	0.016	0.018
W	15.90	16.00	16.30	0.628	0.632	0.644

REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option SL

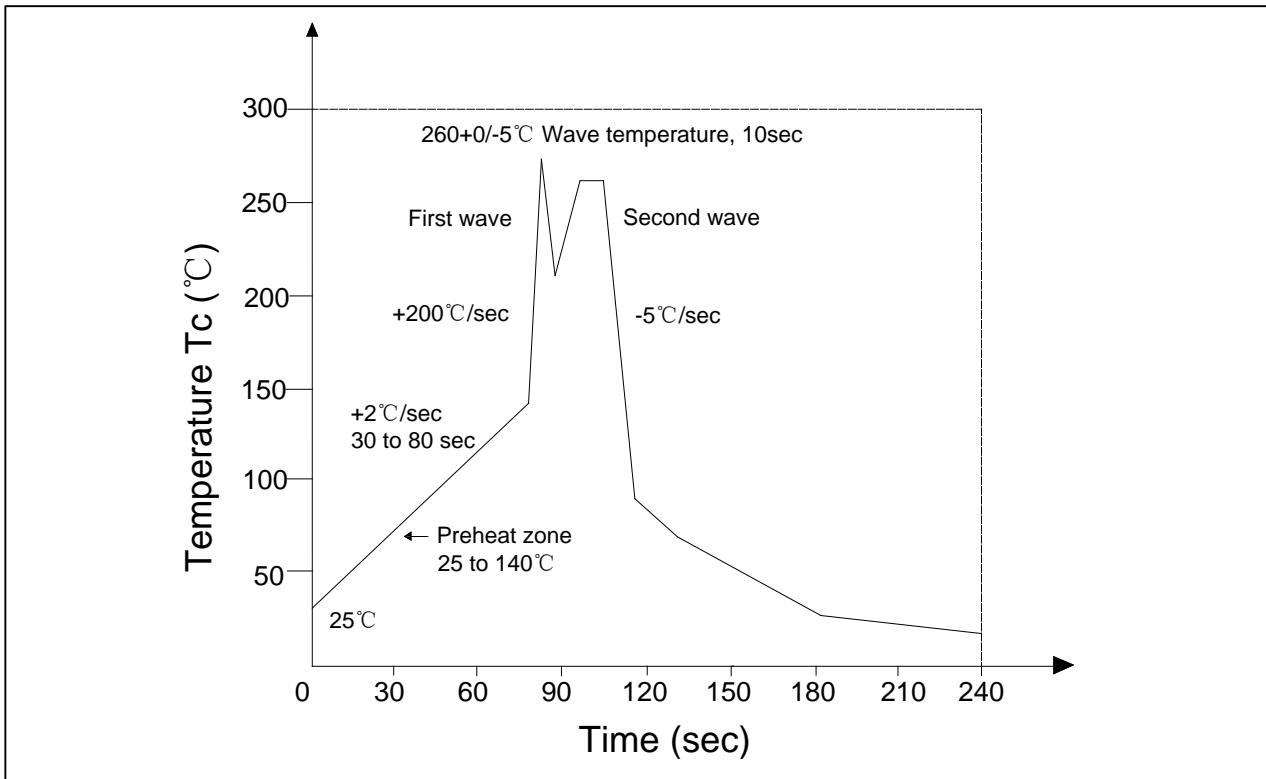


REFLOW INFORMATION




Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (T _{smin})	100	150°C
Temperature Max. (T _{smax})	150	200°C
Time (t _s) from (T _{smin} to T _{smax})	60-120 seconds	60-120 seconds
Ramp-up Rate (t _L to t _P)	3°C/second max.	3°C/second max.
Liquidous Temperature (T _L)	183°C	217°C
Time (t _L) Maintained Above (T _L)	60-150 seconds	60-150 seconds
Peak Body Package Temperature	235°C+0°C/-5°C	260°C+0°C/-5°C
Time (t _P) within 5°C of 260°C	20 seconds	30 seconds
Ramp-down Rate (T _P to T _L)	6°C/second max.	6°C/second max.
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.

Wave Soldering Profile



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