

Description

The TLP521 series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic 4Pin package with different lead forming options.

With the robust coplanar double mold structure, TLP521 series provide the most stable isolation feature.

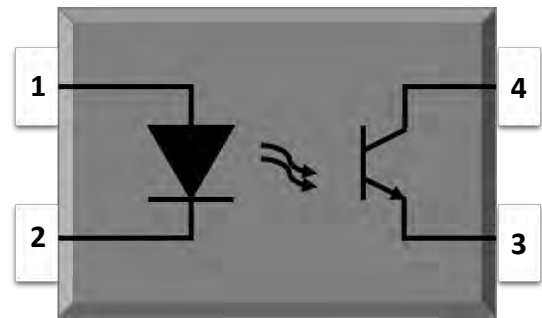
Features

- High isolation 5300 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- Operating temperature range - 55 °C to 110 °C
- RoHS & REACH Compliance
- MSL class 1
- Halogen free (Optional)
- Regulatory Approvals
 - 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

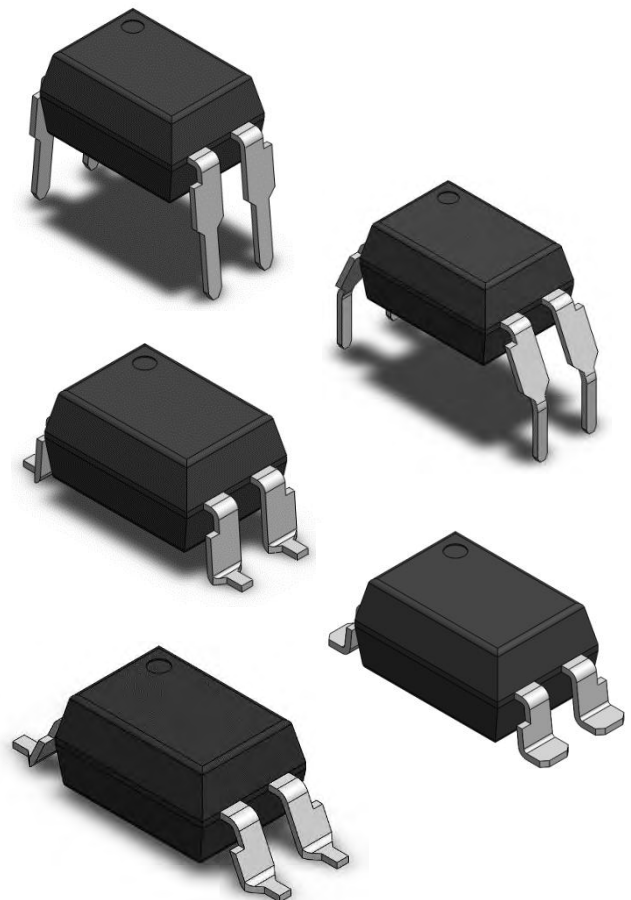
SCHEMATIC

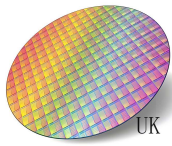


PIN DEFINITION

1. Anode
2. Cathode
3. Emitter
4. Collector

PACKAGE OUTLINE





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 _{rms}	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

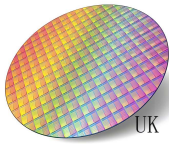
Note 2. AC For 1 Minute, R.H. = 40 ~ 60%

ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C

PARAMETER	SYMBOL	MIN	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
INPUT							
Forward Voltage	V _F	-	1.24	1.4	V	IF=10mA	
Reverse Current	I _R	-	-	10	μA	VR=6V	
Input Capacitance	C _{in}	-	10	-	pF	V=0, f=1kHz	
OUTPUT							
Collector Dark Current	I _{CEO}	-	-	100	nA	VCE=20V, IF=0	
Collector-Emitter Breakdown Voltage	BV _{CEO}	35	-	-	V	IC=0.1mA, IF=0	
Emitter-Collector Breakdown Voltage	BV _{ECO}	6	-	-	V	IE=0.1mA, IF=0	
TRANSFER CHARACTERISTICS							
Current Transfer Ratio	TLP521,SM		50	-	600	%	IF=5mA, VCE=5V IF=1mA, VCE=0.4V
	521-1X,XSM		50	-	600		
	521GB,GBSM	CTR	100	-	600		
	521-1GB,GBSM		100	-	600		
	521XGB,XGBSM		100	-	300		
	521-1XGB,XGBSM		100	-	300		
Collector-Emitter Saturation Voltage	V _{CE(sat)}	-	0.06	0.2	V	IF=20mA, IC=1mA	
Isolation Resistance	R _{ISO}	10 ¹²	10 ¹⁴	-	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance	C _{IO}	-	0.4	1	pF	V=0, f=1MHz	
Response Time (Rise)	t _r	-	3	18	μs	VCE=2V, IC=2mA	3
Response Time (Fall)	t _f	-	4	18	μs	RL=100Ω	3
Cut-off Frequency	f _c	-	80	-	kHz	VCE=2V, IC=2mA RL=100Ω,-3dB	4

Note 3. Fig.12&13

Note 4. Fig.14



CHARACTERISTIC CURVES

Fig.1 Forward Current vs. Ambient Temperature

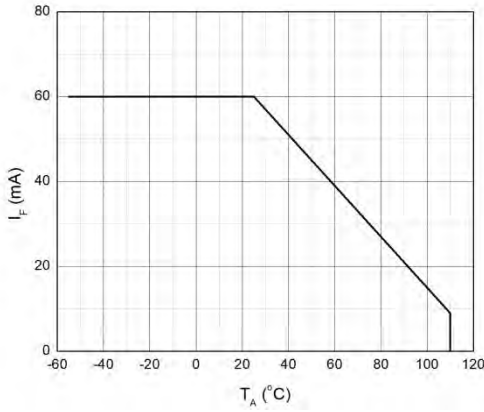


Fig.2 Collector Power Dissipation vs. Ambient Temperature

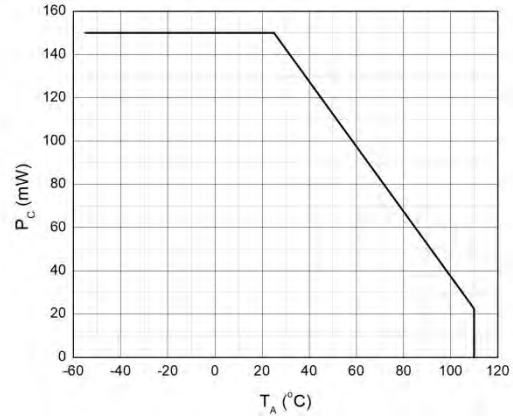


Fig.3 Forward Current vs. Forward Voltage

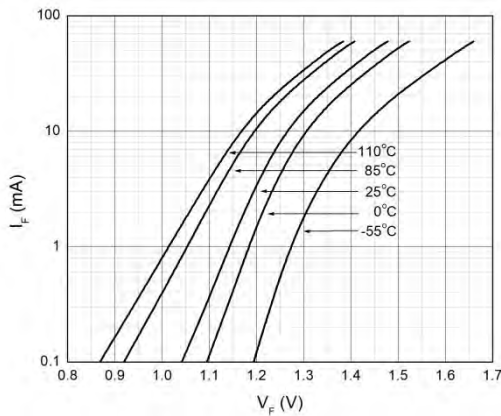


Fig.4 Collector Dark Current vs. Ambient Temperature

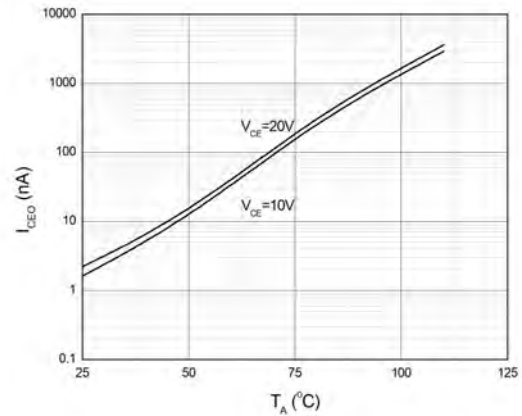


Fig.5 Collector Current vs. Collector-emitter Voltage

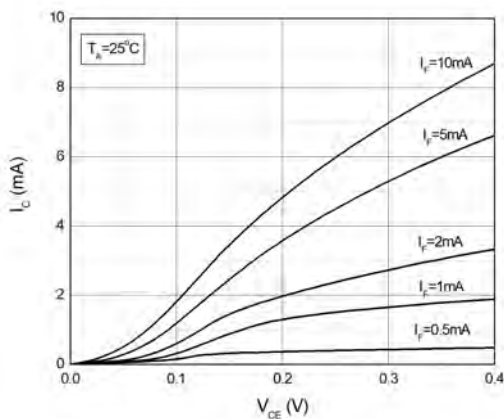
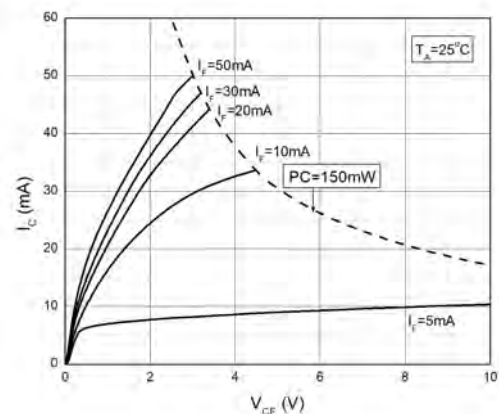
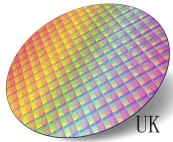


Fig.6 Collector Current vs. Collector-emitter Voltage





CHARACTERISTIC CURVES

Fig.7 Normalized Current Transfer Ratio vs. Forward Current

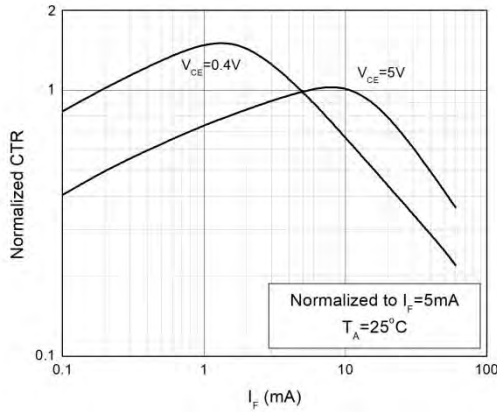


Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature

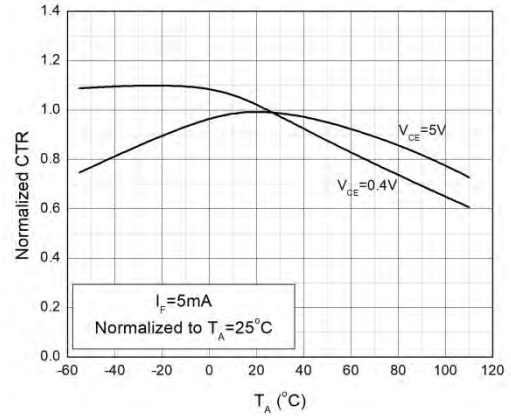


Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature

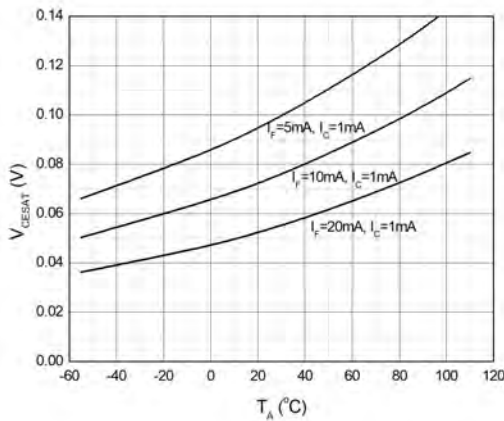


Fig.10 Switching Time vs. Load Resistance

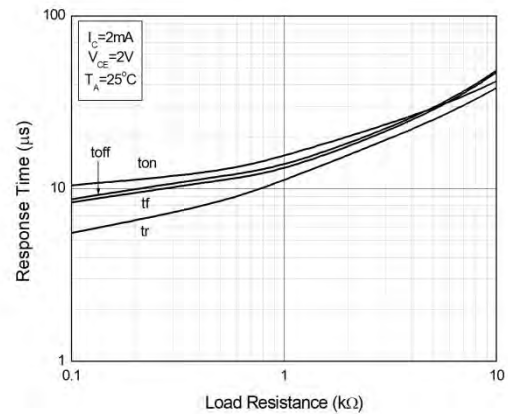
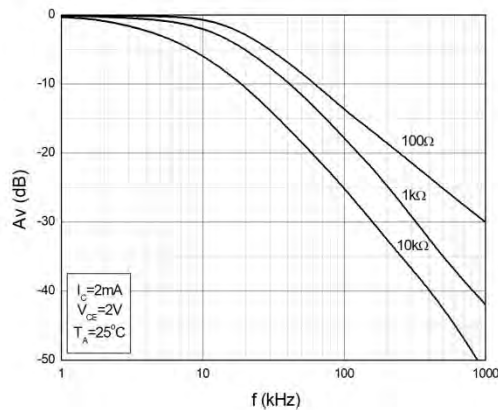
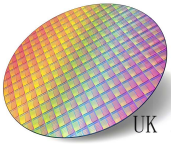


Fig.11 Frequency Response





TEST CIRCUITS

Fig.12 Test Circuits of Response Time

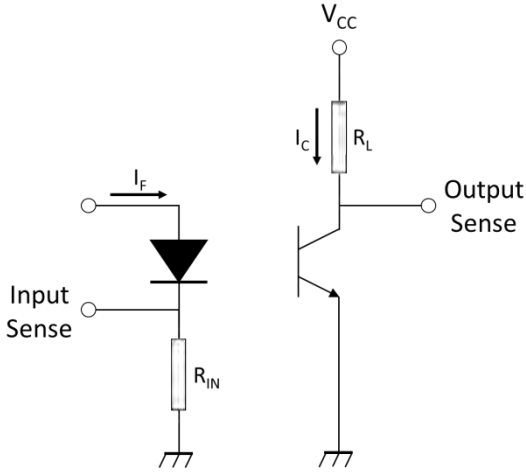


Fig.13 Curves of Response Time

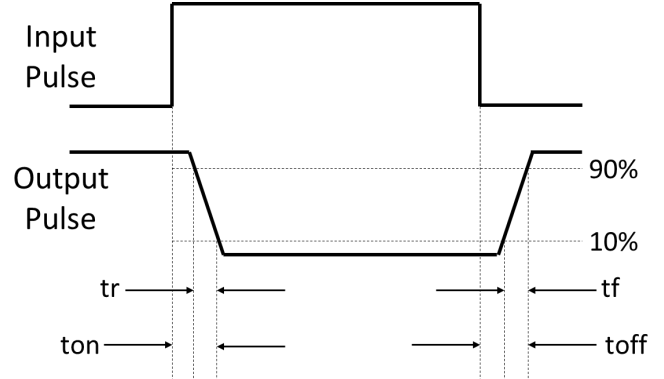
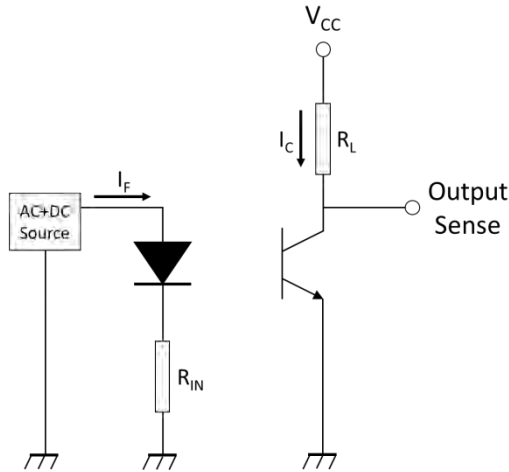
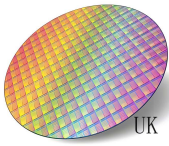


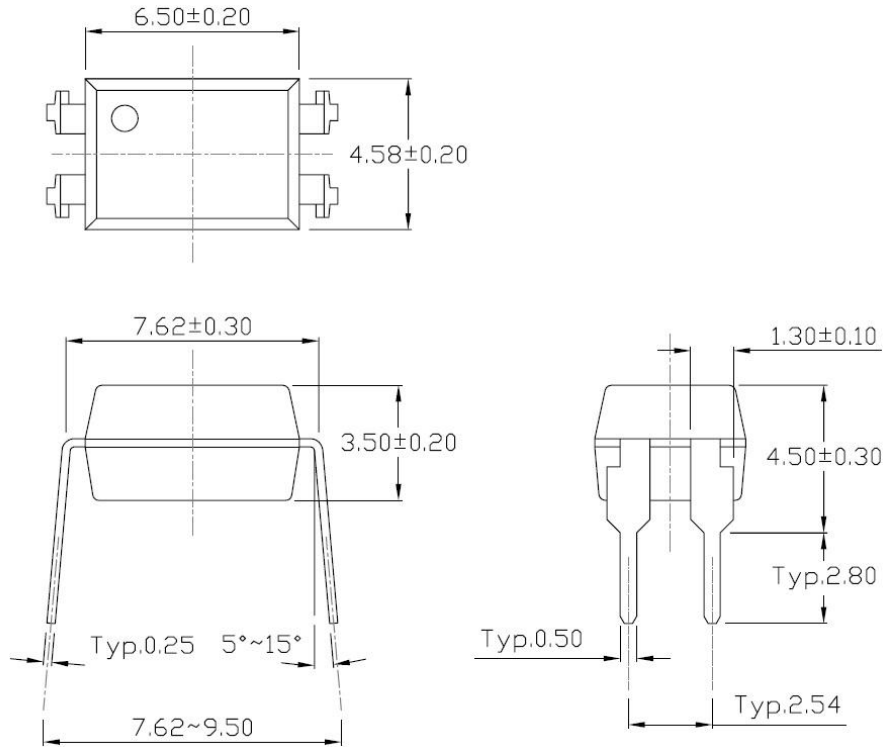
Fig.14 Test Circuits of Frequency Response



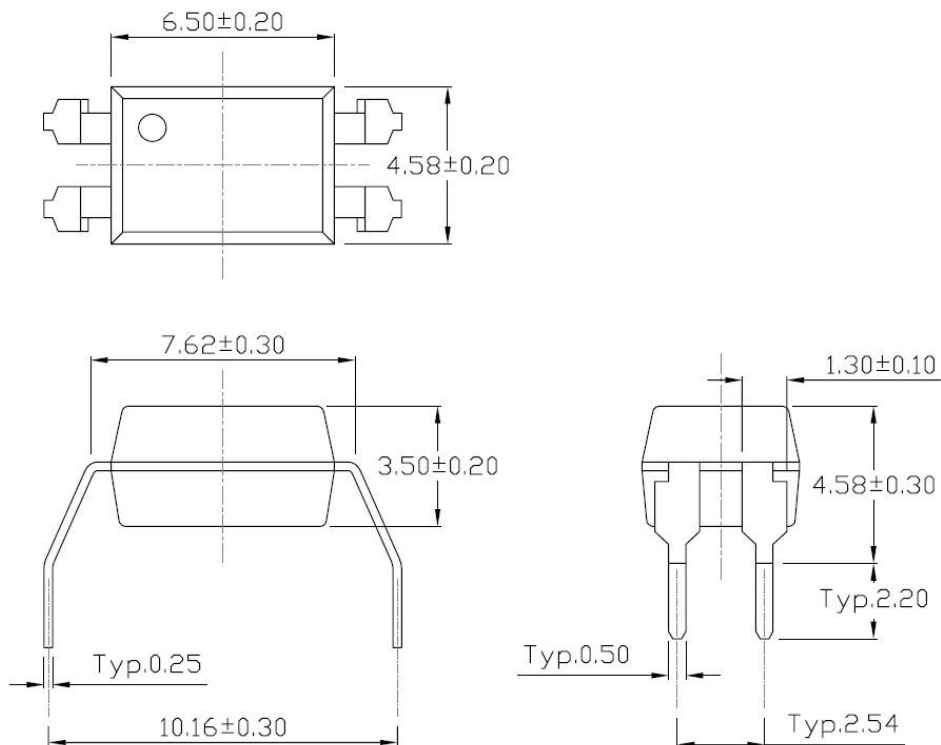


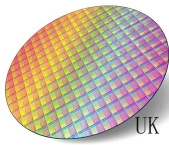
PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Standard DIP – Through Hole (DIP Type)



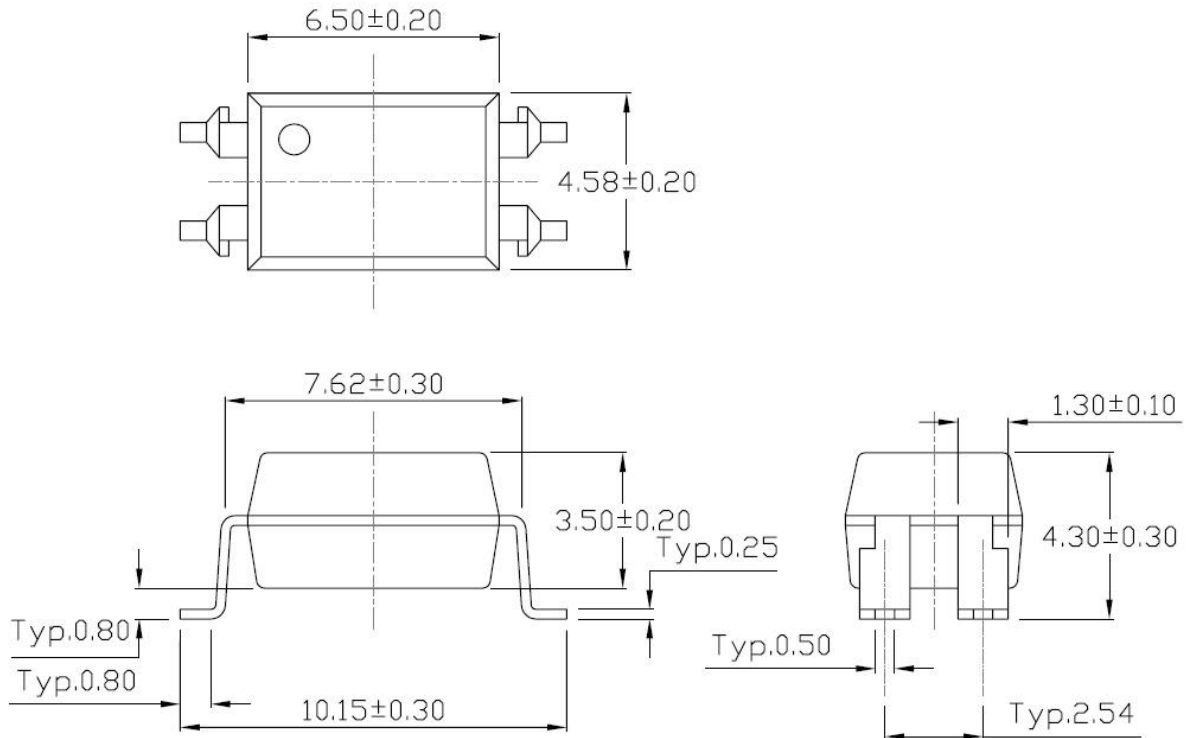
Gullwing (400mil) Lead Forming – Through Hole (M Type)



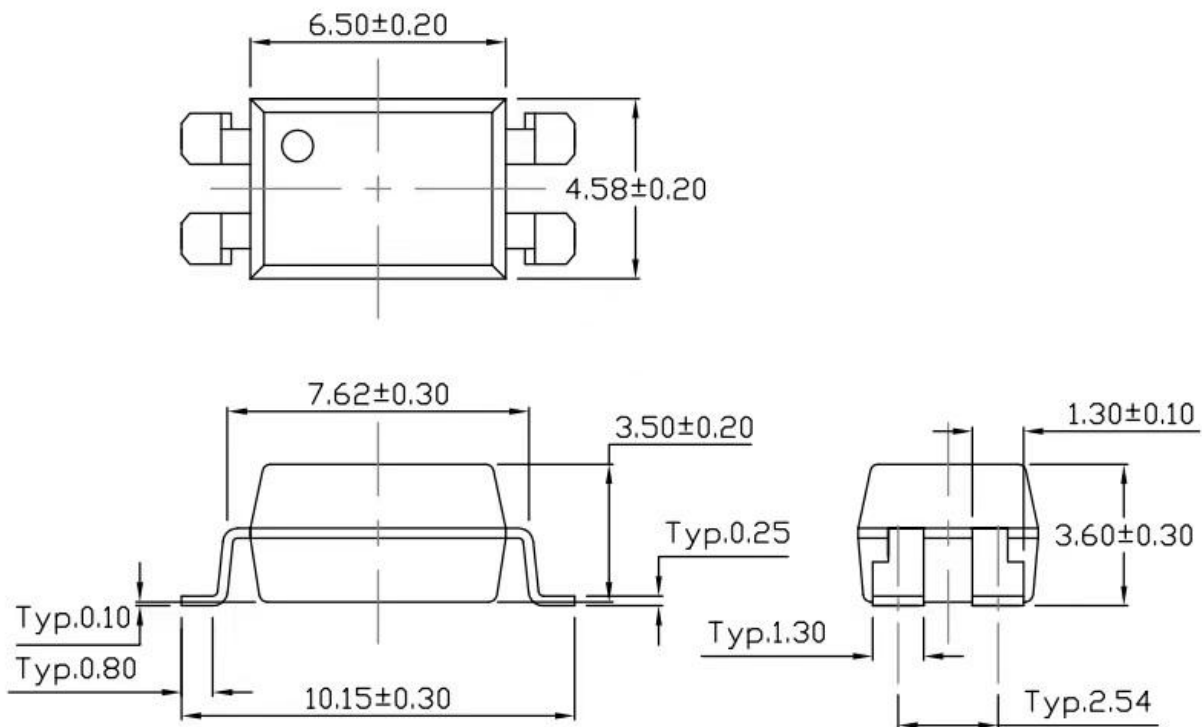


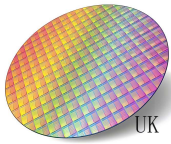
PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Surface Mount Lead Forming (S Type)



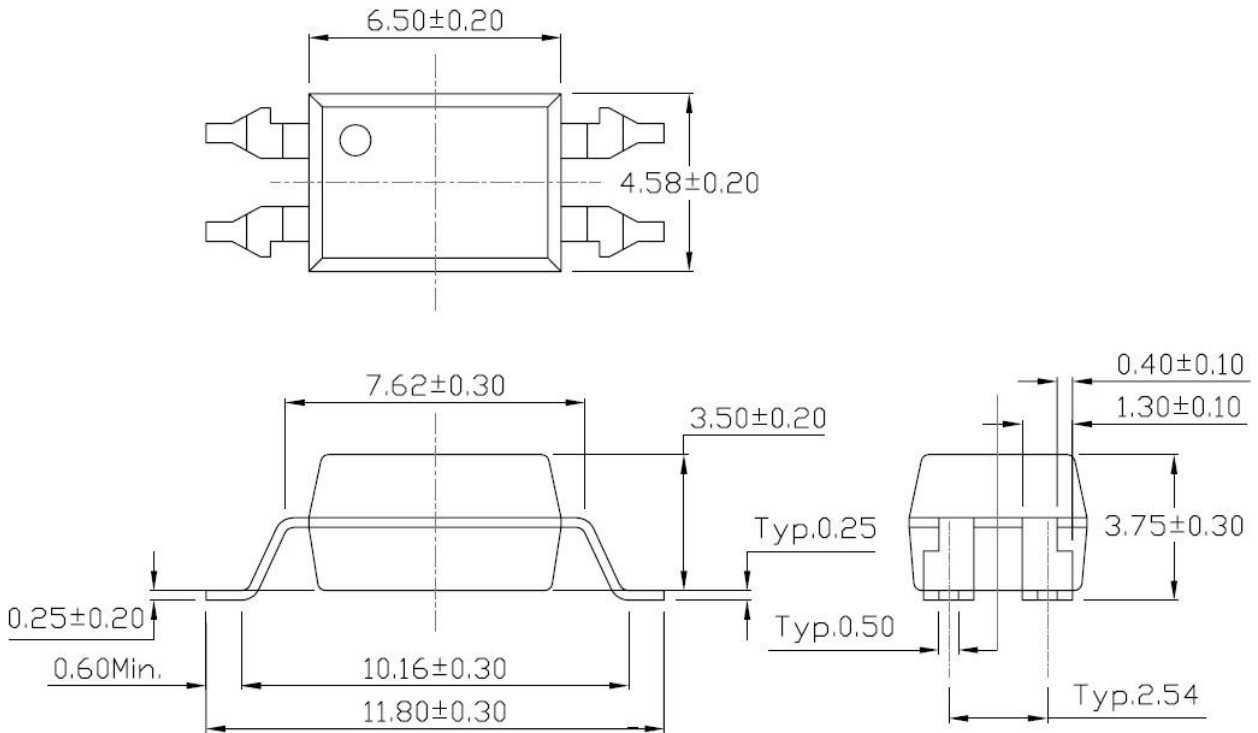
Surface Mount (Low Profile) Lead Forming (SM Type)





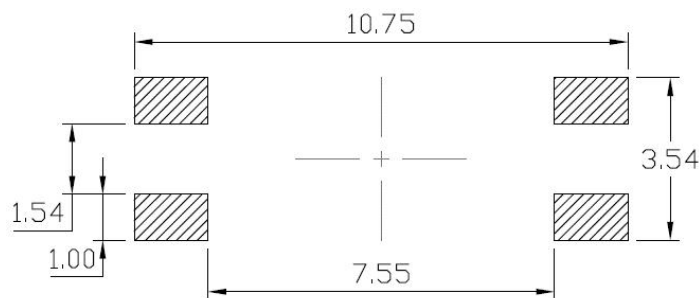
PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Surface Mount (Gullwing) Lead Forming (SLM Type)

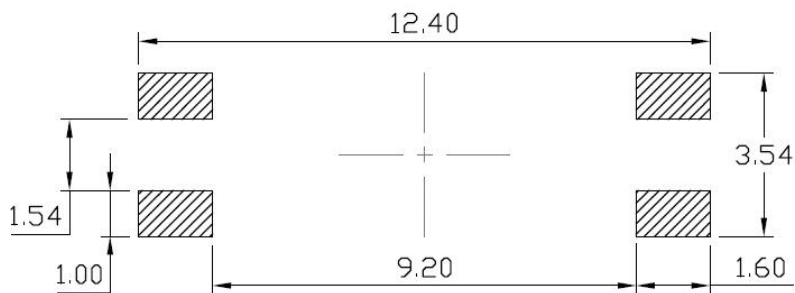


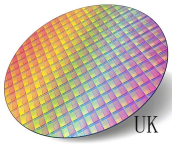
RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)

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



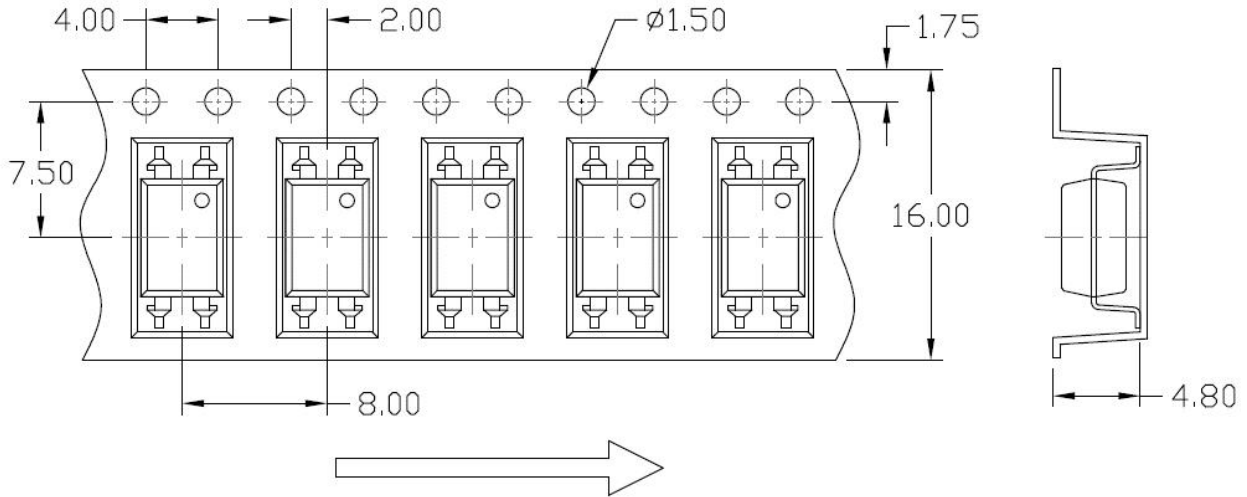
Surface Mount (Gullwing) Lead Forming



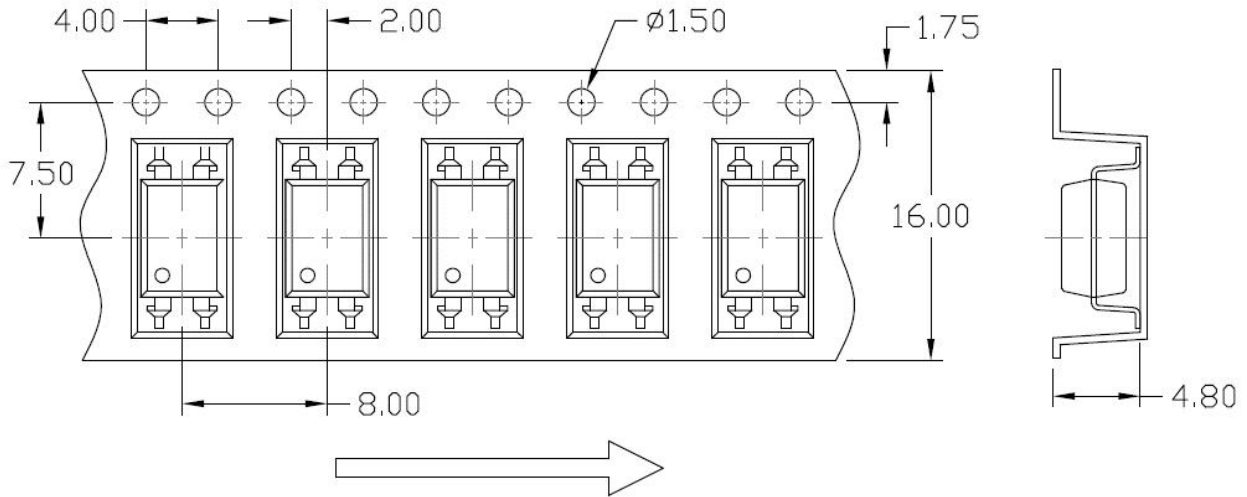


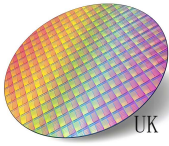
CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S(T1) & SM(T1)



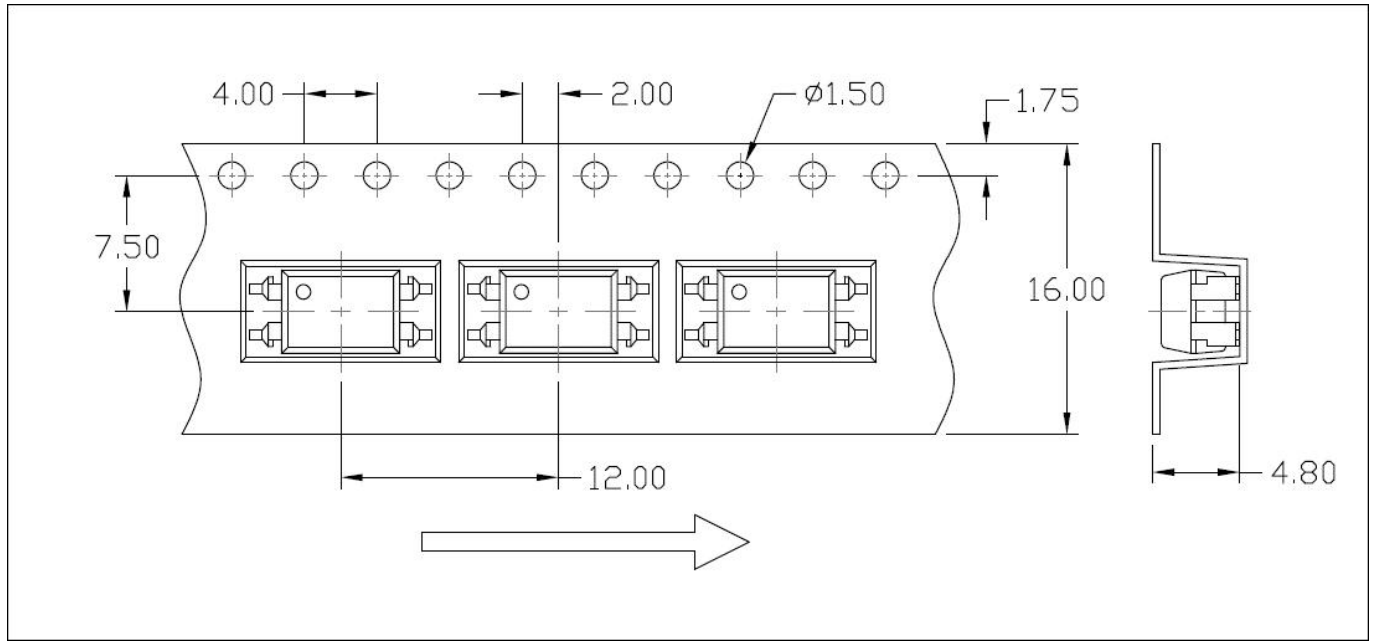
Option S(T2) & SM(T2)



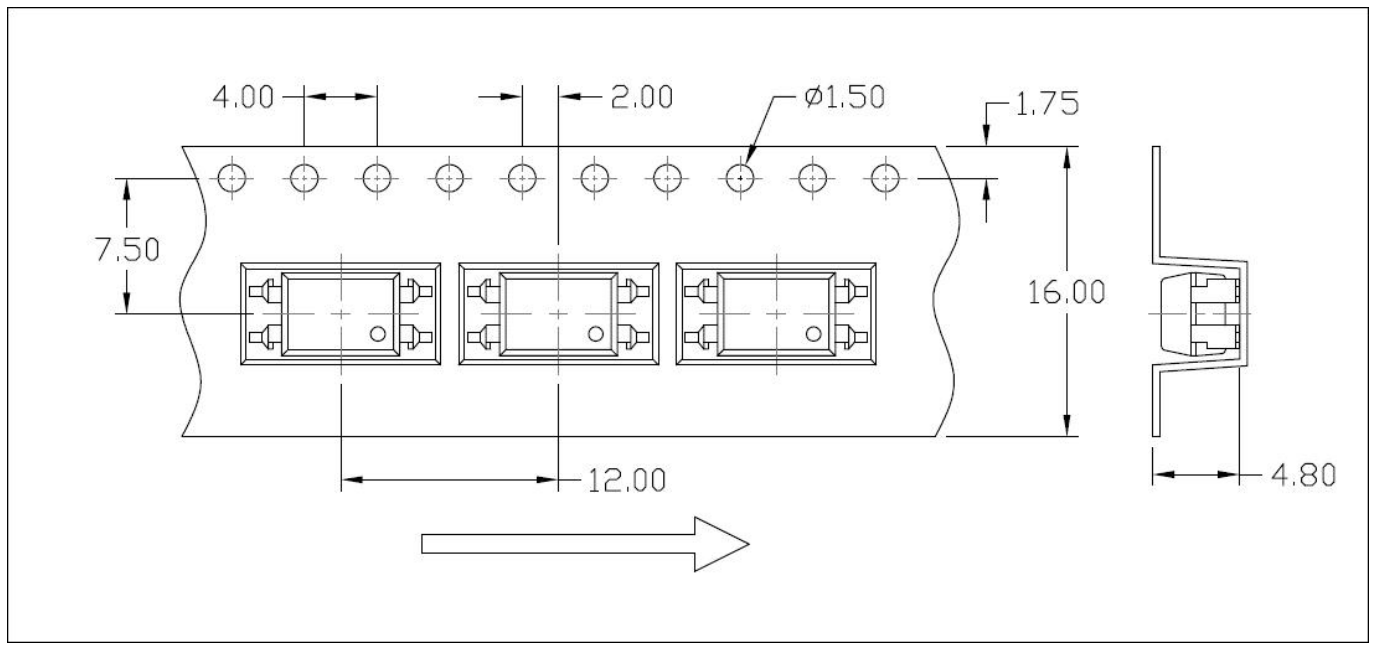


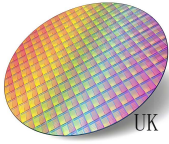
CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S(T3) & SM(T3)



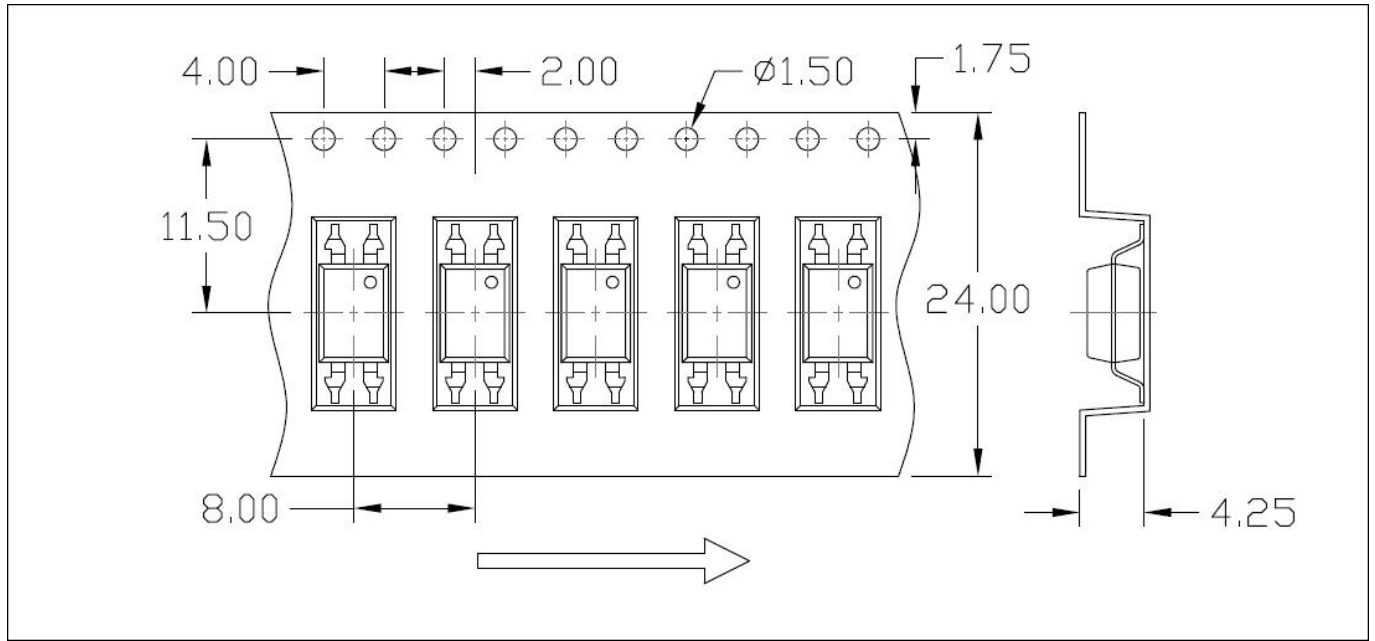
Option S(T4) & SM(T4)



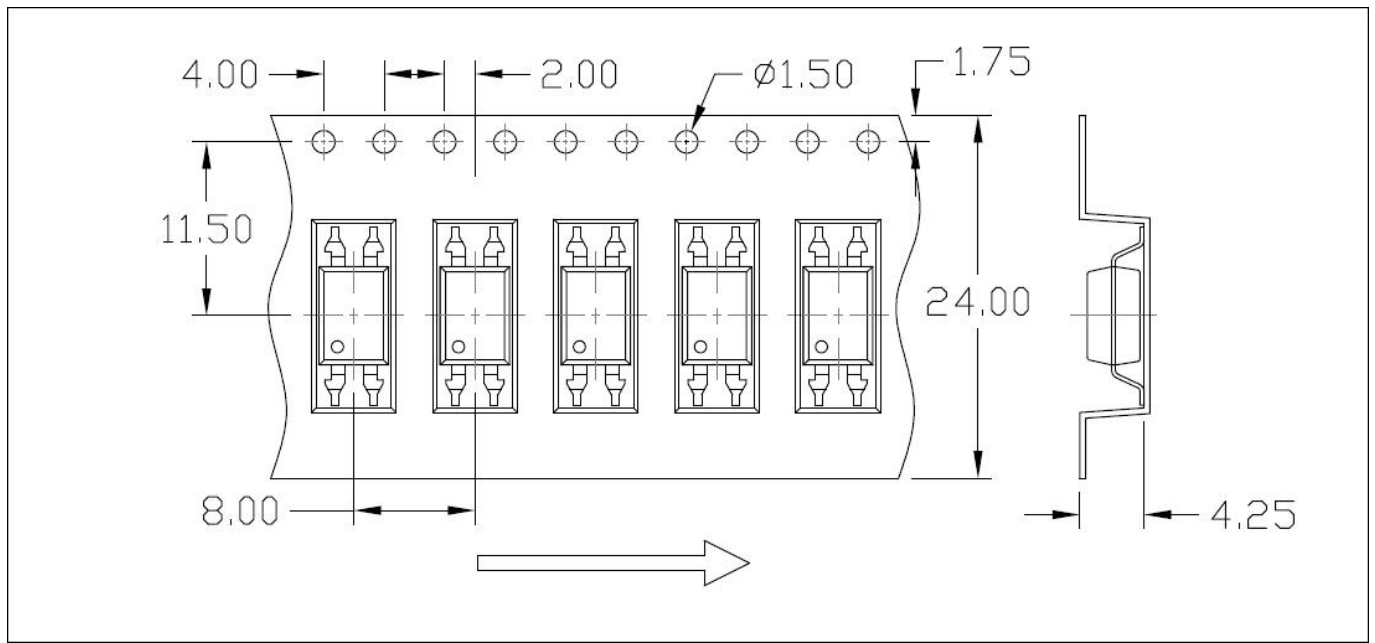


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option SLM(T1)



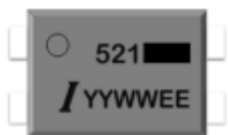
Option SLM(T2)



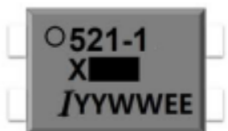
ORDERING AND MARKING INFORMATION

MARKING INFORMATION

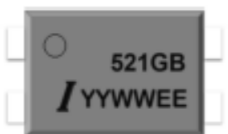
TLP521,SM



TLP521-1X,XSM



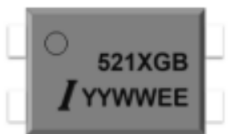
TLP521GB,GBSM



TLP521-1GB,GBSM



TLP521XGB,XGBSM



TLP521-1XGB,XGBSM



521 : Part Number
X : VDE Mark
GB/NONE : CTR Rank
/ : ASG Brand Mark
YY : Year
WW : Work Week
EE : Manufacturing Code

ORDERING INFORMATION

TLP521(-1)(XGB)(L)(T/R)

TLP521– Part Number
 1 or None – All one way optocoupler
 X– Rank (/None/GB)
 GB – Rank (/None/GB)
 L – Lead Form Option /None/SM)
 T/R – Tape and Reel Option

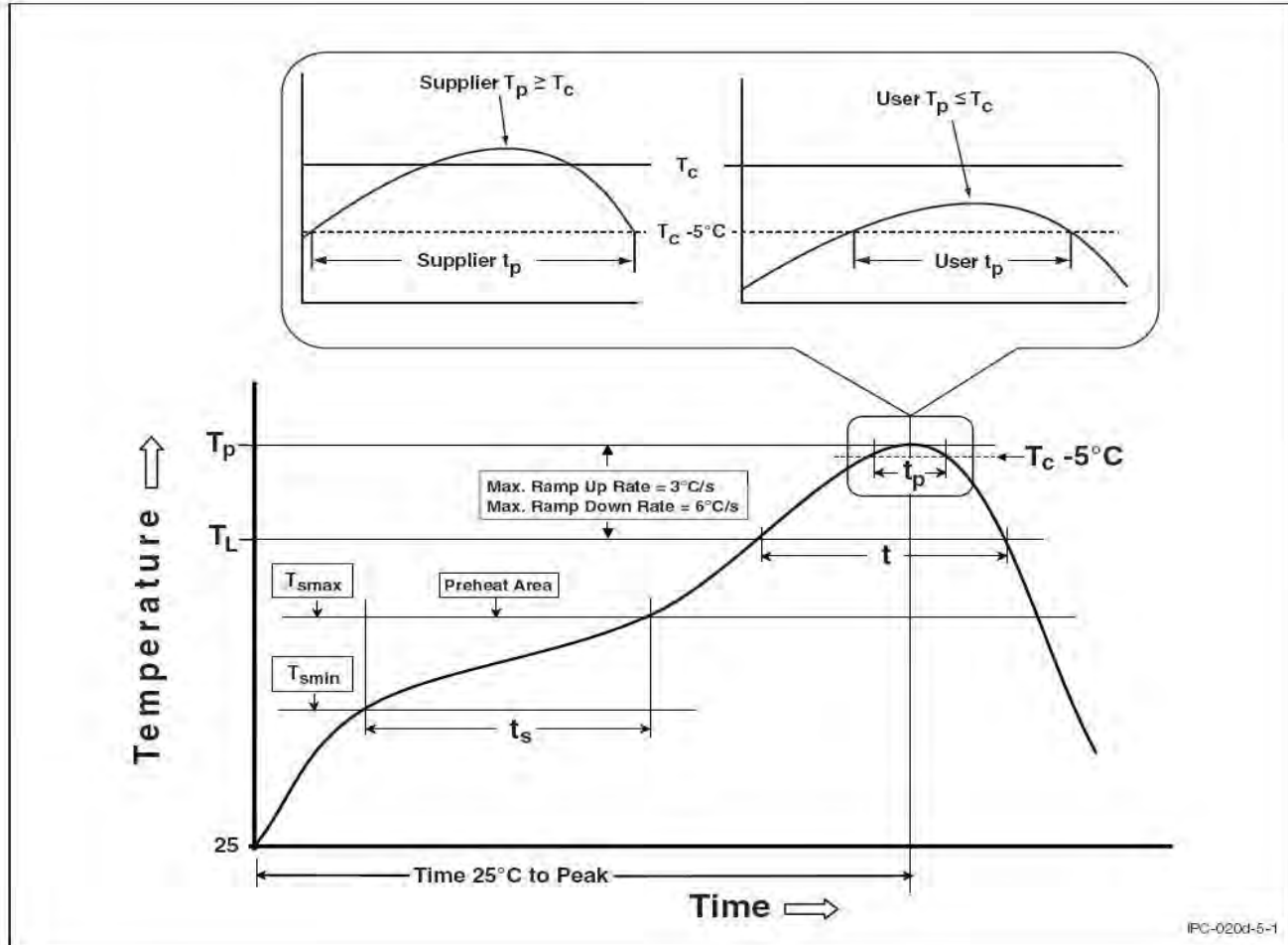
ORDERING P/N LIST

Packing Quantity

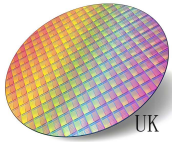
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TLP521	100 Units/Tube	20 Tubes/Inner box	10 Inner box/Outer box = 20k Units
TLP521-1X	100 Units/Tube	20 Tubes/Inner box	10 Inner box/Outer box = 20k Units
TLP521GB	100 Units/Tube	20 Tubes/Inner box	10 Inner box/Outer box = 20k Units
TLP521-1GB	100 Units/Tube	20 Tubes/Inner box	10 Inner box/Outer box = 20k Units
TLP521XGB	100 Units/Tube	20 Tubes/Inner box	10 Inner box/Outer box = 20k Units
TLP521-1XGB	100 Units/Tube	20 Tubes/Inner box	10 Inner box/Outer box = 20k Units
TLP521SMT/R	1000 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 10k Units
TLP521-1XSMT/R	1000 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 10k Units
TLP521GBSMT/R	1000 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 10k Units
TLP521-1GBSMT/R	1000 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 10k Units
TLP521XGBSMT/R	1000 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 10k Units
TLP521-1XGBSMT/R	1000 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 10k Units

REFLOW INFORMATION

REFLOW PROFILE



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.



DISCLAIMER

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- The characteristic curves shown in this datasheet are representing typical performance which are not guaranteed.
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- This product is not intended to be used for military, aircraft, automotive, medical, life sustaining or lifesaving applications or any other application which can result in human injury or death.
- Please contact ASG sales agent for special application request.
- Immerge unit's body in solder paste is not recommended.
- Parameters provided in datasheets may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated in each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify ASG's terms and conditions of purchase, including but not limited to the warranty expressed therein.