



JOC356X1 Series

Rev.A.1.0

DESCRIPTION:

The JOC356X1 series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic SOP4 package. With the robust coplanar double mold structure, JOC356X1 series provide the most stable isolation feature. The products are widely used in switch mode power supplies, programmable controllers, household appliances and office equipment.

MAIN FEATURES

Current transfer ratio (CTR: 50%-600% @ $I_F=5\text{mA}$, $V_{CE}=5\text{V}$)

High isolation voltage between input and output

($V_{iso}=3,750\text{Vrms}$)

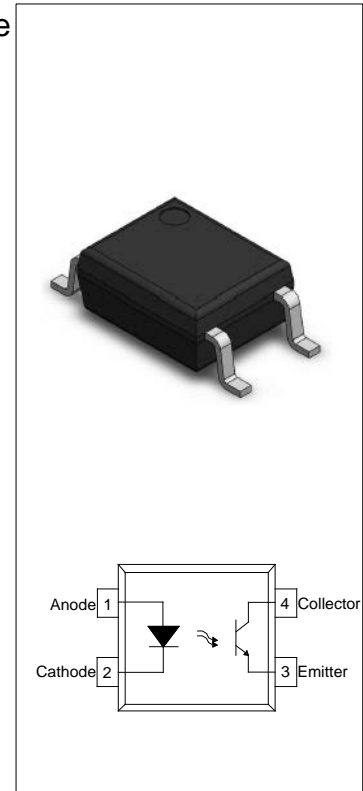
Operating temperature range -55°C to 110°C

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	50	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}	6	V
	Collector Current	I_C	50	mA
	Power Dissipation	P_C	150	mW
Total Power Dissipation		P_{tot}	200	mW
Isolation Voltage		V_{iso}	3750 ^②	Vrms
Operating Temperature		T_{opr}	$-55\sim+110$	$^\circ\text{C}$
Storage Temperature		T_{stg}	$-55\sim+125$	$^\circ\text{C}$

Soldering Temperature	T_{sol}	260	°C
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NOTE1 : 100μs pulse, 100Hz frequency

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

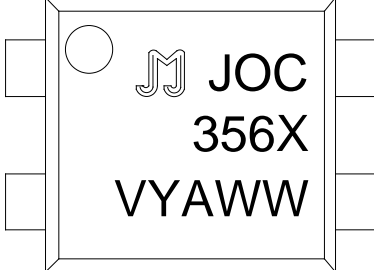
ELECTRICAL CHARACTERISTICS (Temperature=25°C)

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit
Input	Forward Voltage	V_F	$I_F=10mA$	-	1.24	1.4	V
			$I_F=20mA$	-	1.28	1.5	
	Reverse Current	I_R	$V_R=6V$	-	-	1	μA
	Terminal Capacitance	C_t	$V=0,$ $f=1MHz$	-	10	-	pF
Output	Collector-Emitter dark current	I_{CEO}	$V_{CE}=20V,$ $I_F=0$	-	-	100	nA
	Collector-Emitter breakdown voltage	BV_{CEO}	$I_C=0.1mA$ $I_F=0$	80	-	-	V
	Emitter-Collector breakdown voltage	BV_{ECO}	$I_E=0.1mA$ $I_F=0$	6	-	-	V
Transfer Characteristics	Current transfer ratio	$CTR^{\text{①}}$	$I_F=5mA$ $V_{CE}=5V$	50	-	600	%
	Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_F=20mA$ $I_C=1mA$	-	0.06	0.2	V
	Isolation resistance	R_{IO}	DC500V 40~60%R.H.	10^{12}	10^{14}	-	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	$V_{CE}=2V,$ $I_C=2mA$ $R_L=100\Omega$	-	3	18	μs
	Fall Time	t_f		-	4	18	μs
	Response Time	t_{on}		-	6	25	μs
t_{off}		-		5	25	μs	

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

Grade Sign	Min. (%)	Max. (%)
None	50	600
A	80	160
B	130	260
C	200	400
D	300	600

ORDERING AND MARKING INFORMATION

MARKING INFORMATION			
		JOC : Company Abbr. 356 : Part Number X : CTR Rank V : VDE Option Y : Fiscal Year A : Manufacturing Code WW : Work Week	
ORDERING INFORMATION			
JOC356X1(Z)-GV			
JOC – Company Abbr. 356 – Part Number X – Rank (A/B/C/D or None) Z – Tape and Reel Option (T1/T2) G – Green V – VDE Option (V or None)			
Packing Quantity			
Option	Quantity	Quantity – Inner box	Quantity –Outer box
T1	3000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box =45k Units
T2	3000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box =45k Units

Characteristics Curves

FIG.1: Forward Current vs. Ambient Temperature

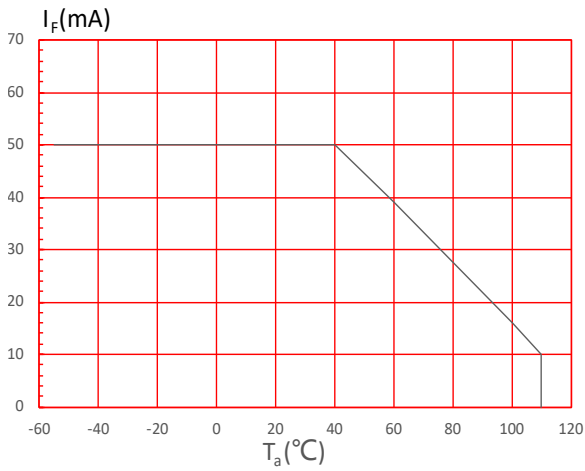


FIG.2: Collector Power Dissipation vs. Ambient Temperature

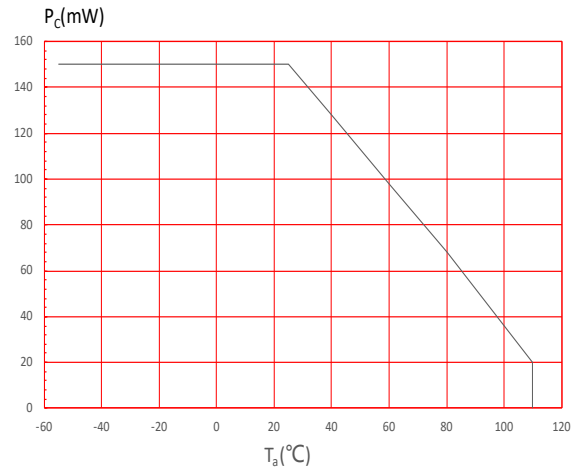


FIG.3: Forward Current vs. Forward Voltage

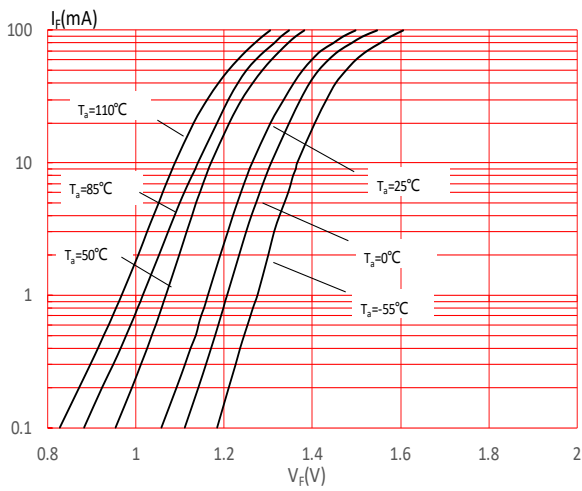


FIG.4: Normalized Collector Dark Current vs. Ambient Temperature

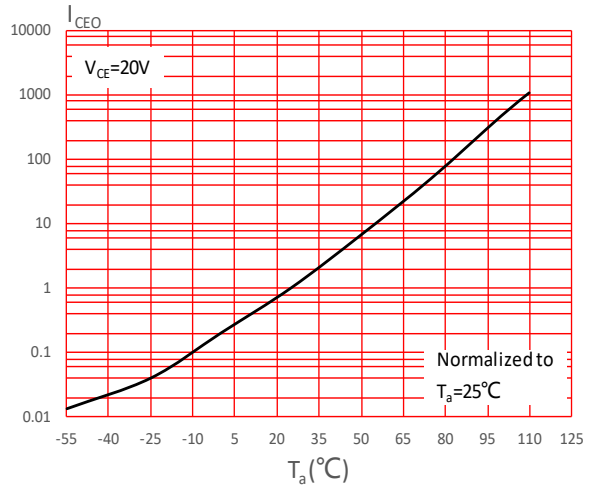


FIG.5: Collector Current vs. Collector-emitter Voltage

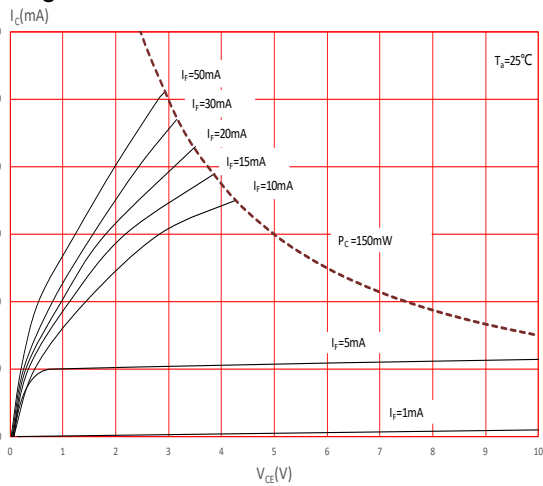


FIG.6: Normalized Current Transfer Ratio vs. Forward Current

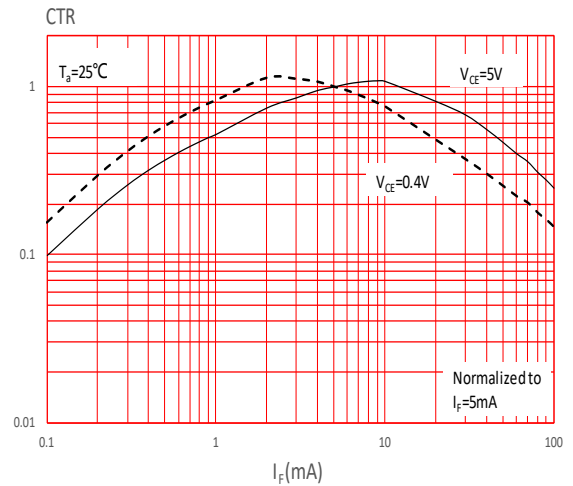


FIG.7: Normalized Current Transfer Ratio vs. Ambient Temperature

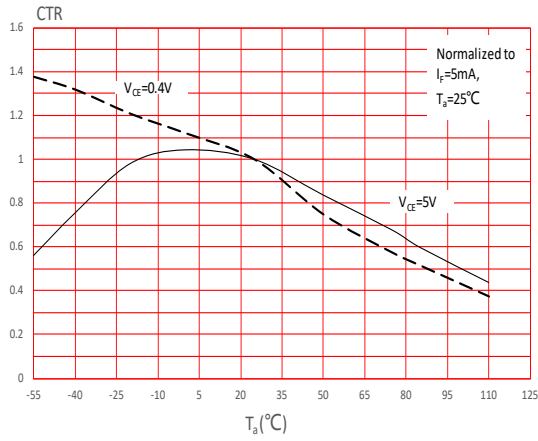


FIG.8: Normalized Collector-emitter Saturation Voltage vs. Ambient Temperature

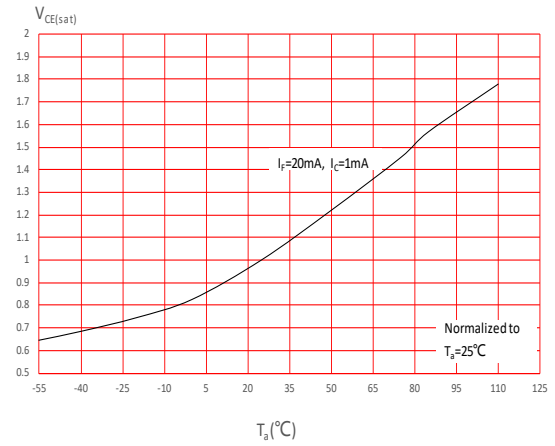


FIG.9: Response Time vs. Load Resistance

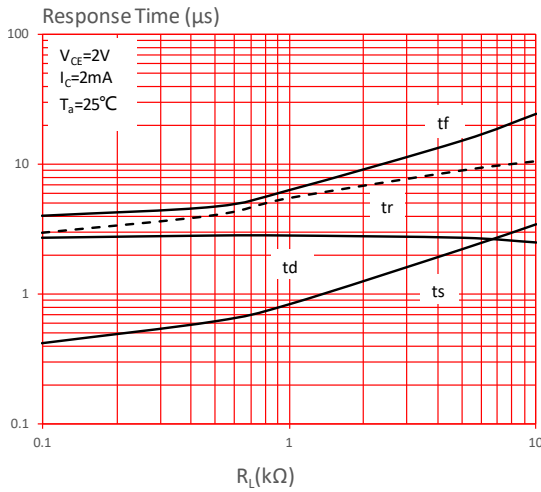
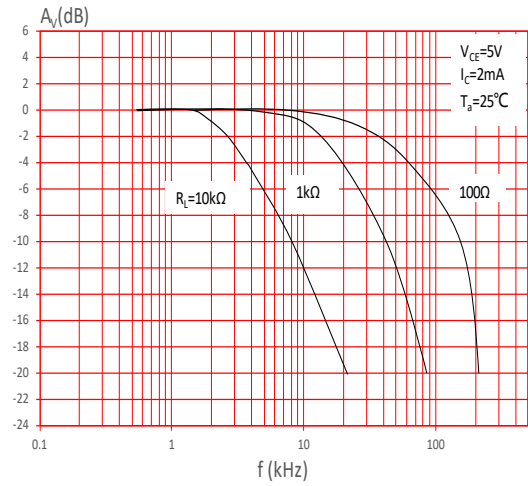


FIG.10: Frequency Response



Test Circuits

FIG.11: Test Circuits of Response Time

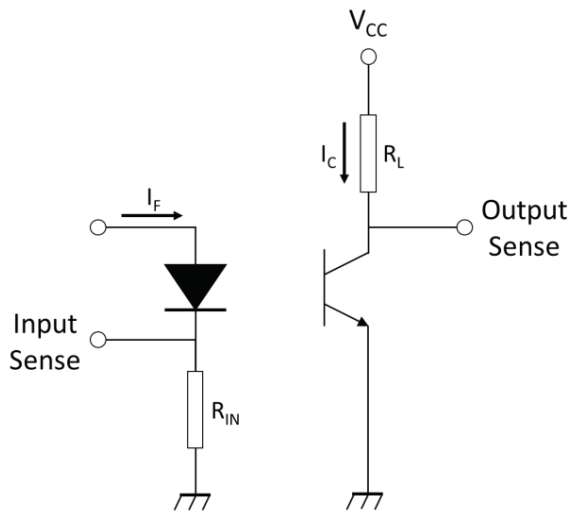


FIG.12: Curves of Response Time

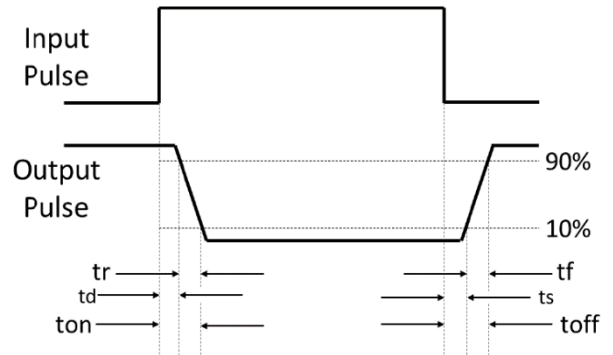
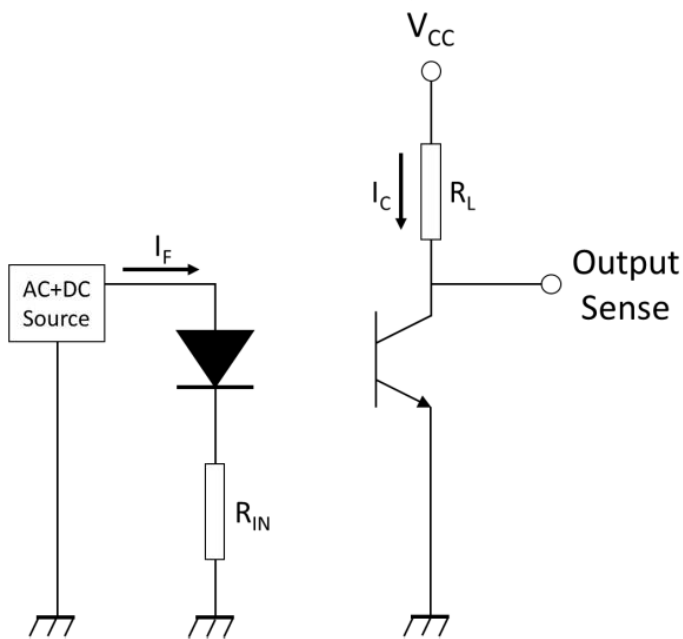
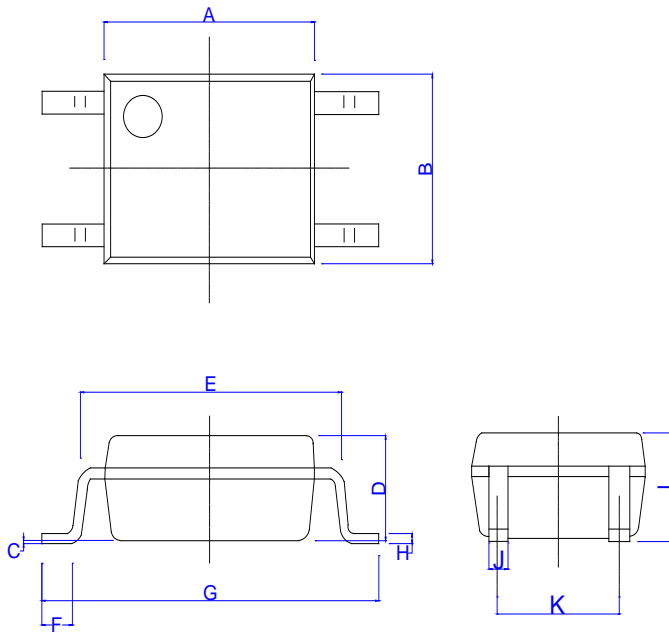


FIG.13: Test Circuits of Frequency Response

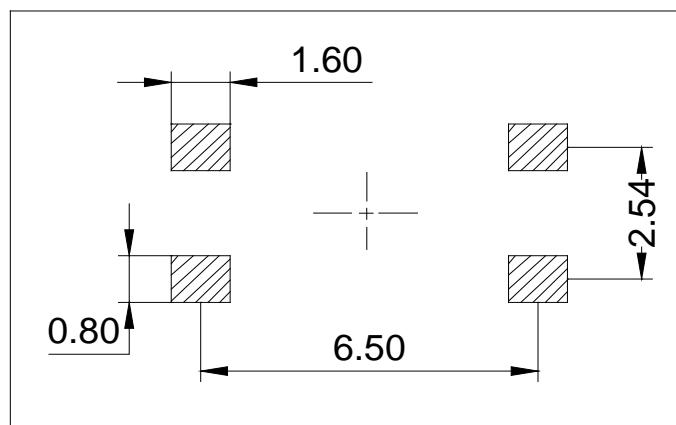


Package Dimension (Unit: mm)



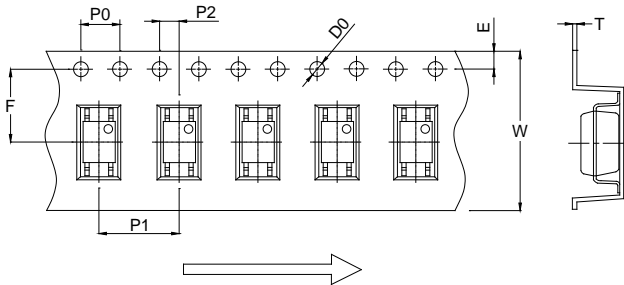
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.20		4.85	0.165		0.191
B	3.30		4.40	0.130		0.173
C	0.00		0.20	0.000		0.008
D	1.75		2.80	0.069		0.110
E	4.90		5.80	0.193		0.228
F	0.30		0.90	0.012		0.035
G	6.30		7.30	0.248		0.287
H	0.10		0.30	0.004		0.012
I	1.80		2.90	0.071		0.114
J	0.25		0.55	0.010		0.022
K	2.29		2.79	0.090		0.110

RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)



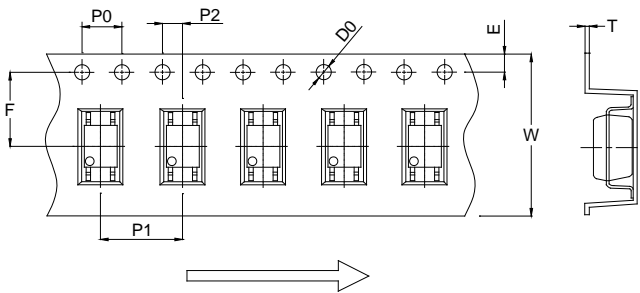
CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option T1



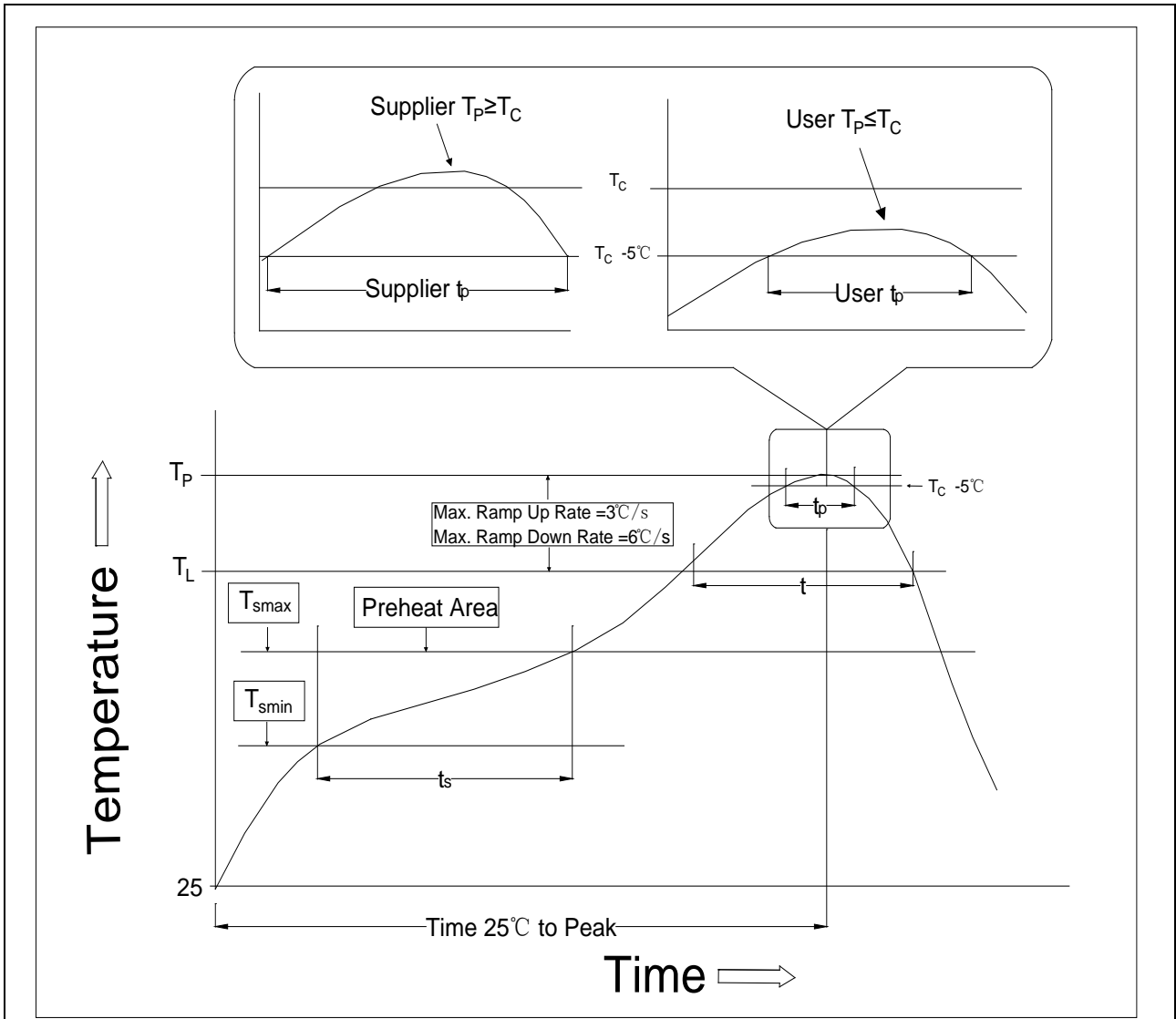
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
D0		1.45	1.65		0.057	0.065
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
T	0.15	0.30	0.45	0.006	0.012	0.018
W	15.70	16.00	16.30	0.618	0.630	0.642

Option T2



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
D0		1.45	1.65		0.057	0.065
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
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	0.291	0.295	0.299
T	0.15	0.30	0.45	0.006	0.012	0.018
W	15.70	16.00	16.30	0.618	0.630	0.642

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.
Liquidus 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.

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