

Description

The 4N29, 4N30, 4N31, 4N32, 4N33 H11B1, H11B2, H11B3, H11B255 series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar darlington phototransistor detector in a plastic 6Pin package with different lead forming options

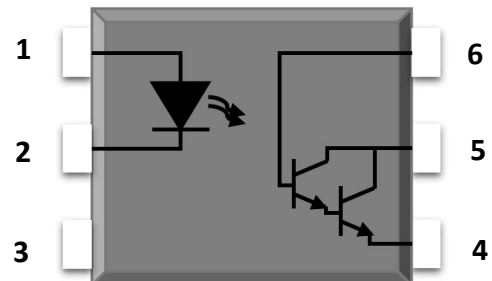
Features

- 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

- Low power logic circuits
- Telecommunications equipment
- Portable electronics
- Interfacing coupling systems of different potentials and impedances

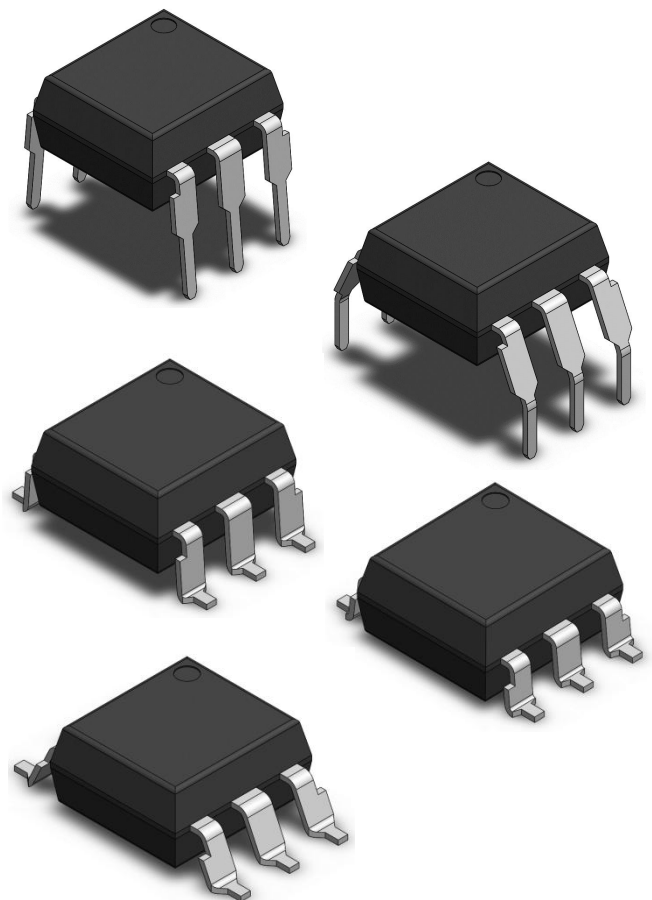
SCHEMATIC

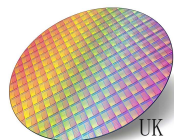


PIN DEFINITION

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

PACKAGE OUTLINE





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**4N29, 4N30, 4N31, 4N32, 4N33,
H11B1,H11B2,H11B3,H11B255**

6Pin, DC Input, Photo Transistor Coupler

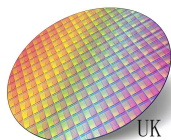
ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT	NOTE
INPUT				
Forward Current	I_F	60	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	120	mW	
OUTPUT				
Collector - Emitter Voltage	V_{CEO}	55	V	
Collector-Base Breakdown Voltage	V_{CBO}	55	V	
Emitter - Collector Voltage	V_{ECO}	7	V	
Emitter-Base Breakdown Voltage	V_{EBO}	7	V	
Collector Current	I_C	150	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	V _{rms}	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

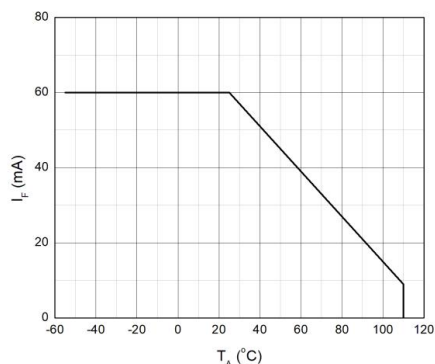
ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C								
PARAMETER	SYMBOL		MIN	TYP.	MAX	UNIT	TEST CONDITION	NOTE
INPUT								
Forward Voltage	VF	/	-	1.24	1.4	V	IF=10mA	
		H11B3	-	1.4	1.5	V	IF=50mA	
Reverse Current	IR		-	-	10	μA	VR=6V	
Input Capacitance	Cin		-	50	-	pF	V=0, f=1kHz	
OUTPUT								
Collector Dark Current	ICEO		-	-	100	nA	VCE=10V	
Collector-Emitter Breakdown Voltage	BVCEO		55	-	-	V	IC=0.1mA	
Collector-Base Breakdown Voltage	BVCBO		55	-	-	V	IC=0.1mA	
Emitter-Collector Breakdown Voltage	BVECO		7	-	-	V	IE=0.1mA	



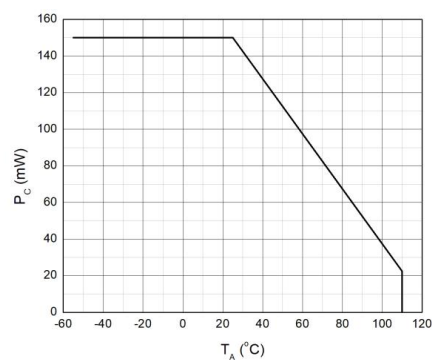
TRANSFER CHARACTERISTICS								
Current Transfer Ratio	CTR	4N31	50	-	-	%	IF=10mA, VCE=10V	
		4N29,4N30	100	-	-			
		4N32,4N33	500	-	-			
		H11B1	500	-	-	%	IF=1mA, VCE=5V	
		H11B2	200	-	-			
		H11B3	100	-	-			
		H11B255	100	-	-		IF=10mA, VCE=5V	
Collector-Emitt er Saturation Voltage	V _{CE(sat)}	4N29,4N30, 4N32,4N33	-	-	1.0	V	IF= 8mA, IC= 2mA	
		4N31	-	-	1.2		IF= 8mA, IC= 2mA	
		H11B1,H11B2 H11B3	-	-	1.0		IF= 1mA, IC= 1mA	
		H11B255	-	-	1.0		IF= 50mA, IC= 50mA	
Isolation Resistance	R _{IO}		10 ¹¹	-	-	Ω	V _{IO} =500Vdc.	
Floating Capacitance	C _{IO}		-	0.8	-	pF	V=0, f=1MHz	
Turn On Time	t _{on}	H11B1,H11B2 H11B3, H11B255	-	25	-	μs	IC= 10mA, VCC= 2V, RL= 100Ω	
		4N29,4N30, 4N31,4N32 4N33	-	-	5	μs	IC= 10mA, VCC= 2V, RL= 100Ω	
Turn Off Time	t _{off}	H11B1,H11B2 H11B3, H11B255	-	18	-	μs	IC= 10mA, VCC= 2V, RL= 100Ω	
		4N32,4N33	-	-	100	μs	IC= 10mA, VCC= 2V, RL= 100Ω	
		4N29,4N30, 4N31	-	-	40	μs		

CHARACTERISTIC CURVES

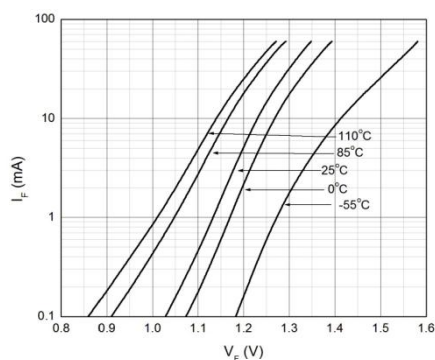
**Fig.1 Forward Current
vs. Ambient Temperature**



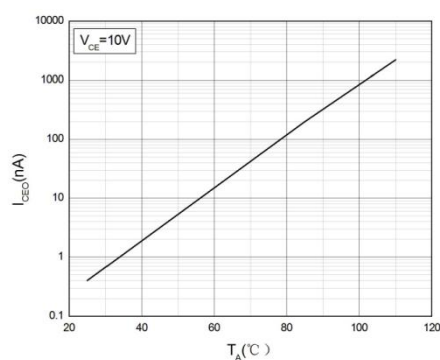
**Fig.2 Collector Power Dissipation
vs. Ambient Temperature**



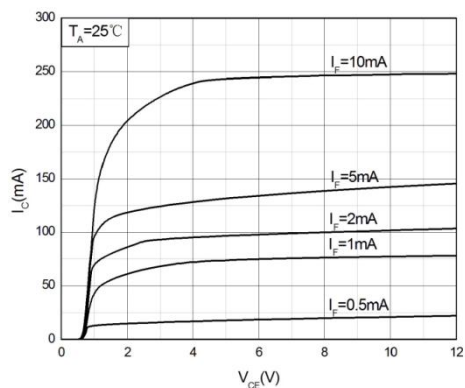
**Fig.3 Forward Current
vs. Forward Voltage**



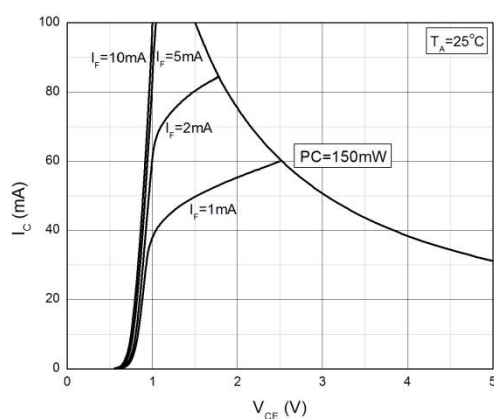
**Fig.4 Collector Dark Current
vs. Ambient Temperature**



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

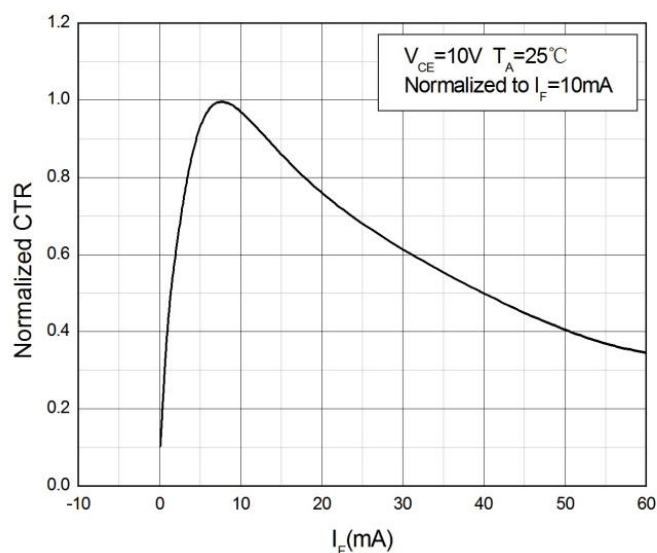


**Fig.6 Collector Current
vs. Collector-emitter Voltage**

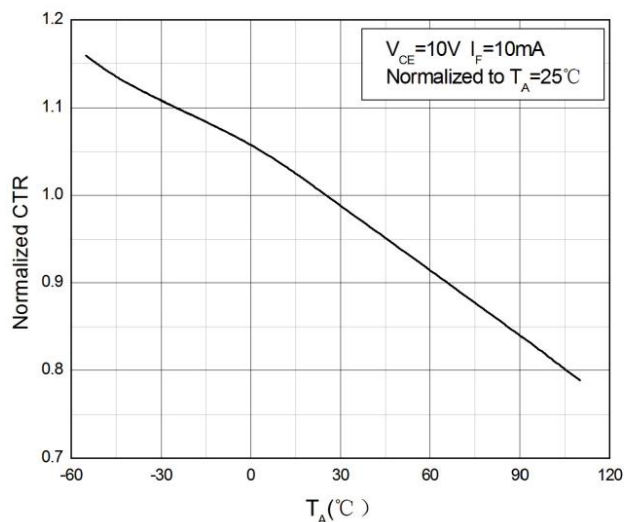


CHARACTERISTIC CURVES

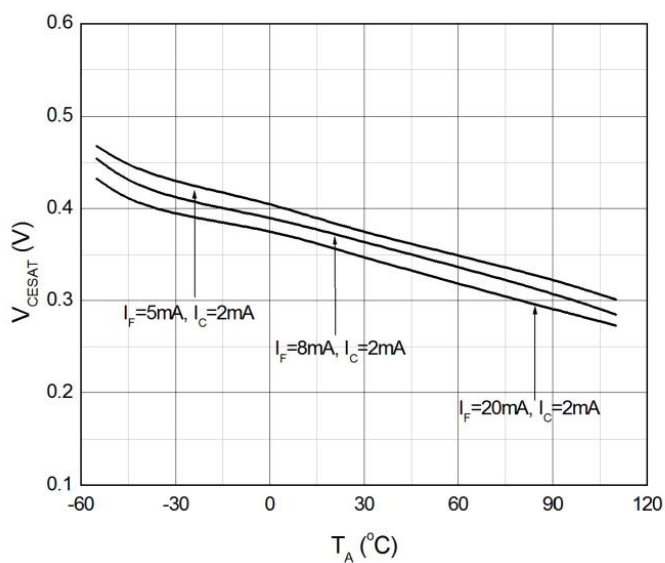
**Fig.7 Normalized Current Transfer Ratio
vs. Forward Current**



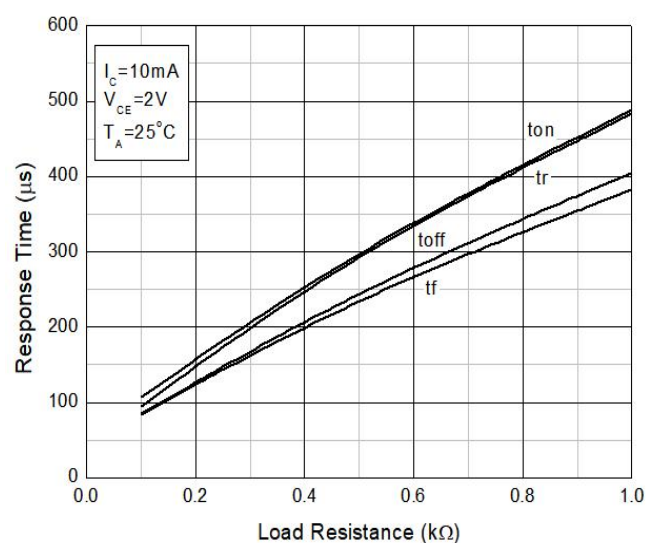
**Fig.8 Normalized Current Transfer Ratio
vs. Ambient Temperature**

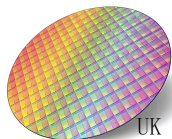


**Fig.9 Collector-emitter Saturation Voltage
vs. Ambient Temperature**



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





TEST CIRCUITS

Fig.11 Test Circuits of Response Time

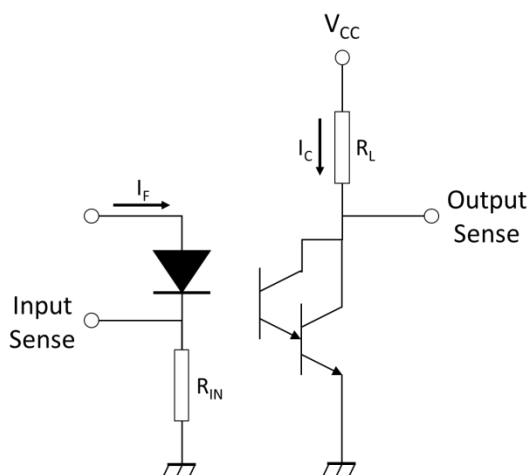


Fig.12 Curves of Response Time

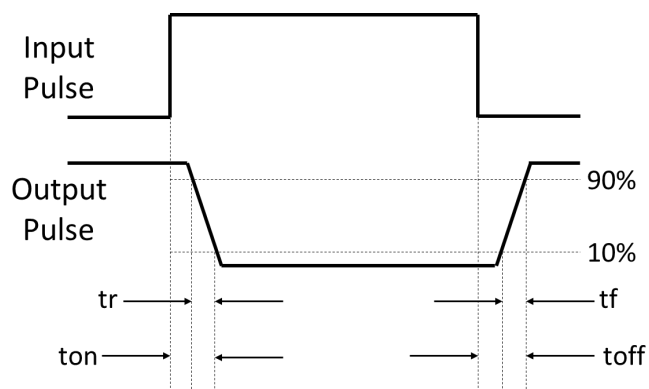
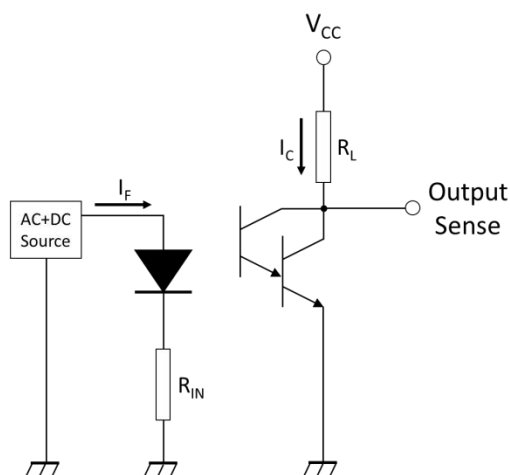
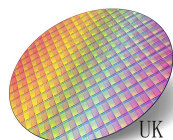


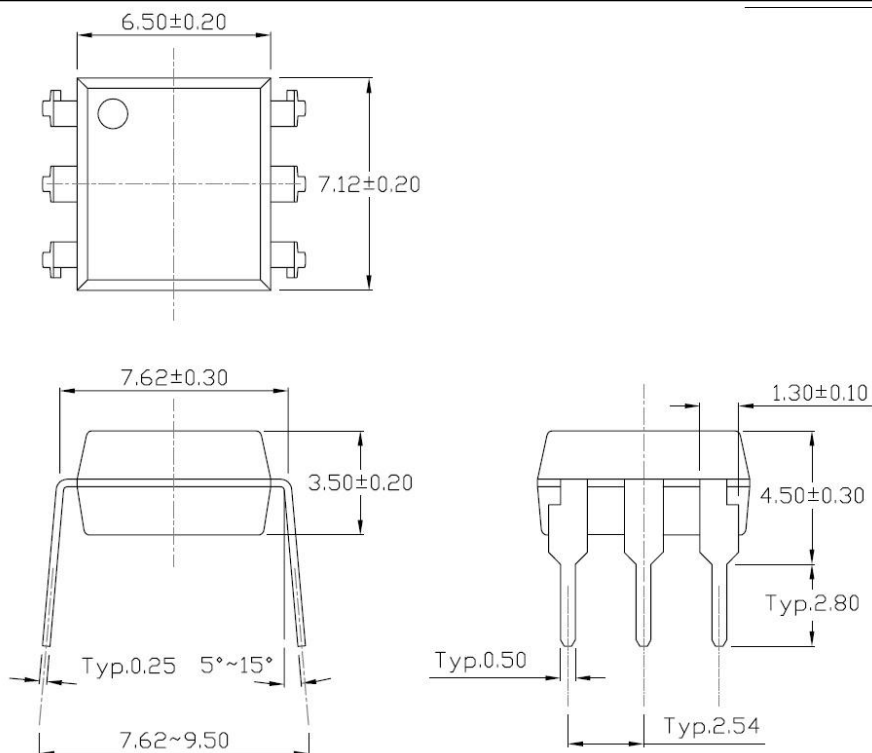
Fig.13 Test Circuits of Frequency Response



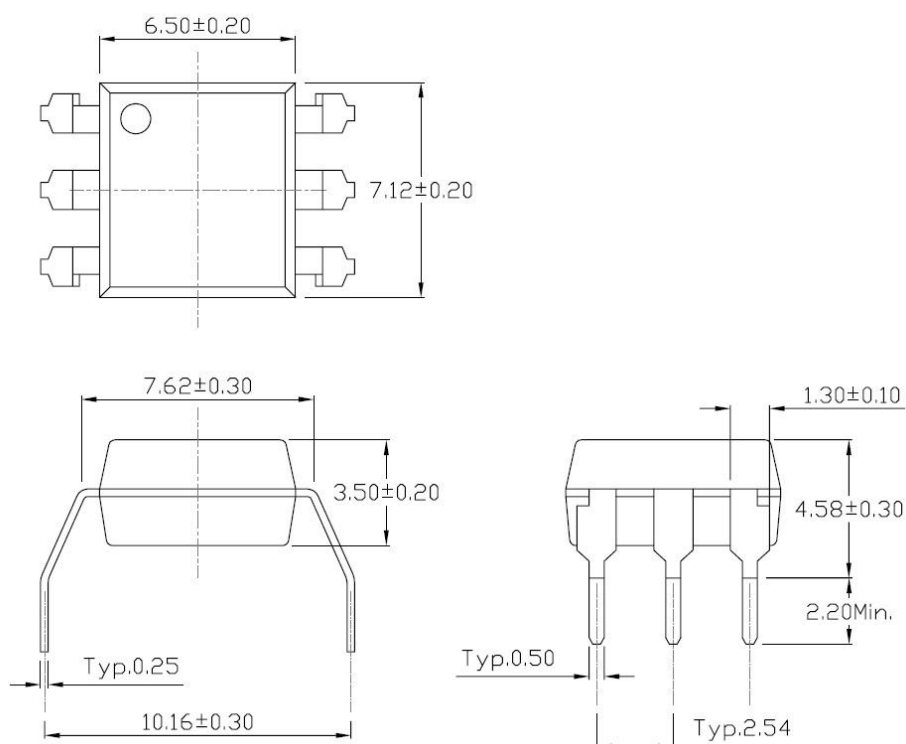


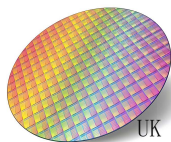
PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Standard DIP – Through Hole (DIP Type)



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





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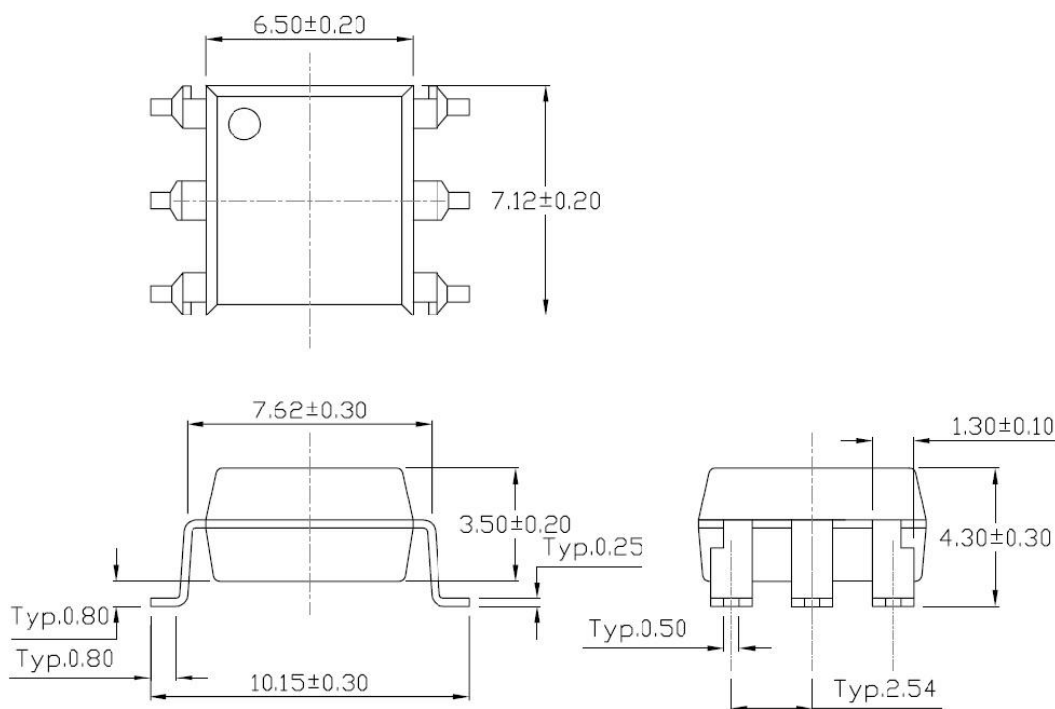
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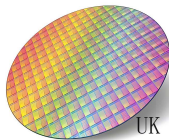
6Pin, DC Input, Photo Transistor Coupler

PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

Surface Mount Lead Forming (SM Type)



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

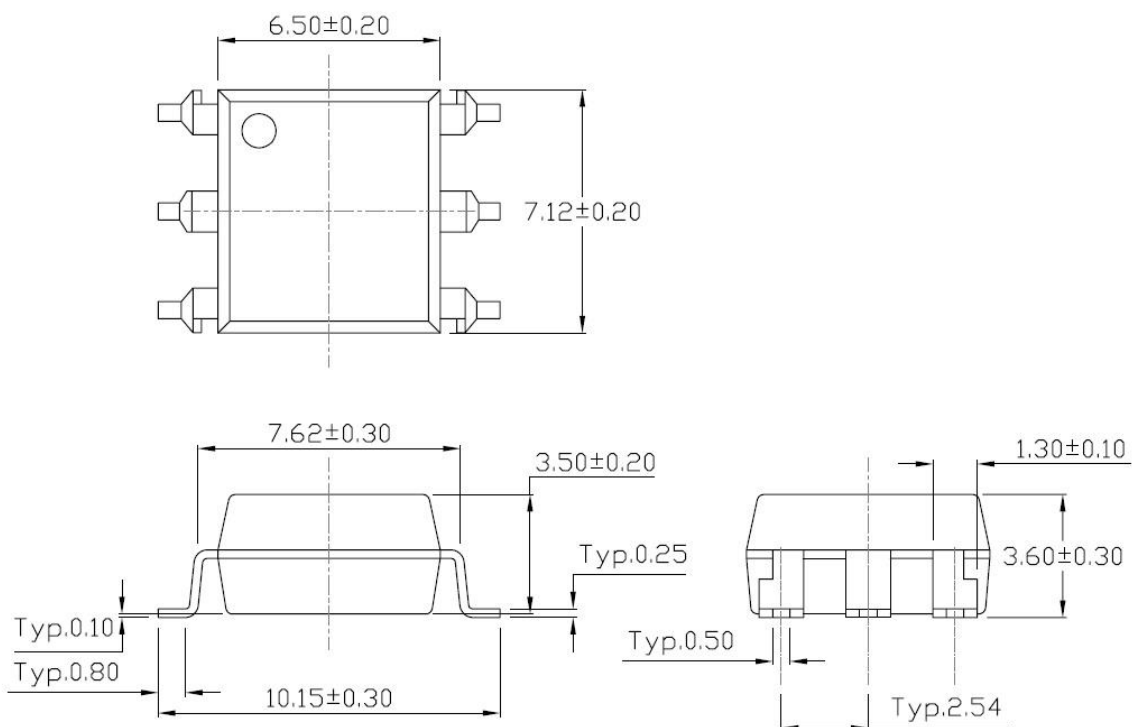


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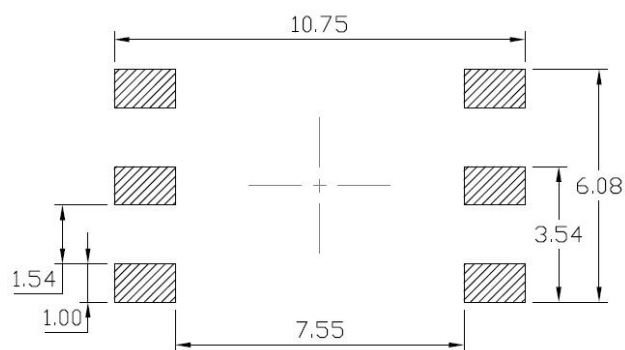
**4N29, 4N30, 4N31, 4N32, 4N33,
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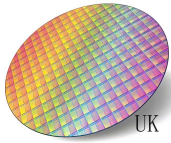
6Pin, DC Input, Photo Transistor Coupler



Recommended Solder Mask (Dimensions in mm unless otherwise stated)

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





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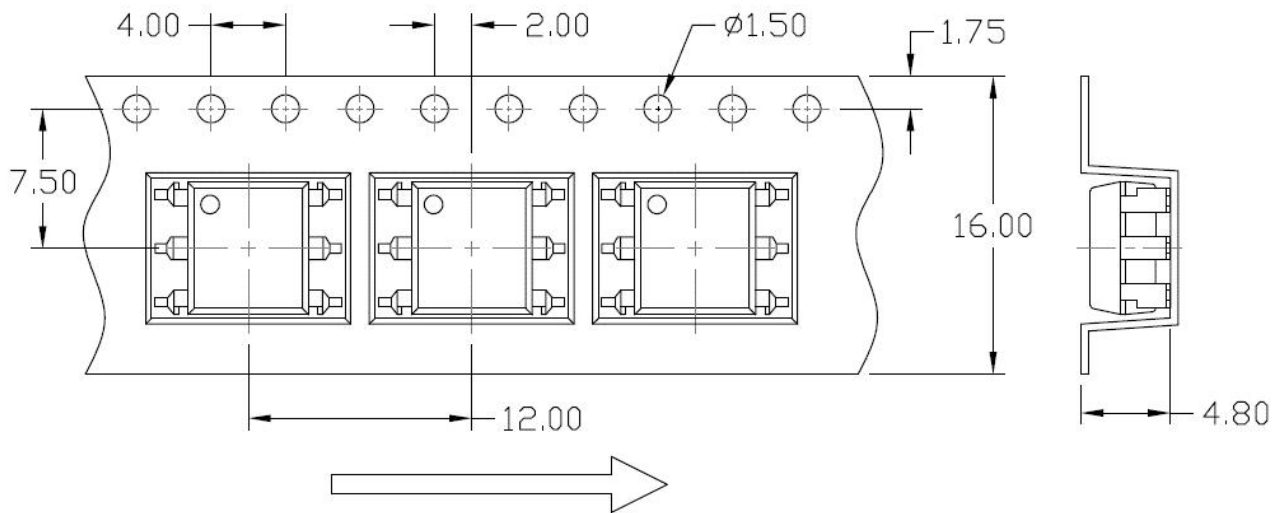
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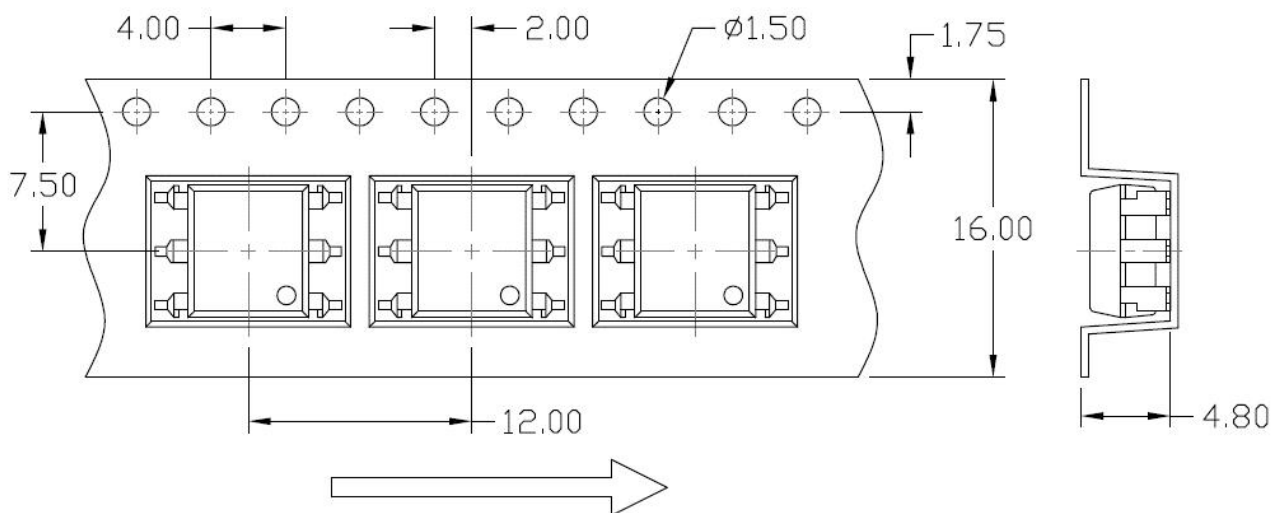
6Pin, DC Input, Photo Transistor Coupler

Carrier Tape Specifications (Dimensions in mm unless otherwise stated)

Option SM(T1) & SL(T1)



Option SM(T2) & SL(T2)



ORDERING AND MARKING INFORMATION

MARKING INFORMATION



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

ORDERING INFORMATION

LABEL INFORMATION

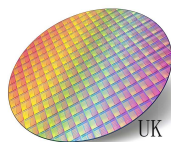
4NXX(L)(T&R)-V

H11BX(L)(T&R)-V

4NXX/ – Part Number and Rank
 (XX=29/30/31/32/33)
 H11BX/ – Part Number and Rank
 (X=1/2/3/255)
 L – Lead Form Option
 (M/SM/SL/SLM/None)
 T&R – Tape and Reel Option (T1/T2)
 V – VDE Option (V or None)

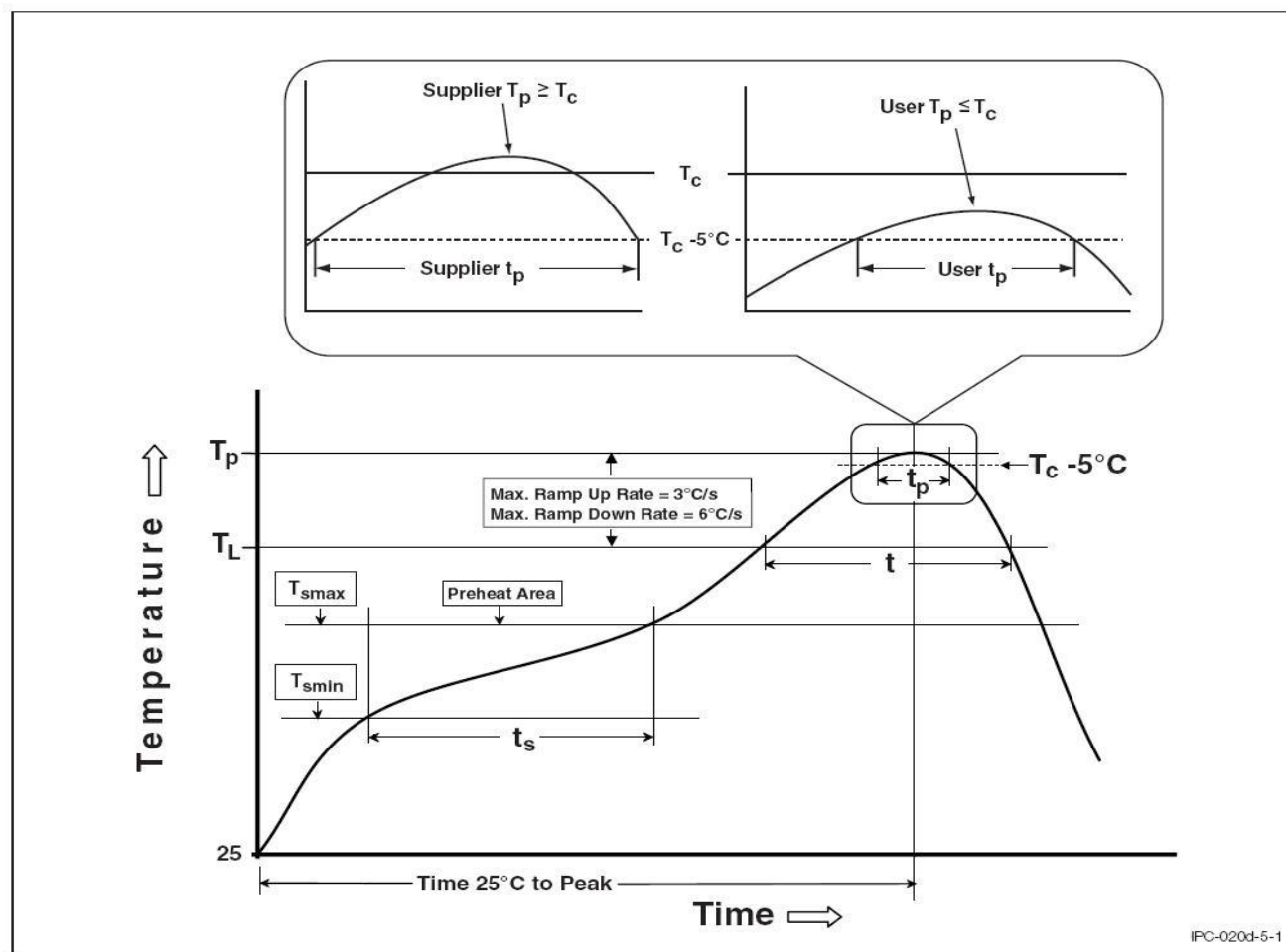
PACKING QUANTITY

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

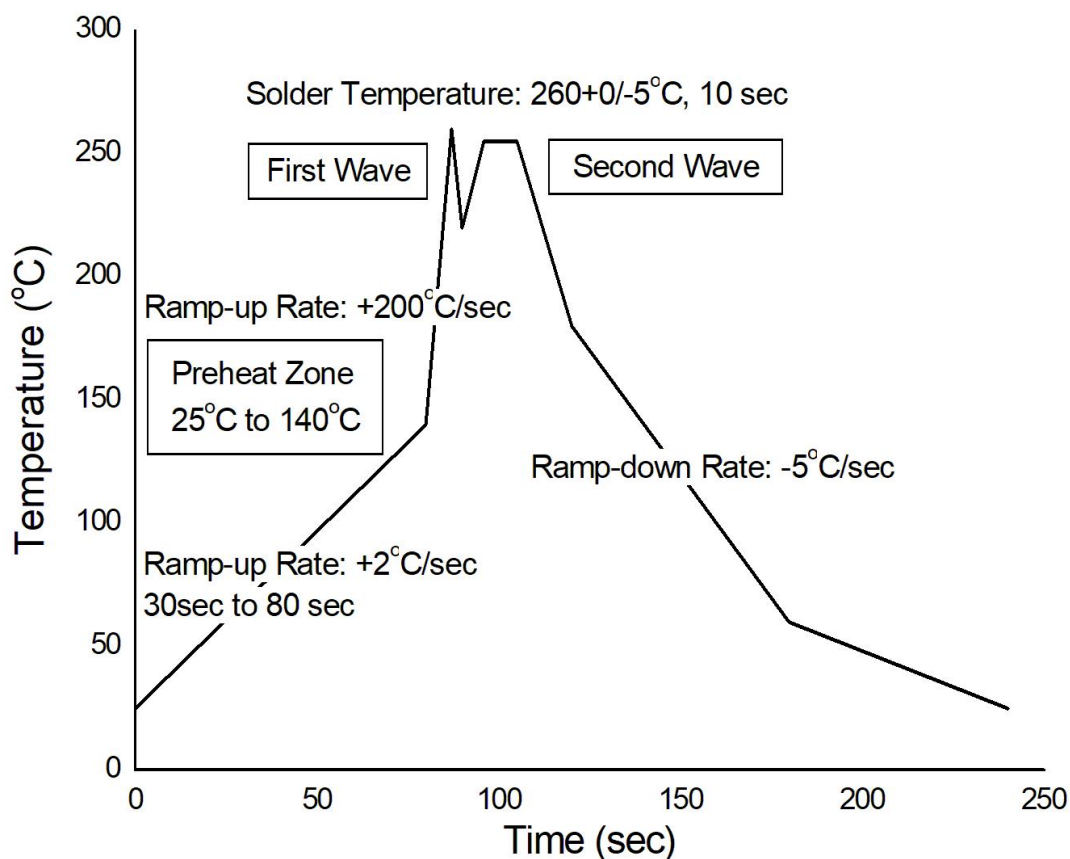
REFLOW PROFILE



Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (T _{min})	100	150°C
Temperature Max. (T _{max})	150	200°C
Time (t _s) from (T _{min} to T _{max})	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
- The products shown in this publication are designed for the general use in electronic applications such as office automation, equipment, communications devices, audio/visual equipment, electrical application and instrumentation purpose, non-infringement and merchantability.
- 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.