

Description

The 4N25, 4N26, 4N27, 4N28, 4N35, 4N36, 4N37, 4N38, H11A1, H11A2, H11A3, H11A4, H11A5 series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic DIP6 package with different lead forming options.

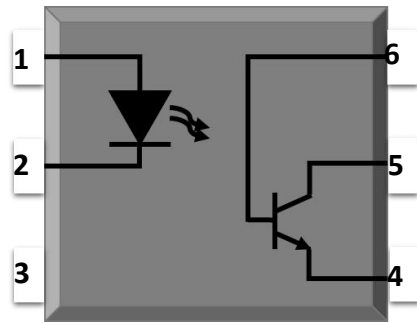
Features

- High isolation 5000 VRMS
- DC input with transistor output
- Operating temperature range - 55 °C to 110 °C
- RoHS & REACH Compliance
- MSL class 1
- Regulatory Approvals
 - UL - UL1577
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC - GB4943.1, GB8898
 - cUL- CSA Component Acceptance Service Notice No. 5A

Applications

- Sequence controller
- Telephone/FAX
- System appliances, measuring instrument
- Programmable logic controller

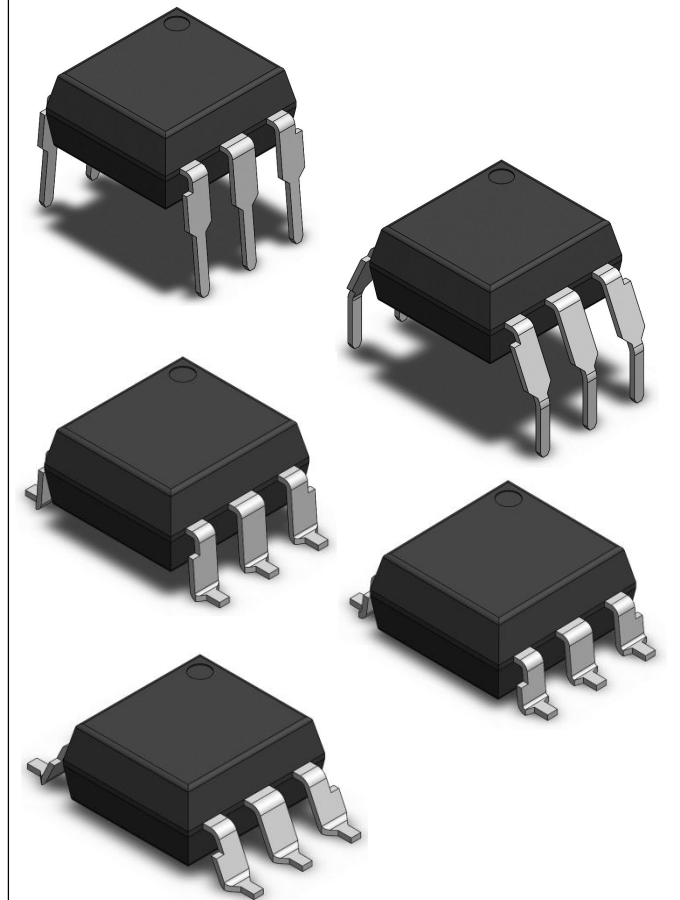
SCHEMATIC

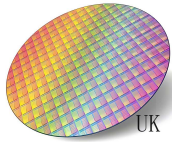


PIN DEFINITION

1. Anode	6. Base
2. Cathode	5. Collector
3. NC	4. Emitter

PACKAGE OUTLINE





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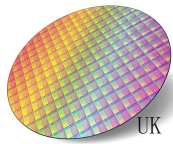
**4N25, 4N26, 4N27, 4N28, 4N35, 4N36, 4N37, 4N38,
H11A1, H11A2, H11A3, H11A4, H11A5**
6Pin, DC Input, Photo Transistor Coupler

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT	NOTE
INPUT				
Forward Current	I_F	50	mA	
Peak Forward Current($t=10\mu s$)	I_{FM}	1	A	1
Reverse Voltage	V_R	6	V	
Power Dissipation($T_A=25^\circ C$)	P_D	70	mW	
OUTPUT				
Collector - Emitter Voltage	V_{CEO}	80	V	
Collector-Base Breakdown Voltage	V_{CBO}	80	V	
Emitter - Collector Voltage	V_{ECO}	7	V	
Emitter-Base Breakdown Voltage	V_{EBO}	7	V	
Collector Current	I_C	80	mA	
Power Dissipation($T_A=25^\circ C$)	P_C	150	mW	
COMMON				
Total Power Dissipation	P_{tot}	200	mW	
Isolation Voltage	V_{iso}	5000	Vrms	2
Operating Temperature	T_{opr}	-55~+110	$^\circ C$	
Storage Temperature	T_{stg}	-55~+110	$^\circ C$	
Soldering Temperature	T_{sol}	260	$^\circ C$	

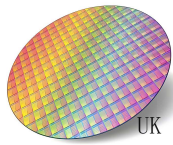
Note 1. AC For 1 Minute, R.H. = 40 ~ 60%

Note 2. For 10 seconds

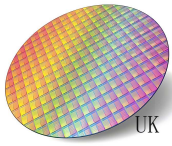


ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	TEST CONDITION	NOTE
INPUT							
Forward Voltage	V_F	-	1.24	1.4	V	$I_F=10\text{mA}$	
Reverse Current	I_R	-	-	10	μA	$V_R=6\text{V}$	
Input Capacitance	C_{in}	-	30	-	pF	$V=0, f=1\text{kHz}$	
OUTPUT							
Collector Dark Current	I_{CEO}	-	-	50	nA	$V_{CE}=10\text{V}, I_F=0$	
Collector-Emitter Breakdown Voltage	BV_{CEO}	80	-	-	V	$I_C=1\text{mA}, I_F=0$	
Emitter-Collector Breakdown Voltage	BV_{ECO}	7	-	-	V	$I_E=0.1\text{mA}, I_F=0$	
Collector-Base Breakdown	BV_{CBO}	80	-	-	V	$I_C=0.1\text{mA}, I_F=0$	
Emitter-Base Breakdown	BV_{EBO}	7	-	-	V	$I_E=0.1\text{mA}, I_F=0$	



TRANSFER CHARACTERISTICS							
Current Transfer Ratio	CTR	4N35, 4N36, 4N37	100	-	-	%	IF=10mA, VCE=10V
		4N25,4N26, 4N38 H11A2, H11A3	20	-	-		
		4N27, 4N28,H11A4	10	-	-		
		H11A1	50	-	-		
		H11A5	30	-	-		
Collector-Emitt er Saturation Voltage	V _{CE(sat)}	4N35,4N36,4N37	-	-	0.3	V	IF= 10mA, IC= 0.5mA
		4N38	-	-	1.0		IF= 20mA, IC= 4mA
		4N25,4N26, 4N27,4N28	-	-	0.5		IF= 50mA, IC= 2mA
		H11A1,H11A2, H11A3,H11A4, H11A5	-	-	0.4		IF= 10mA, IC= 0.5mA
Isolation Resistance	R _{IO}		10 ¹²	10 ¹⁴	-	Ω	V _{IO} =500Vdc.
Floating Capacitance	C _{IO}		-	0.2	1	pF	V=0, f=1MHz
Cut-off Frequency	f _c		-	6	-	kHz	VCE=5V, IC=2mA RL=100Ω,-3dB
Turn On Time	t _{on}	4N25,4N26,4N27, 4N28,H11A1, H11A2,H11A3, H11A4,H11A5	-	3	15	-	IF= 10mA, VCC= 10V, RL= 100Ω
		4N35,4N36,4N37, 4N38	-	10	12	-	Ic= 2mA, VCC= 10V, RL= 100Ω
Turn Off Time	t _{off}	4N25,4N26,4N27, 4N28,4N28,H11A1, H11A2,H11A3, H11A4,H11A5	-	3	16	-	IF= 10mA, VCC= 10V, RL= 100Ω
		4N35,4N36,4N37, 4N38	-	9	12	-	Ic= 10mA, VCC= 10V, RL= 100Ω



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6Pin, DC Input, Photo Transistor Coupler

CHARACTERISTIC CURVES

Fig.1 Forward Current vs. Ambient Temperature

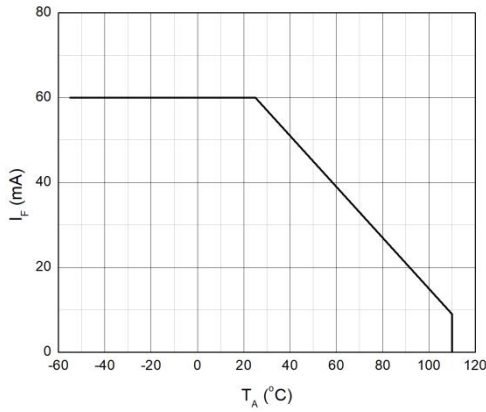


Fig.2 Collector Power Dissipation vs. Ambient Temperature

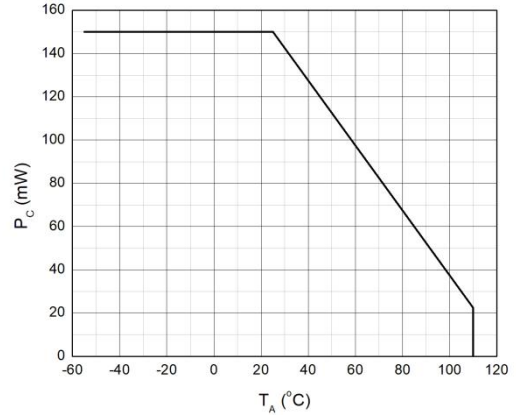


Fig.3 Forward Current vs. Forward Voltage

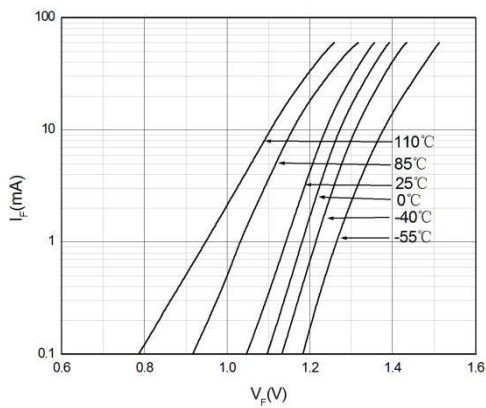


Fig.4 Collector Dark Current vs. Ambient Temperature

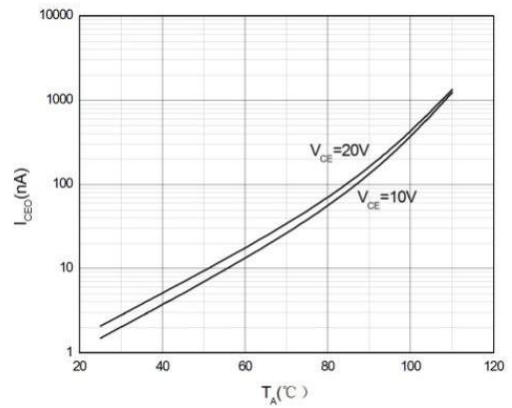


Fig.5 Collector Current vs. Collector-emitter Voltage

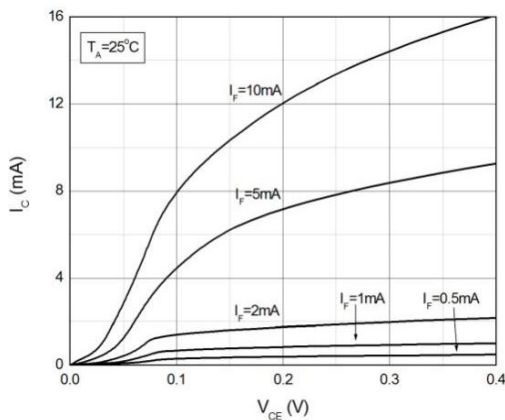
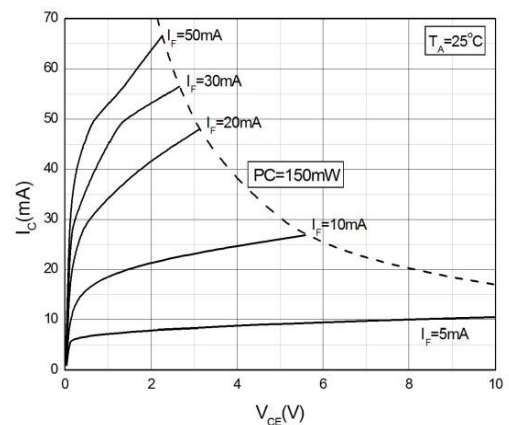
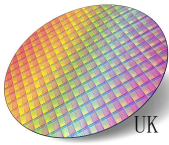


Fig.6 Collector Current vs. Collector-emitter Voltage





CHARACTERISTIC CURVES

Fig.7 Normalized Current Transfer Ratio vs. Forward Current

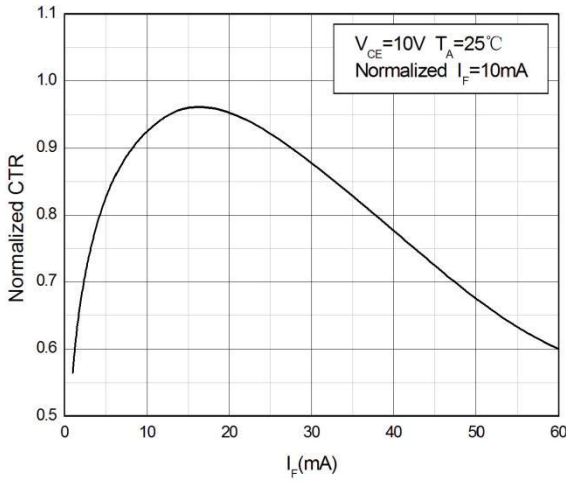


Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature

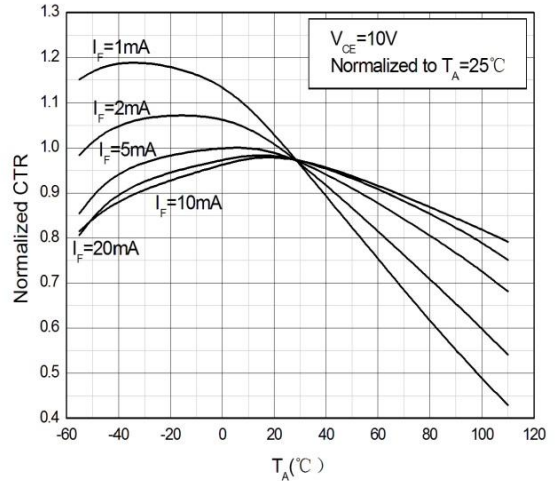


Fig.9 Current Transfer Ratio(Unsaturated) vs Base-Emitter Resistance

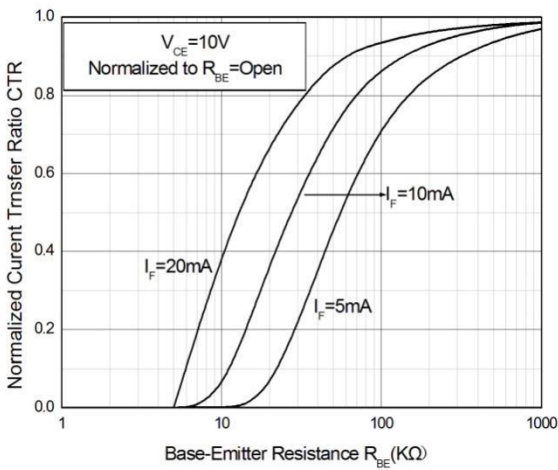
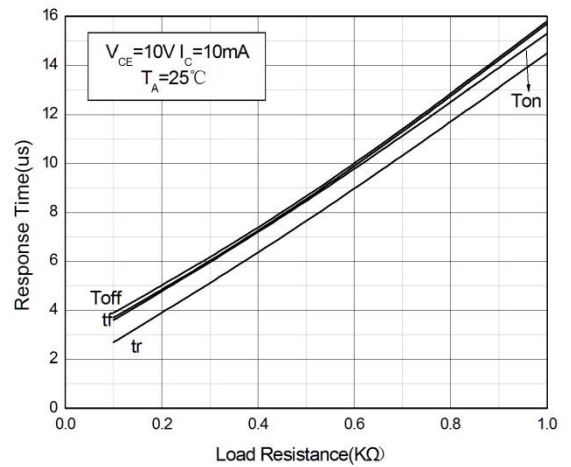
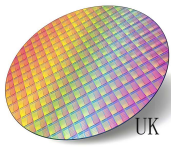


Fig.10 Switching Time vs. Load Resistance





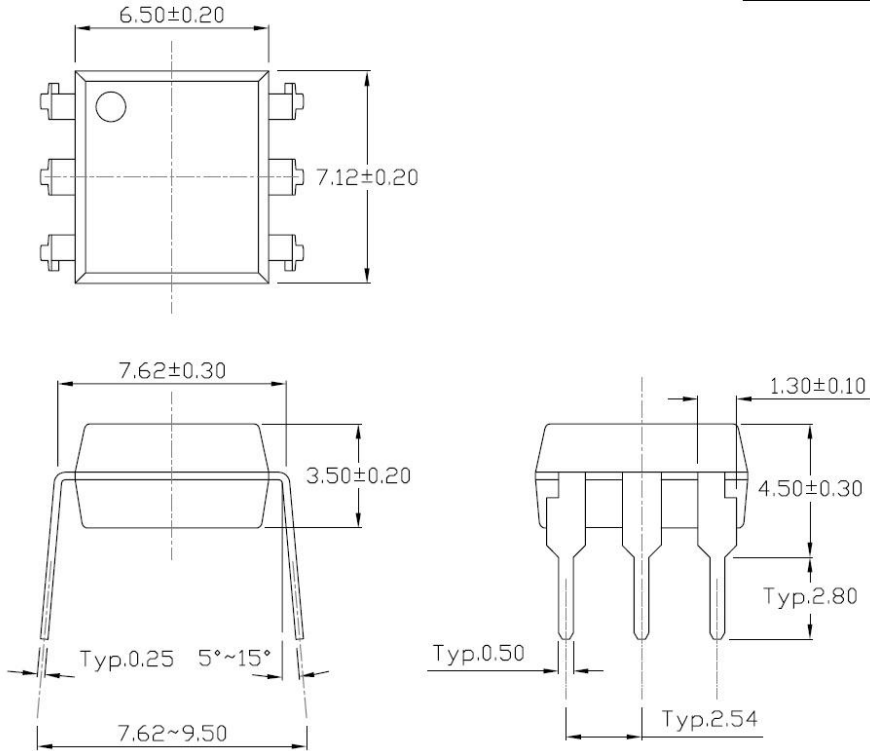
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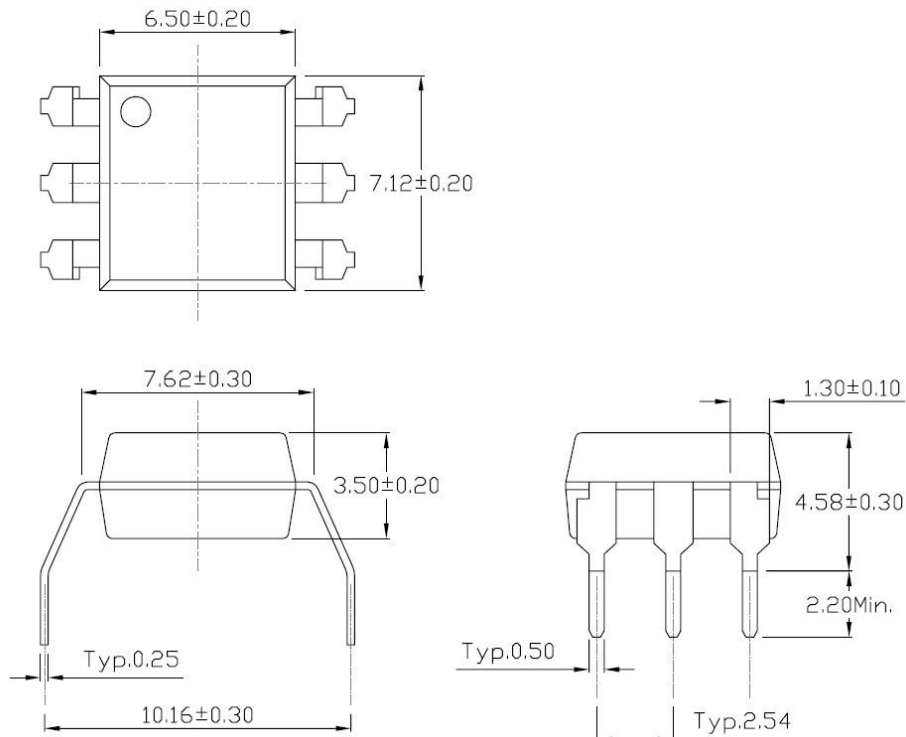
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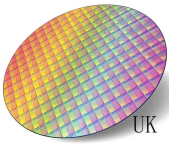
PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Standard DIP – Through Hole (DIP Type)



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





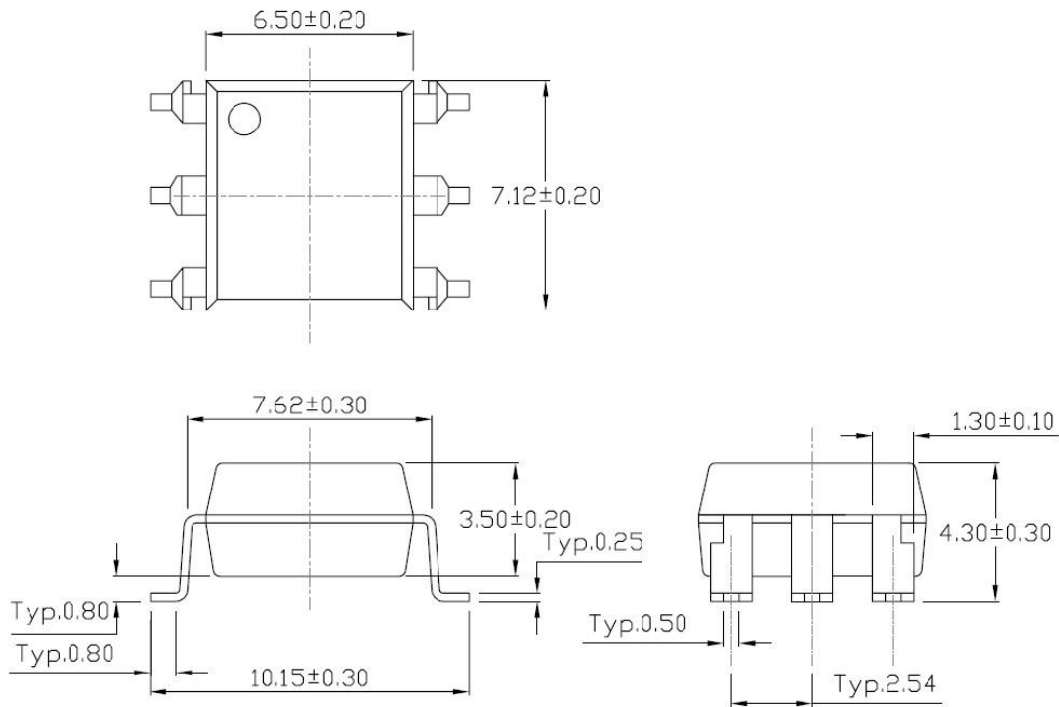
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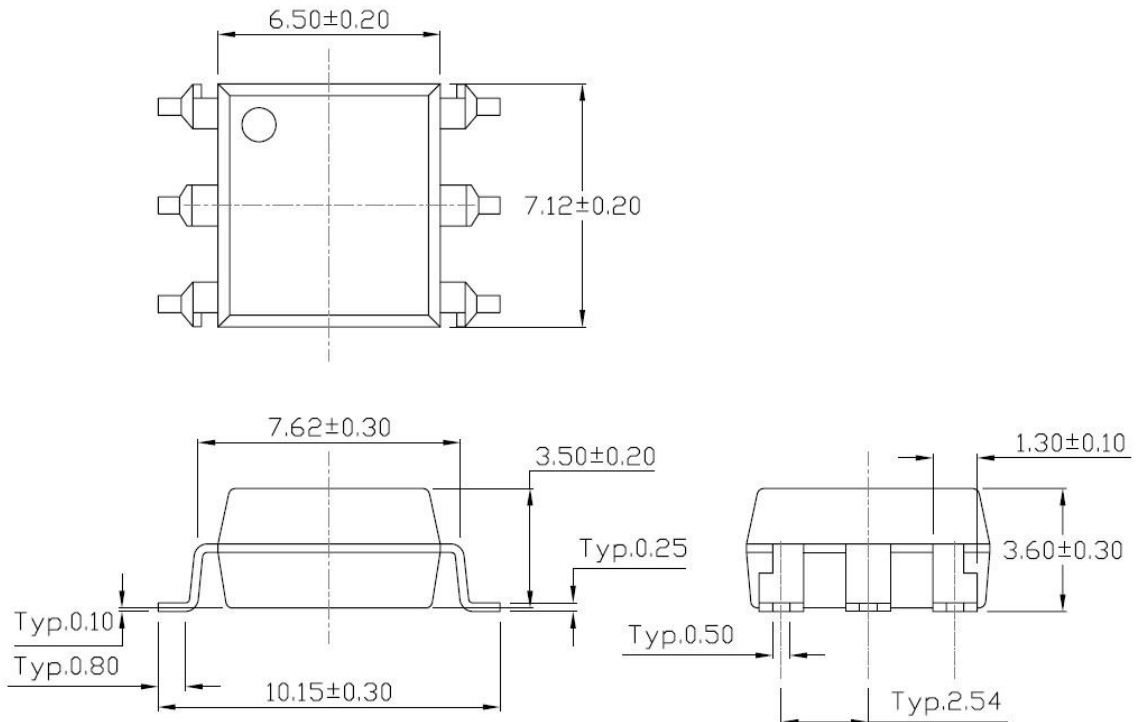
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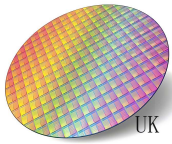
PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Surface Mount Lead Forming (SM Type)



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





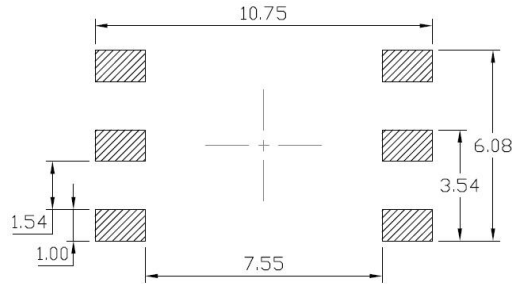
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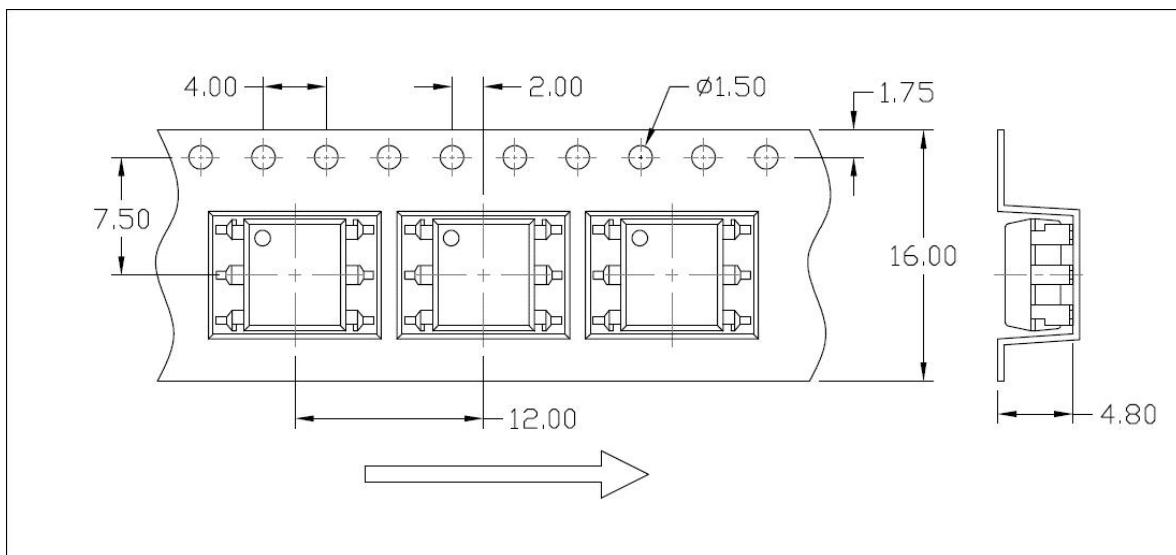
Recommended Solder Mask (Dimensions in mm unless otherwise stated)

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

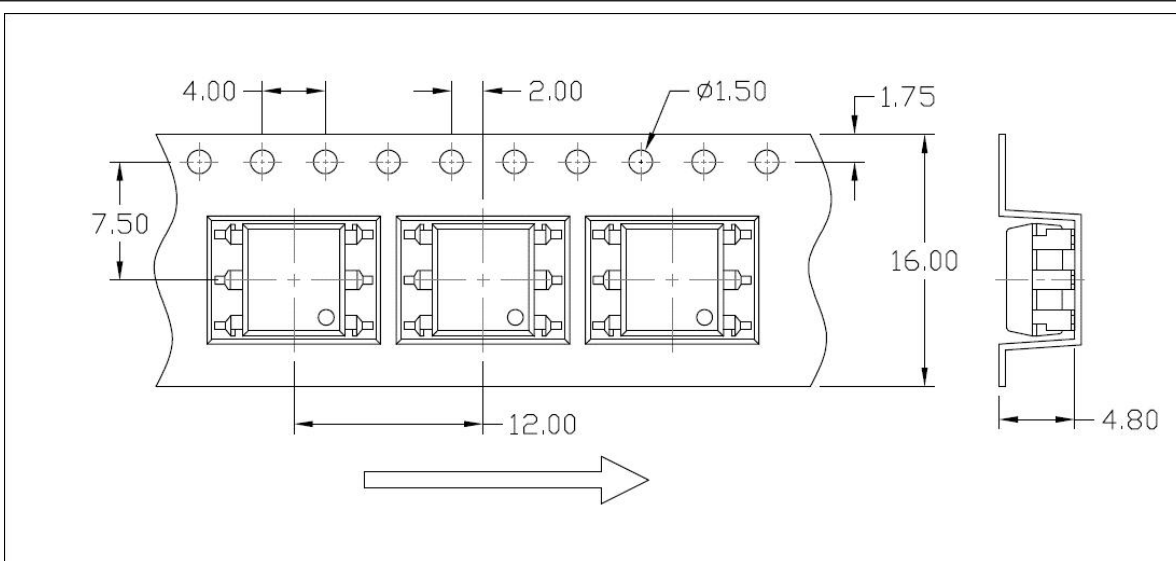


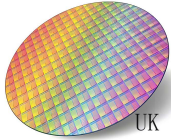
Carrier Tape Specifications (Dimensions in mm unless otherwise stated)

Option SM(T&R) & SL(T1)



Option SM(T2) & SL(T2)





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6Pin, DC Input, Photo Transistor Coupler

ORDERING AND MARKING INFORMATION

MARKING INFORMATION



4NXX : Part Number & Rank
/ : Company Abbr.
YY : Year
WW : Work Week

ORDERING INFORMATION

LABEL INFORMATION

4NXX(L)(TR)-V

4NXX – Part Number and Rank
 (XX=25/26/27/28/35/36/37/38)

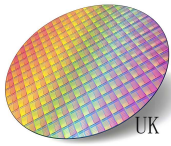
L – Lead Form Option(M/SM/SL/None)

TR – Tape and Reel Option (T&R/T2)

V – VDE Option (V or None)

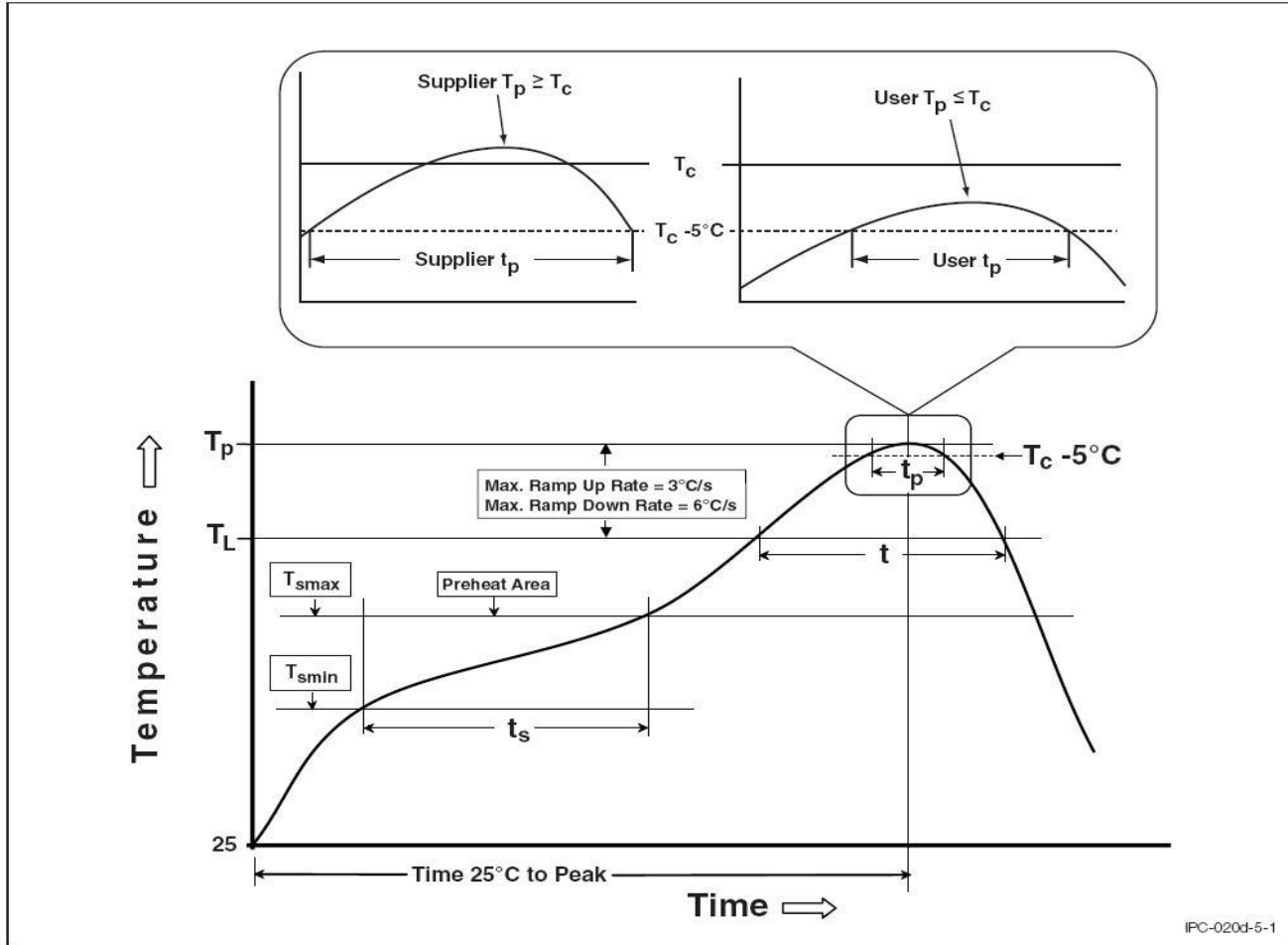
PACKING QUANTITY

Option	Description	Quantity
None	Standard 6 Pin Dip	65Units/Tube
M	Gullwing(400mil) Lead Forming	65Units/Tube
SM(T1)	Surface Mount Lead Forming – With Option 1 Taping	1000 Units/Reel
SM(T2)	Surface Mount Lead Forming – With Option 2 Taping	1000 Units/Reel
SL(T1)	Surface Mount Lead Forming(Low Profile) – With Option 1 Taping	1000 Units/Reel
SL(T2)	Surface Mount Lead Forming(Low Profile) – With Option 2 Taping	1000 Units/Reel



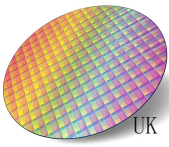
REFLOW INFORMATION

REFLOW PROFILE



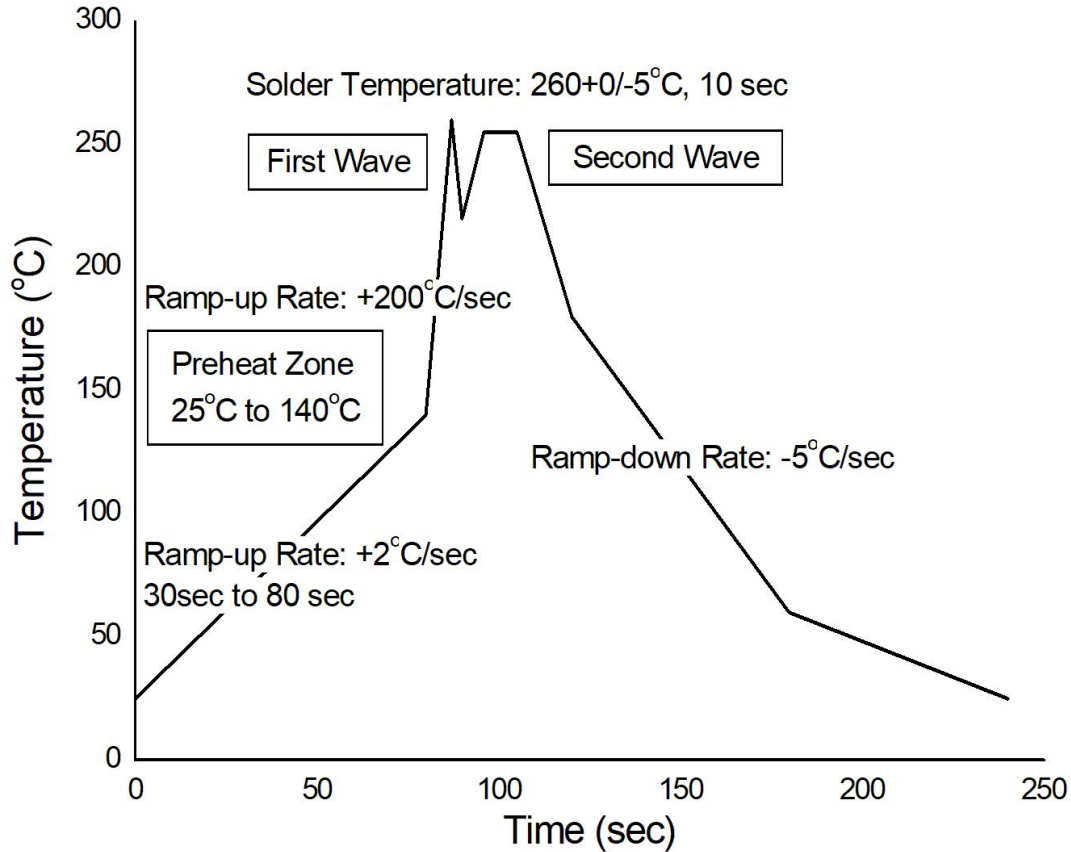
IFC-020d-5-1

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.



TEMPERATURE PROFILE OF SOLDERING

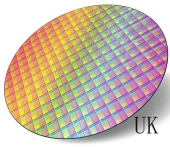
WAVE SOLDERING (JESD22-A111 COMPLIANT)



HAND SOLDERING BY SOLDERING IRON

Soldering Temperature	380±0/-5°C
Soldering Time	3 sec max.

- One time soldering is recommended for all soldering method.
- Do not solder more than three times for IR reflow soldering.



DISCLAIMER

- ASG is continually improving the quality, reliability, function and design. ASG reserves the right to make changes without further notices.
- The characteristic curves shown in this datasheet are representing typical performance which are not guaranteed.
- ASG makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, ASG disclaims (a) any and all liability arising out of the application or use of any product, (b) any and all liability, including without limitation special, consequential or incidental damages, and (c) any and all implied warranties, including warranties of fitness for particular
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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.
- Discoloration might be occurred on the package surface after soldering, reflow or long-time use. It neither impacts the performance nor reliability.