



**THE DATASHEET OF  
APC-817A1-SL**



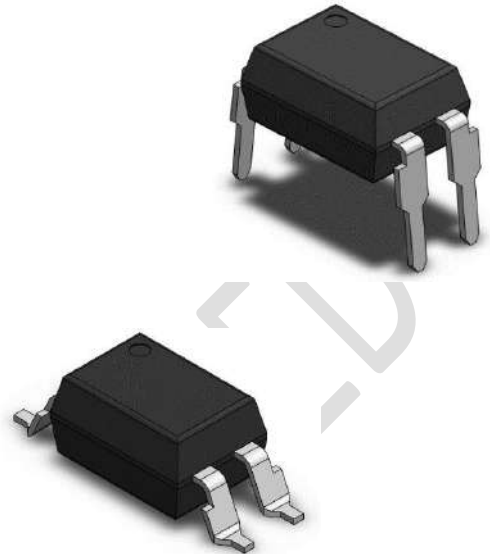
## Specification for APC-817 Series

### APC-817

*DIP4, DC Input, Photo Transistor Coupler*

The APC-817 series combines an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic DIP4 package with different lead forming options.

With the robust coplanar double mold structure, APC-817 series provide the most stable isolation feature.

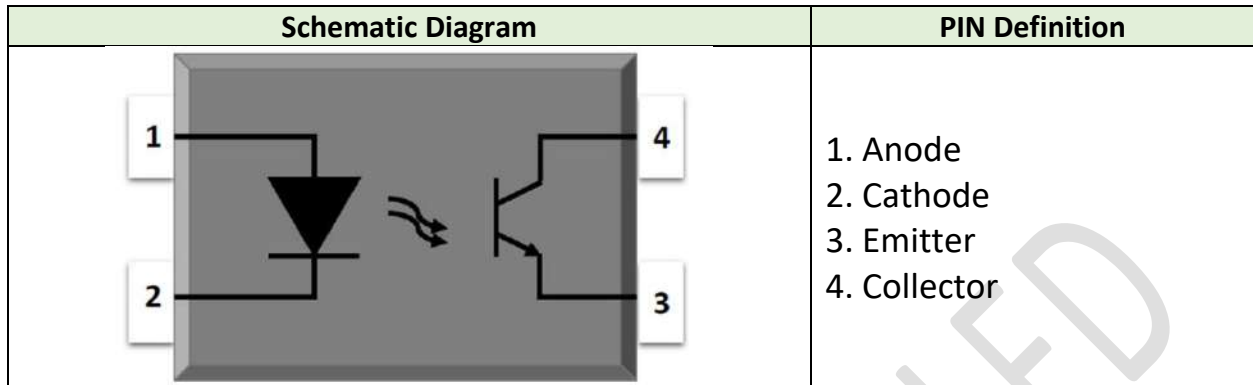


### Features:

- High isolation  $V_{rms}$ : 5000V
- CTR flexibility available
- DC input with transistor output
- Operating temperature: - 55 °C to 110 °C
- RoHS & REACH Compliance
- MSL Class 1
- Halogen free (Optional)
- UL - UL1577
- VDE - EN60747-5-5(VDE0884-5)
- CQC - GB4943.1, GB8898
- cUL- CSA Component Acceptance Service Notice No. 5A

### Applications:

- Switch mode power supplies
- Programmable controllers
- Household appliances
- Office equipment



Absolute Maximum Ratings				
Parameter	Symbol	Value	Unit	Note
Input				
Forward Current	$I_F$	60	mA	
Peak Forward Current	$I_{FP}$	1	A	1
Reverse Voltage	$V_R$	6	V	
Input Power Dissipation	$P_I$	100	mW	
Output				
Collector – Emitter Voltage	$V_{CEO}$	35	V	
Emitter – Collector Voltage	$V_{ECO}$	6	V	
Collector Current	$I_C$	50	mA	
Output Power Dissipation	$P_O$	150	mW	
Common				
Total Power Dissipation	$P_{tot}$	200	mW	
Isolation Voltage	$V_{iso}$	5000	V <sub>rms</sub>	2
Operating Temperature	$T_{opr}$	-55~110	°C	
Storage Temperature	$T_{stg}$	-55~125	°C	
Soldering Temperature	$T_{sol}$	260	°C	

Note 1. 100μs pulse, 100Hz frequency

Note 2. AC For 1 Minute, R.H. = 40 ~ 60%

Electrical Optical Characteristics at T <sub>a</sub> =25°C								
Parameter	Symbol	min	Typ.	Max.	unit	Test Condition	Note	
Input								
Forward Voltage	V <sub>F</sub>	-	1.24	1.4	V	I <sub>F</sub> =10mA		
Reverse Current	I <sub>R</sub>	-	-	10	μA	V <sub>R</sub> =6V		
Input Capacitance	C <sub>in</sub>	-	10	-	pF	V=0, f=1kHz		
Output								
Collector Dark Current	I <sub>CEO</sub>	-	-	100	nA	V <sub>EC</sub> =20V, I <sub>F</sub> =0		
Collector – Emitter Breakdown Voltage	BV <sub>CEO</sub>	35	-	-	V	I <sub>C</sub> =0.1mA, I <sub>F</sub> =0		
Emitter – Collector Breakdown Voltage	BV <sub>ECO</sub>	6	-	-	V	I <sub>E</sub> =0.1mA, I <sub>F</sub> =0		
Transfer Characteristics								
Current Transfer Ratio	<b>APC-817A1</b>	CTR	80	-	160	%	I <sub>F</sub> =5mA, V <sub>CE</sub> =5V	5
	<b>APC-817B1</b>		130	-	260			
	<b>APC-817C1</b>		200	-	400			
	<b>APC-817D1</b>		300	-	600			
Collector – Emitter Saturation Voltage	V <sub>CE(sat)</sub>	-	0.06	0.2	V	I <sub>F</sub> =20mA, I <sub>C</sub> =1mA		
Isolation Resistance	R <sub>ISO</sub>	10 <sup>12</sup>	10 <sup>14</sup>	-	Ω	DC500V, 40~60% R.H.		
Floating Capacitance	C <sub>IO</sub>	-	0.4	1	pF	V=0, f=1MHz		
Response Time (rise)	Tr	-	3	18	μs	V <sub>CE</sub> =2V, I <sub>C</sub> =2mA RL=100Ω	3	
Response Time (fall)	Tf	-	4	18	μs		3	
Cut-off Frequency	f <sub>c</sub>	-	80	-	kHz	V <sub>CE</sub> =2V, I <sub>C</sub> =2mA RL=100Ω, -3dB	4	

Note 3. Fig.12&13

Note 4. Fig.14

Note 5. CTR Value varies for each rank

### Naming System:

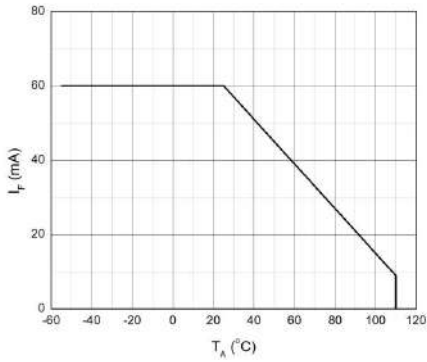
#### **APC-817A1-SL**

A1: Indicated to the CTR value listed on Page 3 (A1/B1/C1/D1)

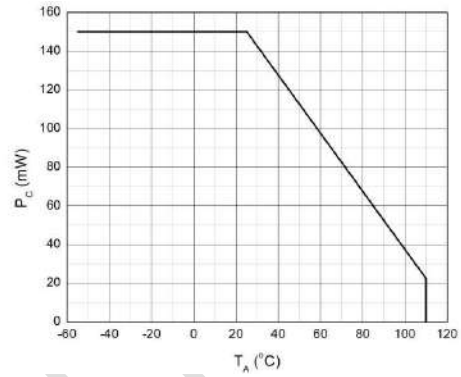
S: Indicated to the PIN type listed on Page 7 to Page 9 (None/M/S/SL/SML)

**Characteristic Curves**

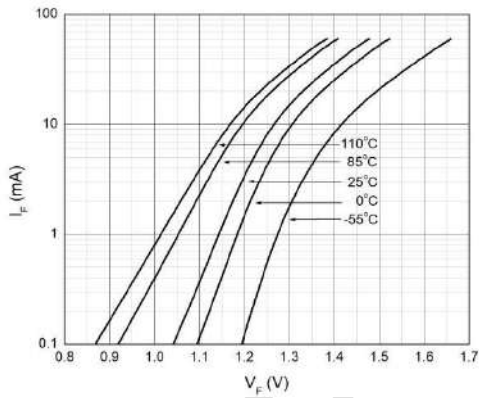
**Fig 1. Forward Current vs. Ambient Temperature**



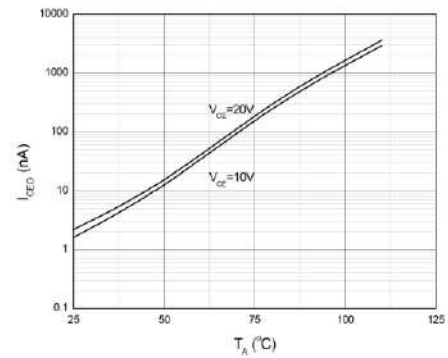
**Fig 2. Collector Power Dissipation vs. Ambient Temperature**



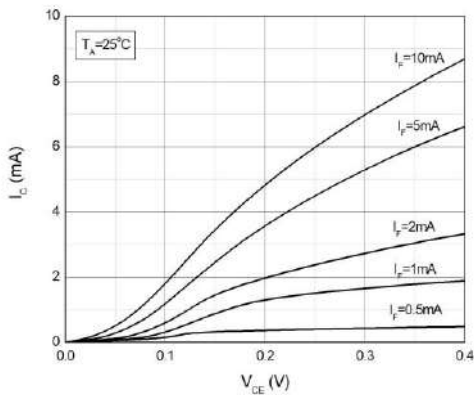
**Fig 3. Forward Current vs. Forward Voltage**



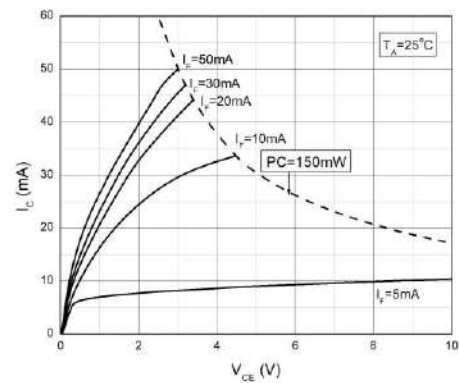
**Fig 4. Collector Dark Current vs. Ambient Temperature**



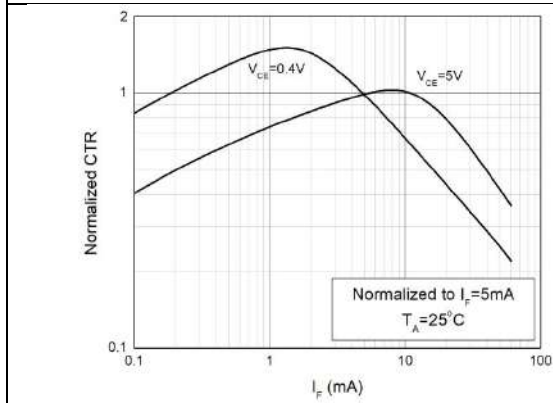
**Fig 5. Collector Current vs. Collector-emitter Voltage**



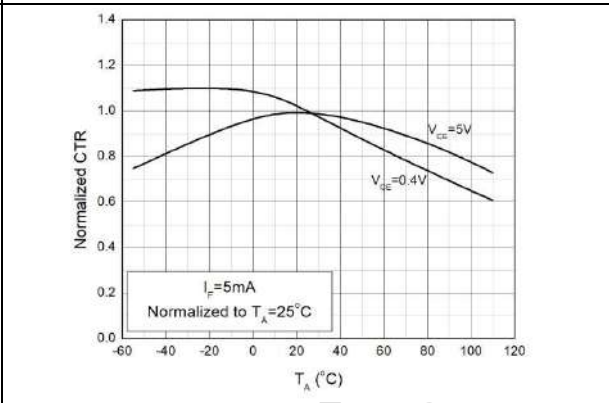
**Fig 6. Collector Current vs. Collector-emitter Voltage**



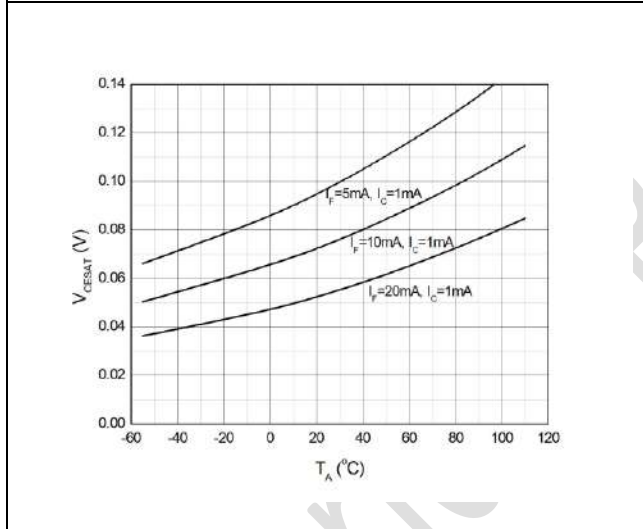
**Fig 7. Normalized Current Transfer Ratio vs. Forward Current**



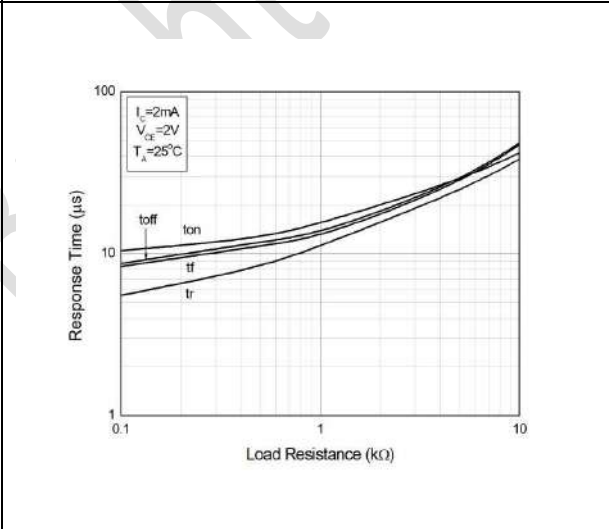
**Fig 8. Normalized Current Transfer Ratio vs. Ambient Temperature**



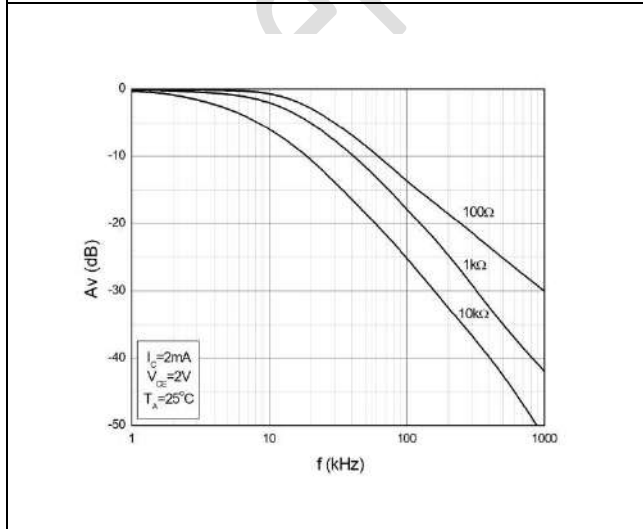
**Fig 9. Collector-emitter Saturation Voltage vs. Ambient Temperature**



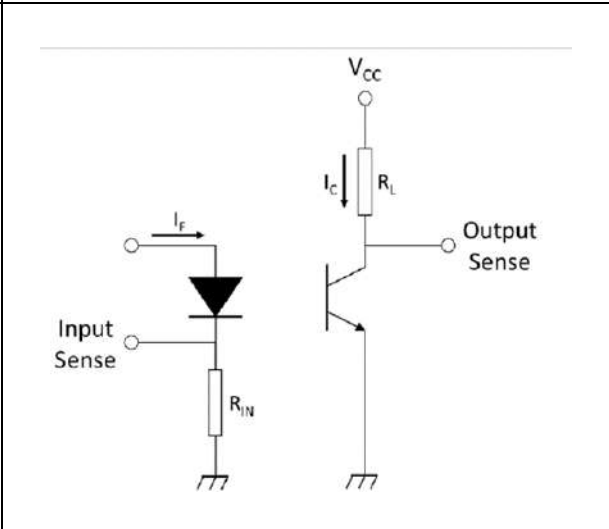
**Fig 10. Switching Time vs. Load Resistance**



**Fig 11. Frequency Response**



**Fig 12. Test Circuits of Response Time**





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Fig 13. Curves of Response Time

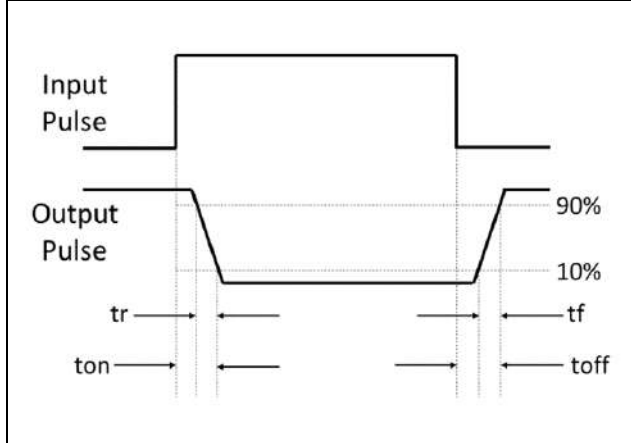
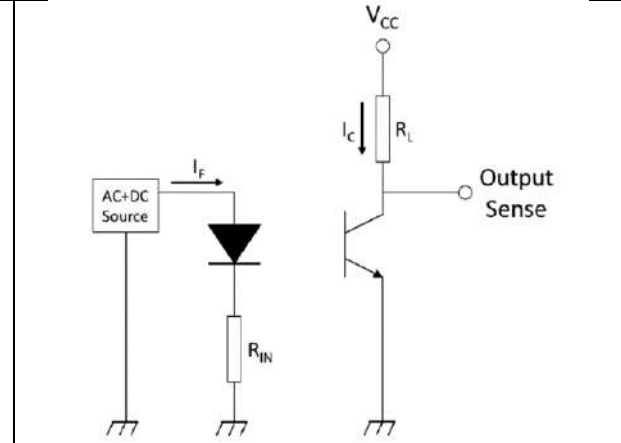


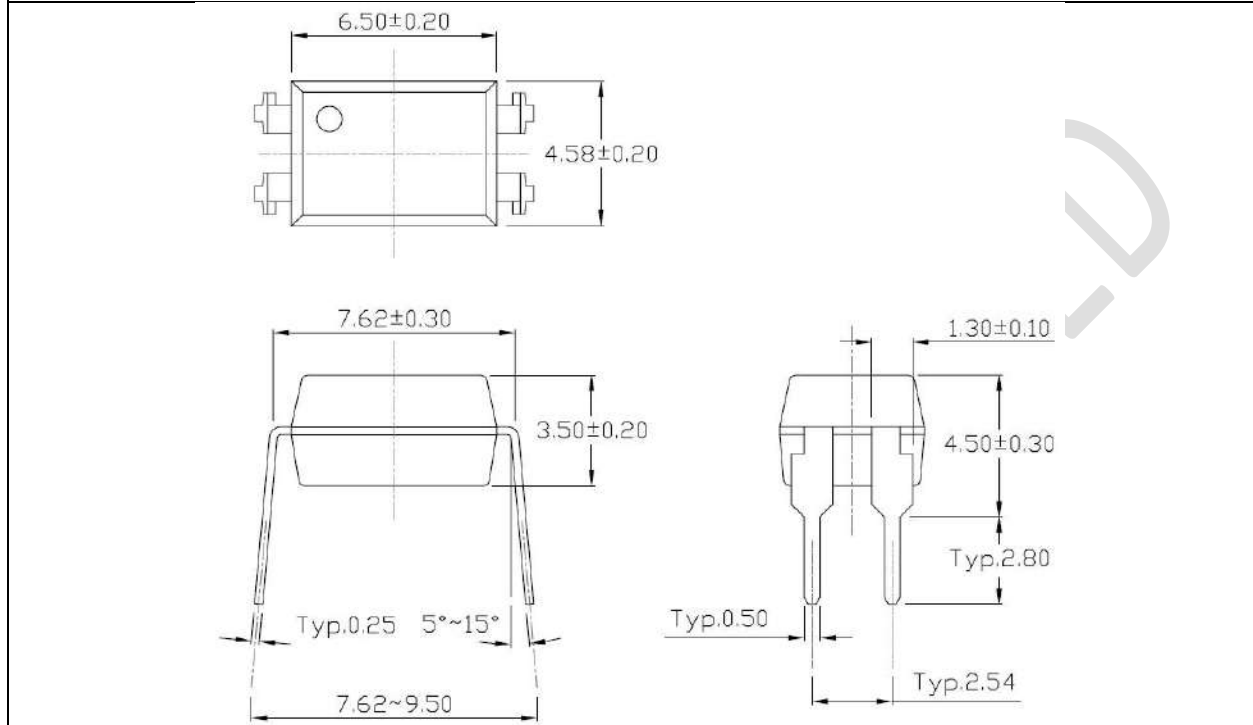
Fig 14. Test Circuits of Frequency Response



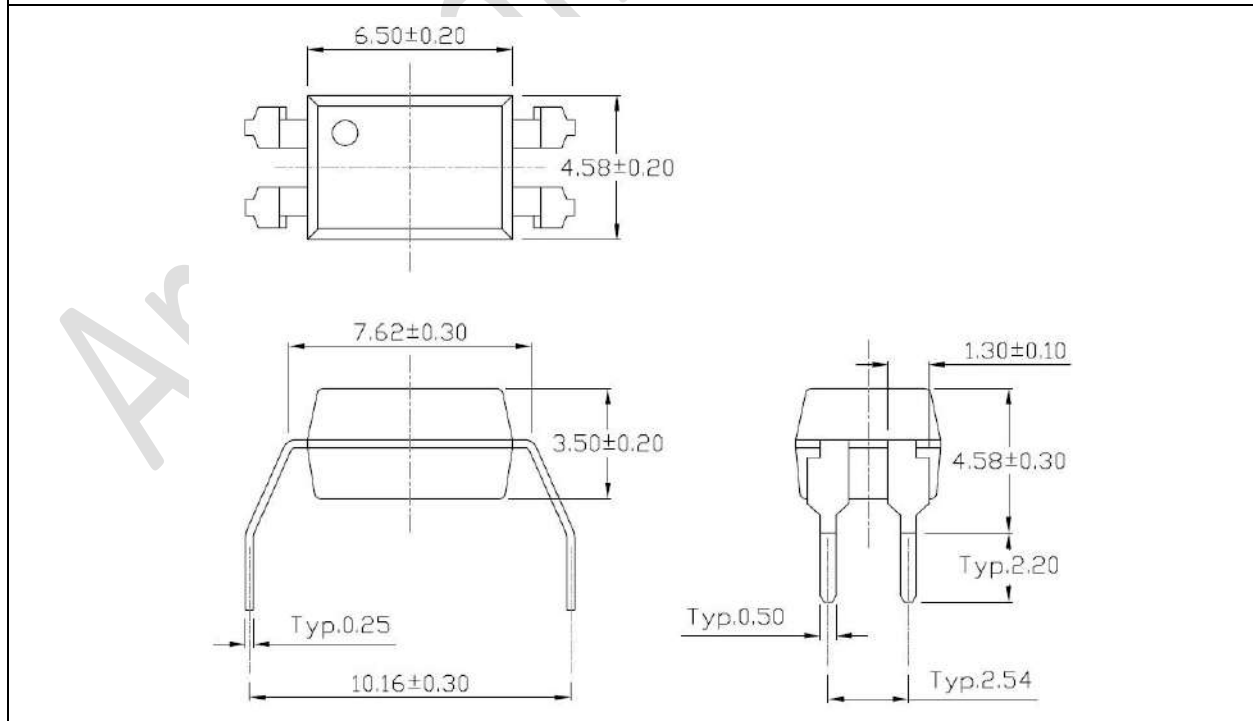
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**Package Dimension (mm)**

**Standard DIP – Through hole (DIP Type) – APC-817xx**



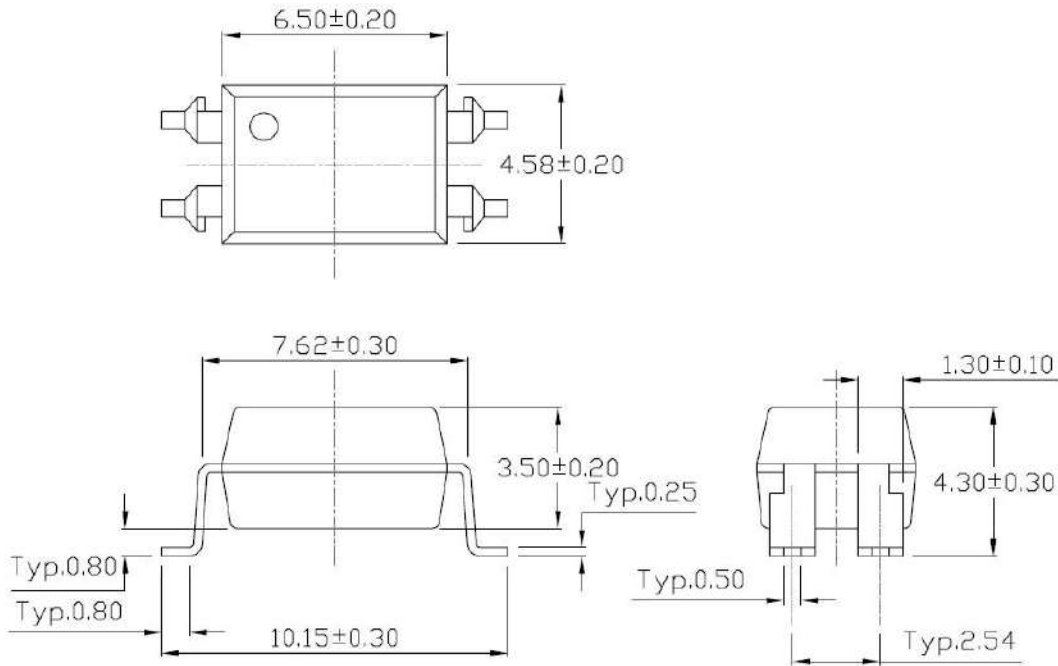
**Gullwing (400mil) Lead Forming – Through Hole (M Type) – APC-817xx-M**



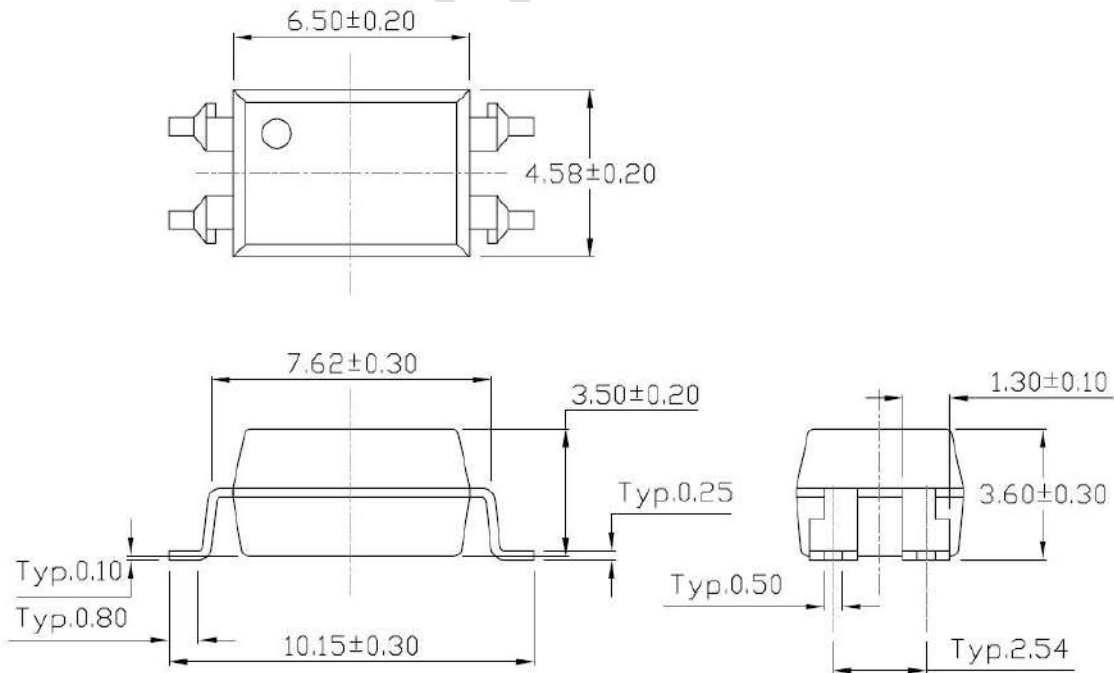


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## Surface Mount Lead Forming (S Type) – APC817xx-S



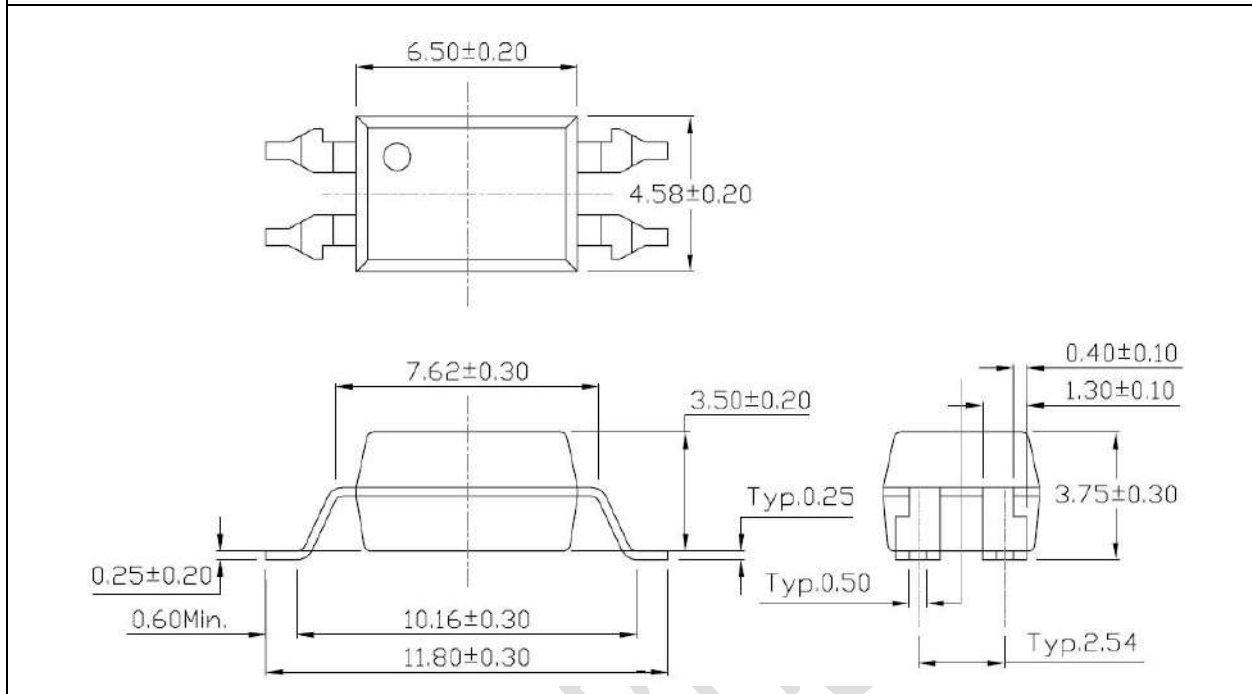
## Surface Mount (Low Profile) Lead Forming (SL Type) - APC-817xx-SL





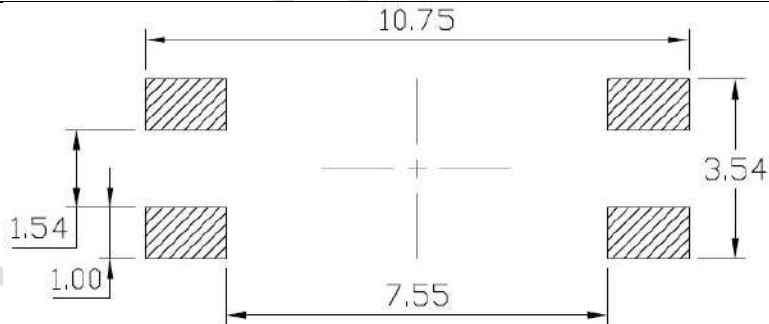
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## Surface Mount (Gullwing) Lead Forming (SLM Type) - APC-817xx-SLM

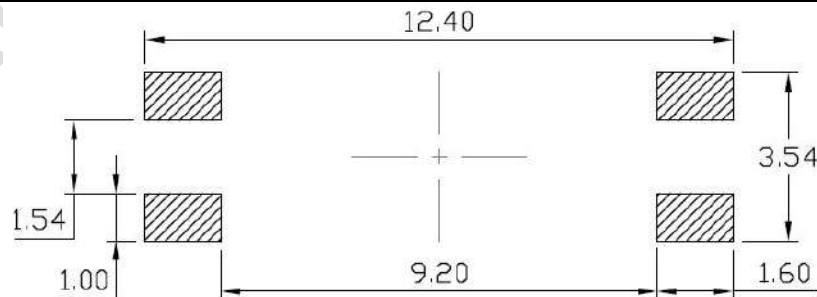


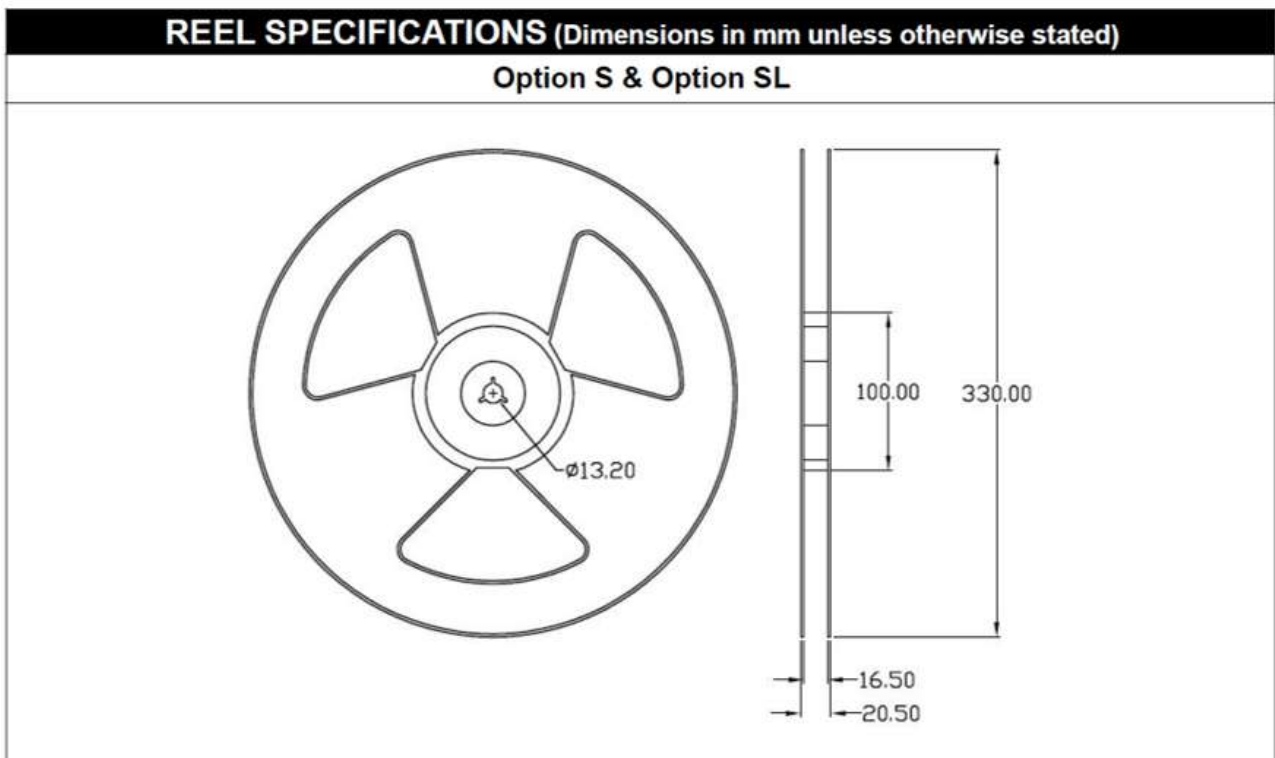
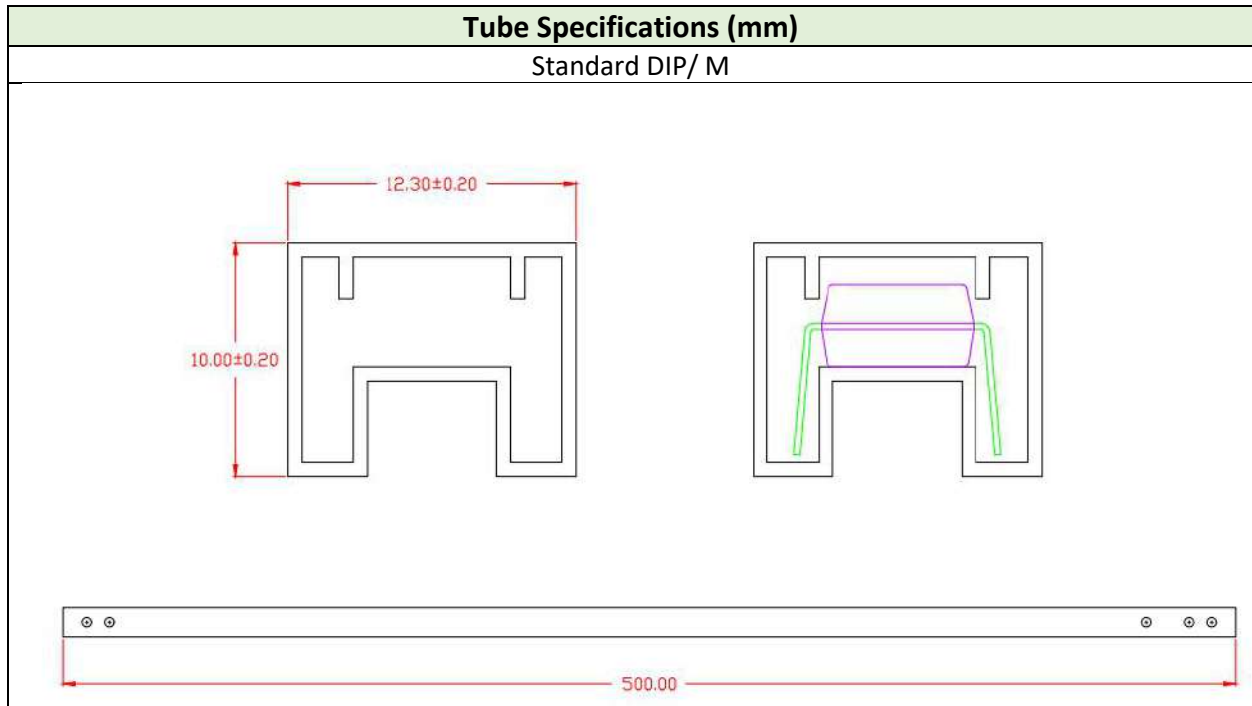
### Recommended Solder Mask (mm)

#### Surface Mount Lead Forming & Surface Mount (Low Profile) Lead Forming



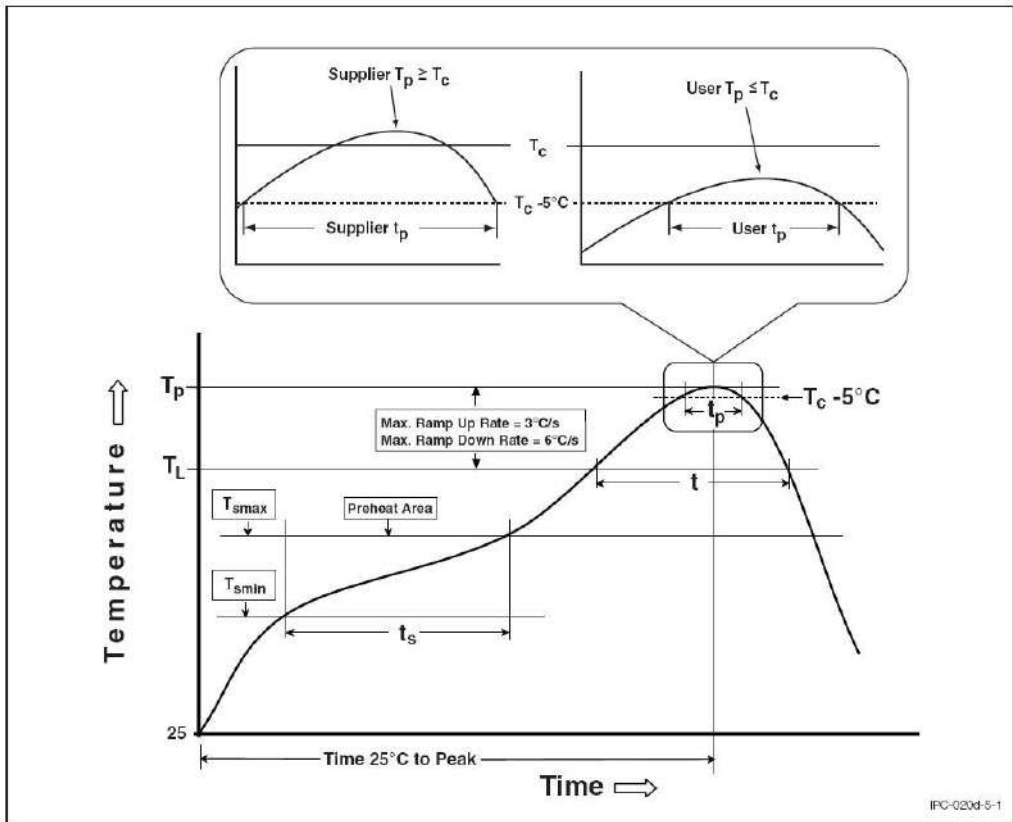
#### Surface Mount (Gullwing) Lead Forming





**Reflow Information**

**Reflow Profile**





Profile Feature	Sn-Pb Assembly Profile	Pb-free Assembly Profile
Temperature min. ( $T_{s, min}$ )	100°C	150°C
Temperature Max. ( $T_{s, Max}$ )	150°C	200°C
Time ( $t_s$ ) from ( $T_{s, min}$ to $T_{s, max}$ )	60-120 s	60-120 s
Ramp-up Rate ( $t_L$ to $t_P$ )	3°C/s max.	3°C/s max.
Liquidous Temperature ( $T_L$ )	183°C	217°C
Time ( $t_L$ ) Maintained Above ( $T_L$ )	60-150 s	60-150 s
Peak Body Package Temperature	230°C +0°C/ -5°C	260°C +0°C/ -5°C
Time ( $t_P$ ) within 5°C of 260°C	20 s	30 s
Ramp-down Rate ( $T_P$ to $T_L$ )	6°C/s max.	6°C/s max.
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.

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