

## JOC354X1 Series

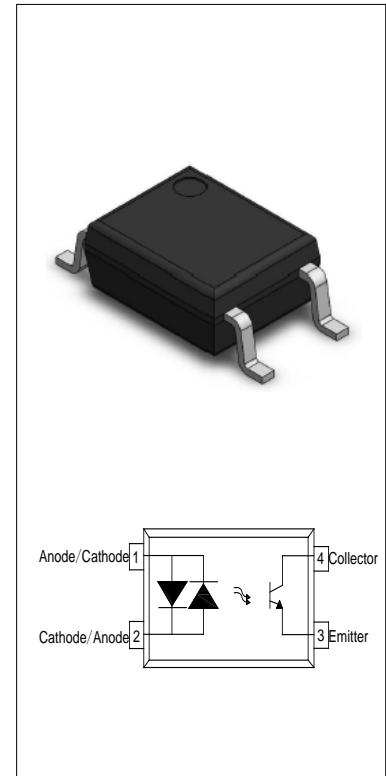
Rev.A.1.0

### DESCRIPTION:

The JOC354X1 series combine two AlGaAs infrared emitting diodes as the AC input which is optically coupled to a silicon planar phototransistor detector in a plastic SOP4 package with the robust coplanar double mold structure, JOC354X1 series provide the most stable isolation feature. The products are widely used in AC line monitor, programmable controllers, telephone line interface, system appliance and measurement instrument.

### MAIN FEATURES

- High isolation 3750 VRMS
- CTR flexibility available see order information
- AC input with transistor output
- Operating temperature range -55°C to 110°C
- REACH compliance
- Halogen free (Optional)
- UL、VDE、CQC approvals



### ABSOLUTE MAXIMUM RATINGS (Temperature=25°C)

Parameter		Symbol	Value	Unit
Input	Forward Current	$I_F$	$\pm 60$	mA
	Peak Forward Current	$I_{FP}$	$\pm 1$ <sup>①</sup>	A
	Power Dissipation	$P_I$	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	$P_O$	150	mW
Total Power Dissipation		$P_{tot}$	200	mW
Isolation Voltage		$V_{iso}$	3750 <sup>②</sup>	Vrms
Operating Temperature		$T_{opr}$	-55~+110	°C
Storage Temperature		$T_{stg}$	-55~+150	°C
Soldering Temperature		$T_{sol}$	260	°C

**NOTE1:** 100μs pulse, 100Hz frequency    **NOTE2:** AC for 1minute, R.H.=40~60%

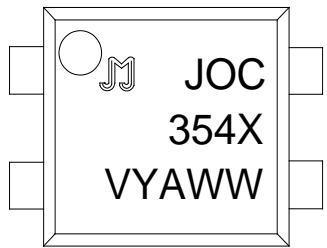
**ELECTRICAL CHARACTERISTICS** (Temperature=25°C)

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit
Input	Forward Voltage	$V_F$	$I_F=\pm 10\text{mA}$	-	1.24	1.4	V
			$I_F=\pm 20\text{mA}$	-	1.28	1.5	
	Input Capacitance	$C_{in}$	$V=0,$ $f=1\text{MHz}$	-	10	-	pF
Output	Collector-Emitter dark current	$I_{CEO}$	$V_{CE}=20\text{V},$ $I_F=0$	-	-	100	nA
	Collector-Emitter breakdown voltage	$BV_{CEO}$	$I_C=0.1\text{mA}$ $I_F=0$	80	-	-	V
	Emitter-Collector breakdown voltage	$BV_{ECO}$	$I_E=0.1\text{mA}$ $I_F=0$	6	-	-	V
Transfer Characteristics	Current transfer ratio	CTR <sup>①</sup>	$I_F=\pm 1\text{mA}$ $V_{CE}=5\text{V}$	20	-	400	%
	Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_F=\pm 20\text{mA}$ $I_C=1\text{mA}$	-	0.07	0.2	V
	Isolation resistance	$R_{IO}$	DC500V 40~60%R.H.	$10^{12}$	$10^{14}$	-	$\Omega$
	Floating Capacitance	$C_{IO}$	$V=0,$ $f=1\text{MHz}$	-	0.4	1	pF
	Cut-off Frequency	$f_c$	$V_{CE}=5\text{V},$ $I_C=2\text{mA}$ $R_L=100\Omega,$ -3dB	-	80	-	kHz
	Rise Time	$t_r$	$V_{CE}=2\text{V},$ $I_C=2\text{mA}$ $R_L=100\Omega$	-	4	18	$\mu\text{s}$
	Fall Time	$t_f$		-	5	18	$\mu\text{s}$
	Response Time	$t_{on}$		-	7	25	$\mu\text{s}$
$t_{off}$		-		6	25	$\mu\text{s}$	

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

Grade Sign	Min. (%)	Max. (%)
None	20	400
A1	50	150
B1	80	400

**ORDERING AND MARKING INFORMATION**

<b>MARKING INFORMATION</b>			
		<p>JOC : Company Abbr.                      354 : Part Number                      X : CTR Rank                      V: VDE Option                      Y : Fiscal Year                      A : Manufacturing Code                      WW : Work Week</p>	
<b>ORDERING INFORMATION</b>			
<b>JOC354X1(Z)-GV</b>			
<p>JOC – Company Abbr.                      354 – Part Number                      X1 – Rank (A1/B1/None)                      Z – Tape and Reel Option (T1/T2)                      G – Green                      V – VDE Option (V or None)</p>			
<b>Packing Quantity</b>			
Option	Quantity	Quantity – Inner box	Quantity –Outer box
T1	3000 Units/Reel	2 Reels/Inner box	10 Inner box/Outer box =60k Units
T2	3000 Units/Reel	2 Reels/Inner box	10 Inner box/Outer box =60k Units

Characteristics Curves

FIG.1: Forward Current vs. Ambient Temperature

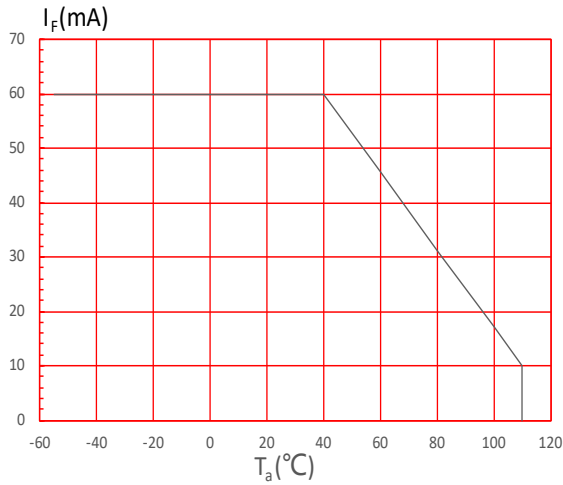


FIG.2: Collector Power Dissipation vs. Ambient Temperature

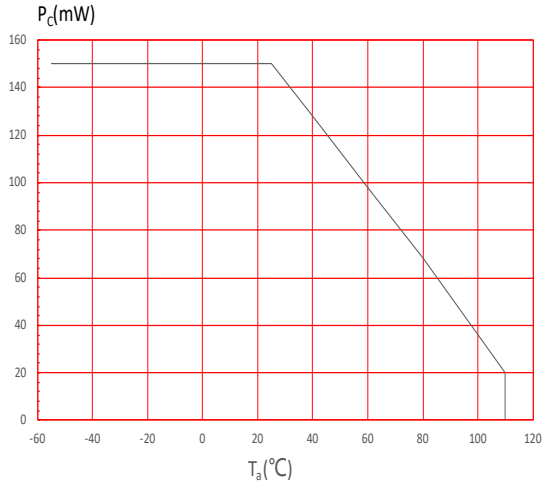


FIG.3: Forward Current vs. Forward Voltage

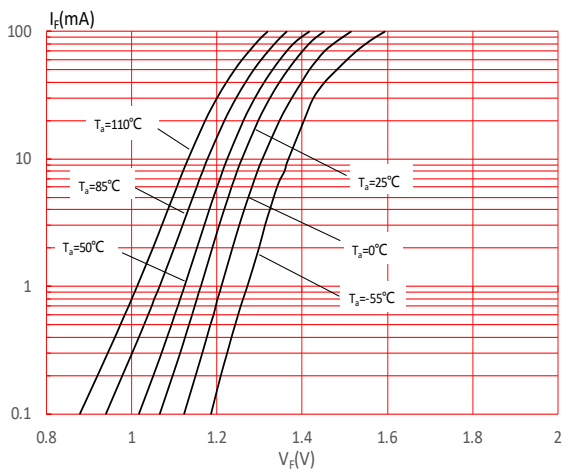


FIG.4: Normalized Collector Dark Current vs. Ambient Temperature

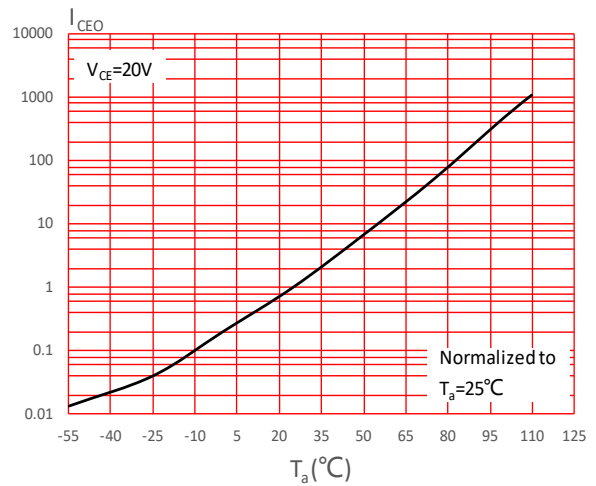


FIG.5: Collector Current vs. Collector-emitter Voltage

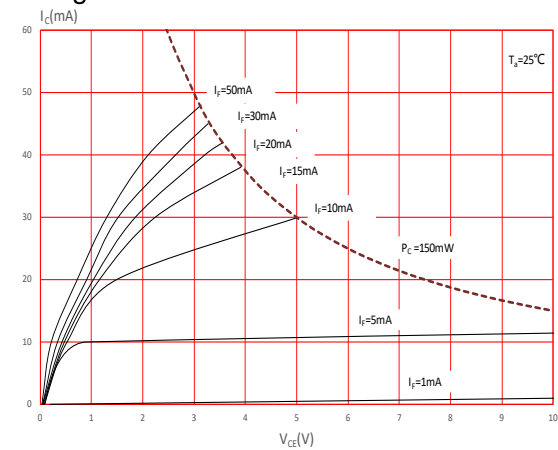
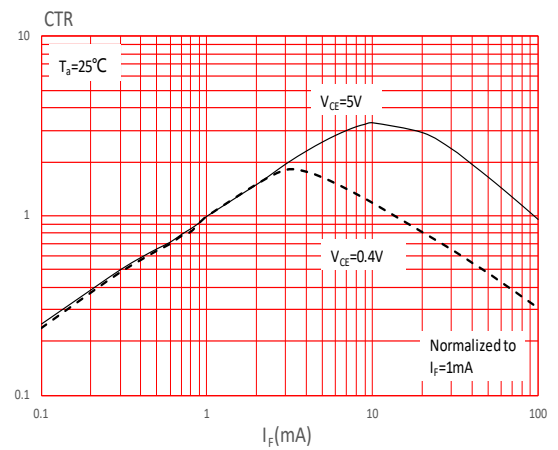
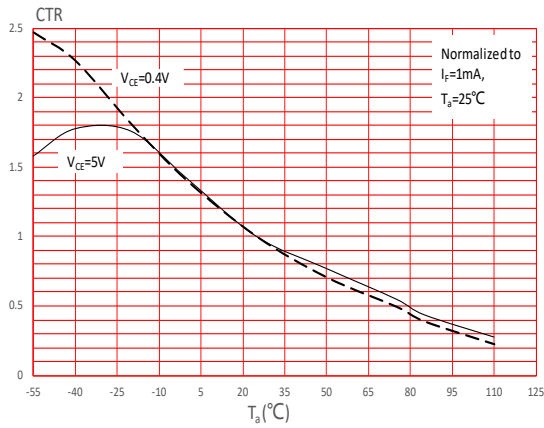


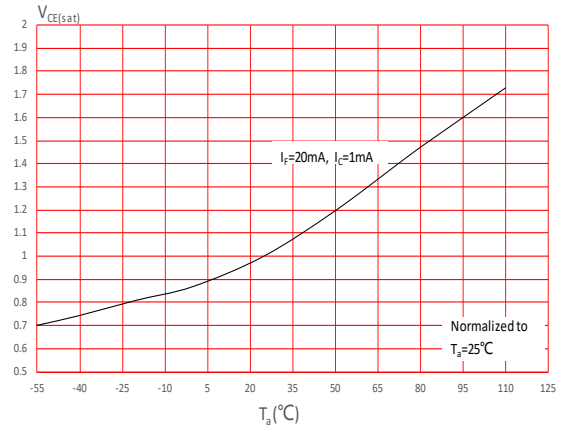
FIG.6: Normalized Current Transfer Ratio vs. Forward Current



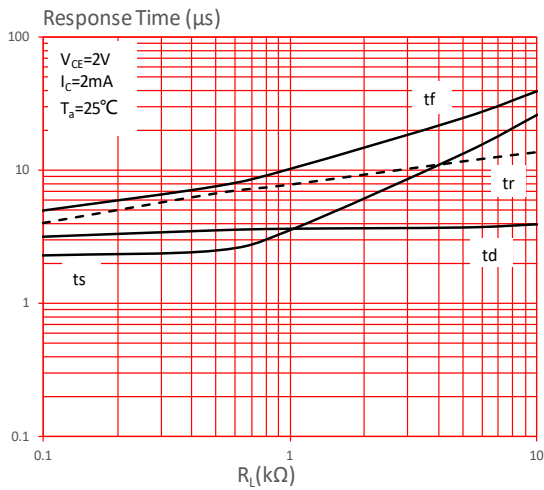
**FIG.7:** Normalized Current Transfer Ratio vs. Ambient Temperature



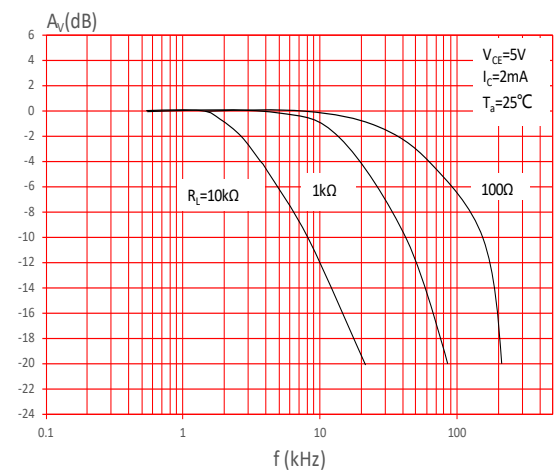
**FIG.8:** Collector-emitter Saturation Voltage vs. Ambient Temperature



**FIG.9:** Response Time vs. Load Resistance



**FIG.10:** Frequency Response



Test Circuits

FIG.11: Test Circuits of Response Time

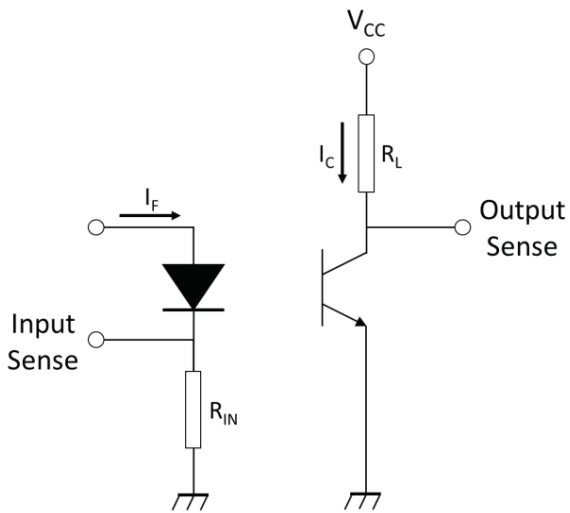


FIG.12: Curves of Response Time

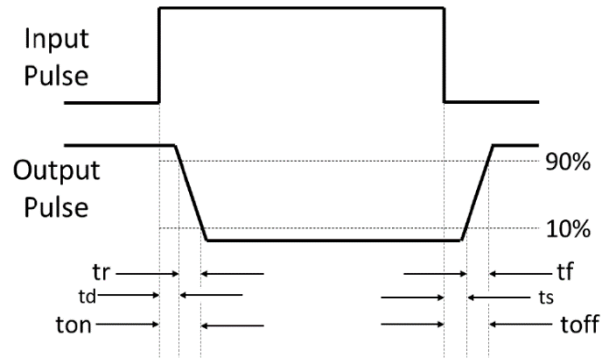
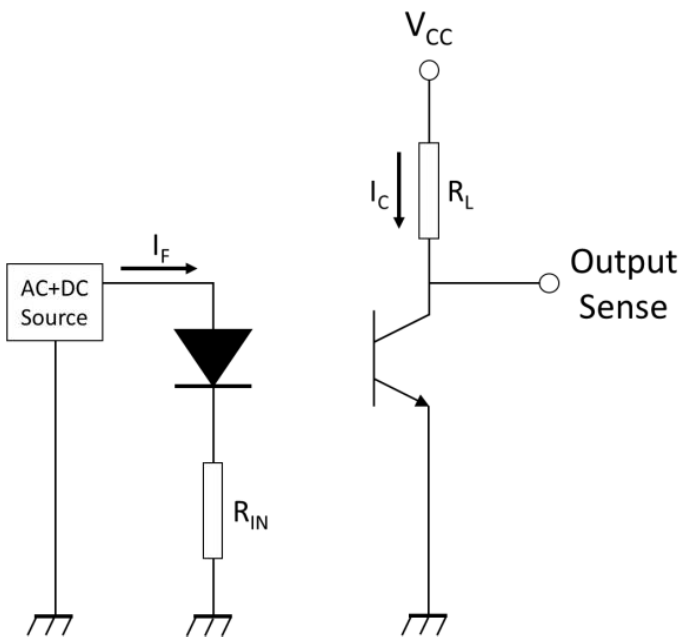
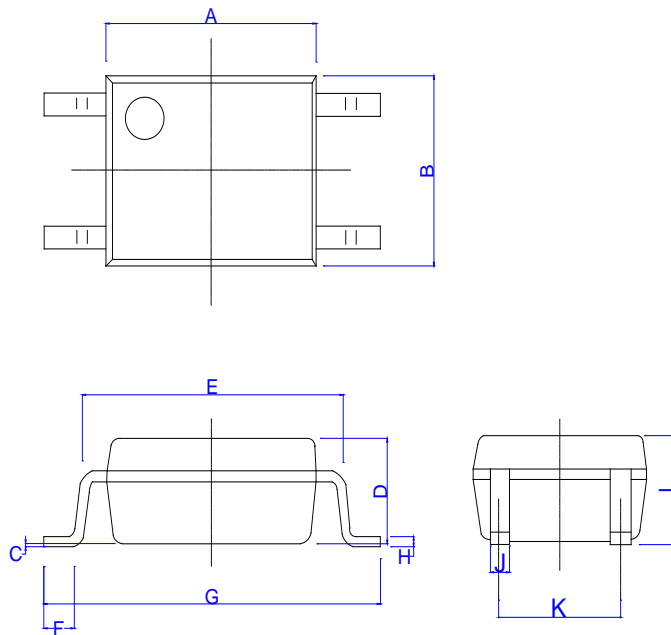


FIG.13: Test Circuits of Frequency Response

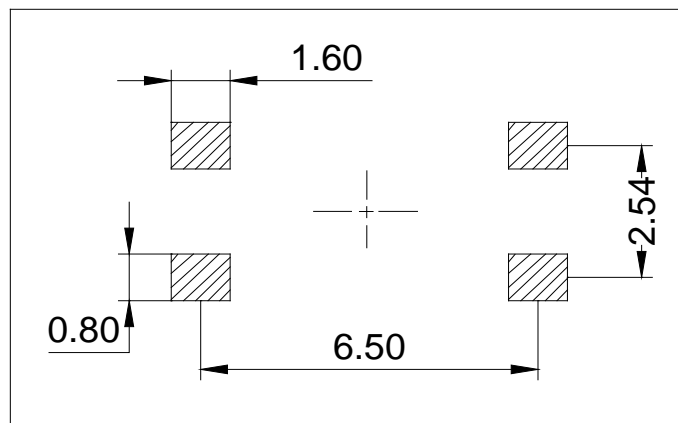


Package Dimension (Unit: mm)



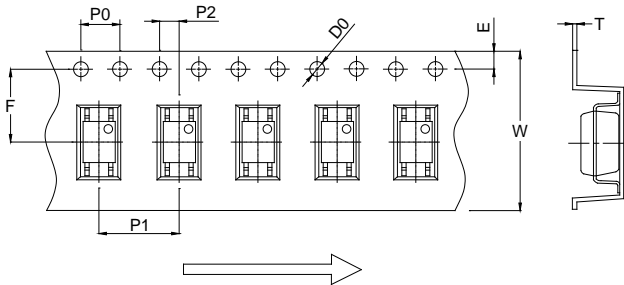
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.20		4.85	0.165		0.191
B	3.30		4.40	0.130		0.173
C	0.00		0.20	0.000		0.008
D	1.75		2.80	0.069		0.110
E	4.90		5.80	0.193		0.228
F	0.30		0.90	0.012		0.035
G	6.30		7.30	0.248		0.287
H	0.10		0.30	0.004		0.012
I	1.80		2.90	0.071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



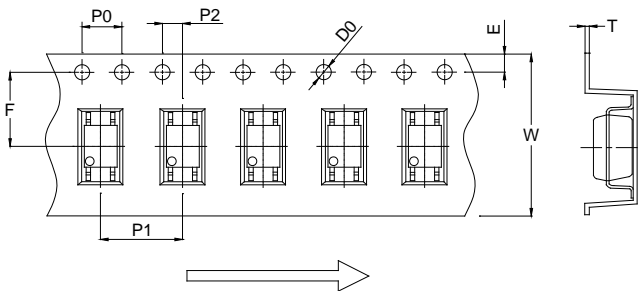
**CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

**Option T1**



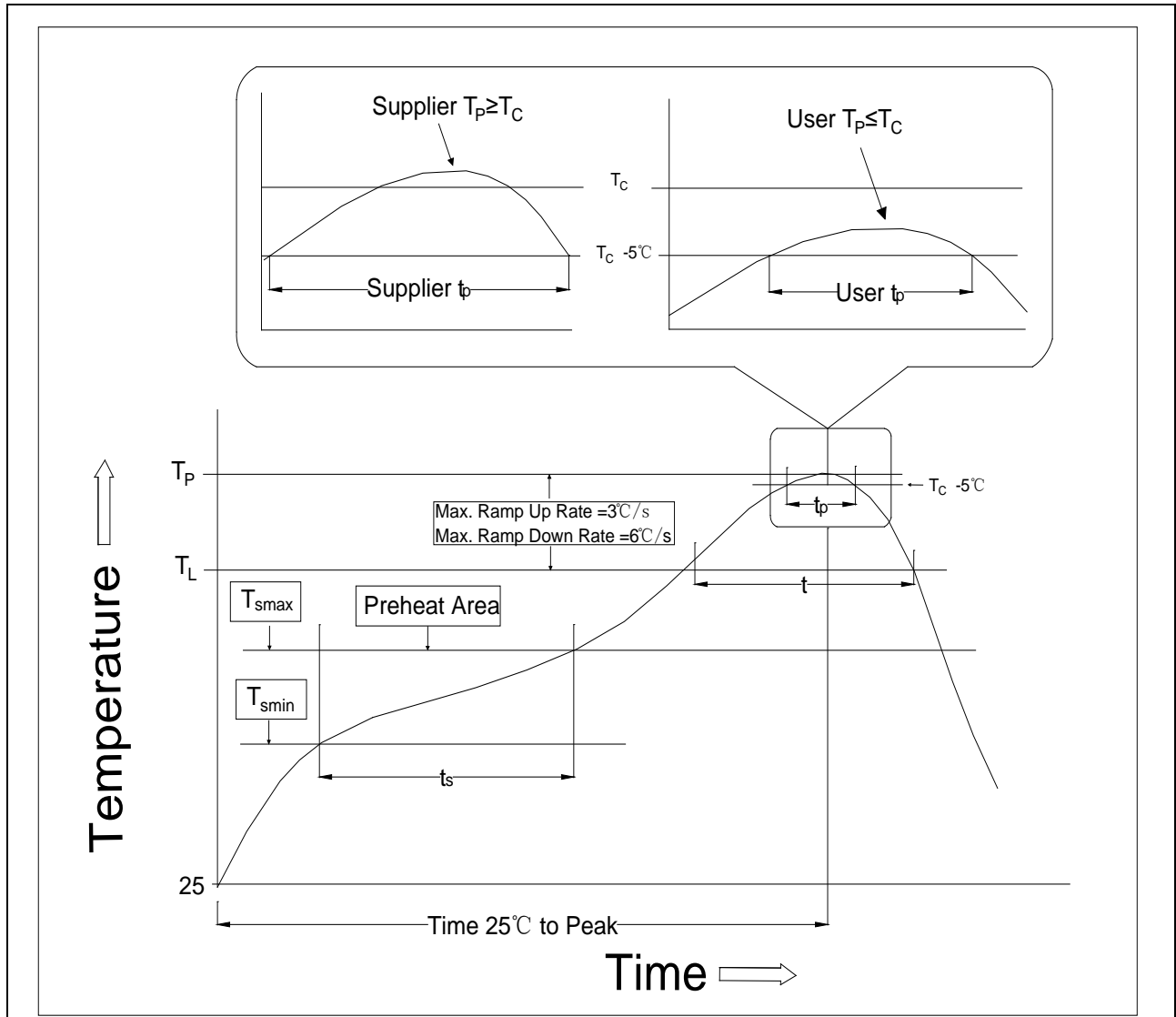
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
D0		1.45	1.65		0.057	0.065
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
T	0.15	0.30	0.45	0.006	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 <sub>smin</sub> )	100	150°C
Temperature Max. (T <sub>smax</sub> )	150	200°C
Time (t <sub>s</sub> ) from (T <sub>smin</sub> to T <sub>smax</sub> )	60-120 seconds	60-120 seconds
Ramp-up Rate (t <sub>L</sub> to t <sub>P</sub> )	3°C/second max.	3°C/second max.
Liquidus Temperature (T <sub>L</sub> )	183°C	217°C
Time (t <sub>L</sub> ) Maintained Above (T <sub>L</sub> )	60-150 seconds	60-150 seconds
Peak Body Package Temperature	235°C+0°C/-5°C	260°C+0°C/-5°C
Time (t <sub>P</sub> ) within 5°C of 260°C	20 seconds	30 seconds
Ramp-down Rate (T <sub>P</sub> to T <sub>L</sub> )	6°C/second max.	6°C/second max.
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.

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