Description

The ICPR21x/22x series is a 1 form A / 2 form A (normally open switch) that can replace electromechanical relays in many applications. It consists an infraredemitting diode optically coupled to a photo-MOSFET in a 4-pin DIP (SMD/SOP) or a 8-pin DIP(SMD) package,and has a peak off-State voltage of 30V~600 V.

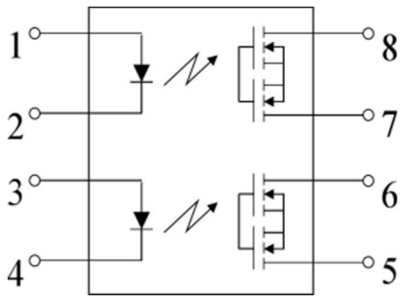
Features

- High I/O isolation voltage of 5,000 V
- Controls low-level analog signals
- High sensitivity and low on-resistance
- Low-level off state leakage current of max. 1 μA

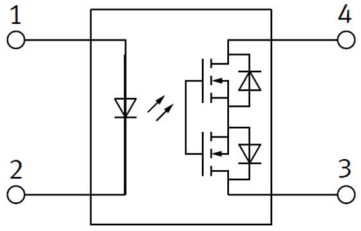
Applications

- Modem
- Telephone equipment
- Electricity, plant equipment
- Security equipment

2 Channel SCHEMATIC



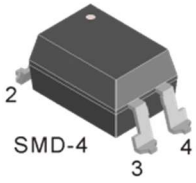
1 Channel SCHEMATIC

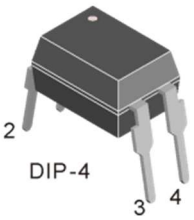


PACKAGE OUTLINE

S M D 8

D I P 8





Order Information

	Output rating				
I/O isolation voltage	**Load voltage**	**Load current**	**Single Channel**	**Dual Channel**	**Packing quantity**
5,000 Vrms (High insulation)	30V	1A	ICPR211	ICPR221	See page11
	60V	550mA	ICPR212	ICPR222	
		2A	ICPR212-2		
	350V	130mA	ICPR210	ICPR220	
	400V	120mA	ICPR214	ICPR224	
	600V	50mA	ICPR216	ICPR226	

ABSOLUTE MAXIMUM RATINGS(Ambient temperature: 25°C)

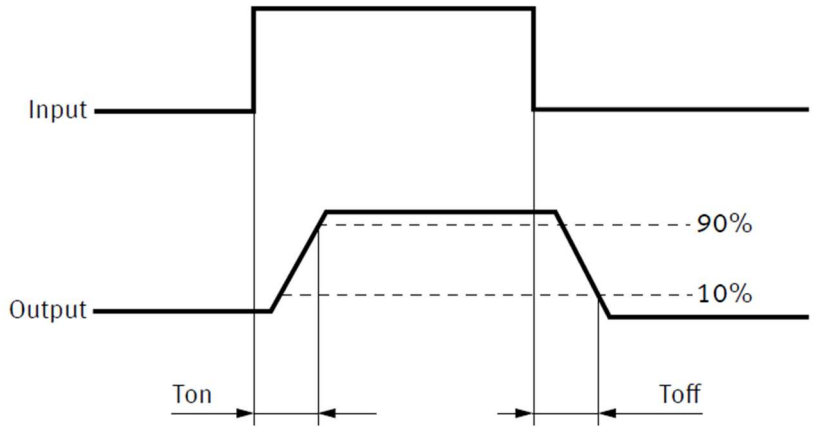
Item		Symbol	211	212	212-2	210	214	216	Unit	Remark
Input	LED forward current	I_F	50						mA	
	LED reverse voltage	V_R	5						V	
	Peak forward current	I_{FP}	1						A	f = 100 Hz,Duty Ratio = 0.1%
	Power dissipation	P	75						mW	
Output	Load voltage (peak AC)	V_L	30	60	60	350	400	600	V	
	Continuous load current	I_L	1	0.55	2	0.13	0.12	0.05	A	
	Peak load current	Ipeak	3	1.5	6	0.4	0.3	0.15	A	100 ms (1 shot), V_L= DC
	Power dissipation	P_{out}	800						mW	DIP8/DIP4
			500							
I/O isolation voltage		V_{iso}	5,000						VAC	(Avoid icing and condensation)
Ambient temperature	Operating	T_{opr}	–40°C ~ + 85°C						°C	
	Storage	T_{stg}	–40°C ~ + 100°C							

ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C

	Parameter		Symbol	Condition	211	212	212-2	210	214	216	Unit
Input	LED operate Current	Typ.	I_{Fon}	I_L=Max.	1.8						mA
		Max.			3.0						
	LED turn off Current	Min.	IFoff	I_L=Max.	0.4						mA
		Typ.			1.7						
	LED dropout Voltage	Typ.	V_F	I_F=50mA	1.3(1.14 V at IF = 5 mA)						V
		Max.			1.4						
Output	On resistance	Typ.	R_{on}	I_F=5mA, I_L=Max., Within1 S	0.25	0.85	0.58	10	15	50	Ω
		Max.			0.5	1.5	1.5	20	25	120	
	Off state leakage current	Min.	ILeak	I_F=0mA, V_L=Max	1000						nA
Transfer characteristics	Turn on time*	Typ.	T_{on}	I_F=5mA, I_L=Max	1.5	1.0	2.0	0.5	0.5	0.5	ms
		Max.			5.0	2.0	5.0	2.0	2.0	2.0	
	Turn off time*	Typ.	T_{off}	I_F=5mA, I_L=Max	0.1	0.1	0.15	0.1	0.1	0.1	ms
		Max.			0.4						
	I/O capacitance	Typ.	C_{iso}	f=1MHz, V_B=0	0.8						pF
		Max.			1.5						
	Initial I/O isolation resistance	Min.	R_{iso}	500V DC	1000						MΩ

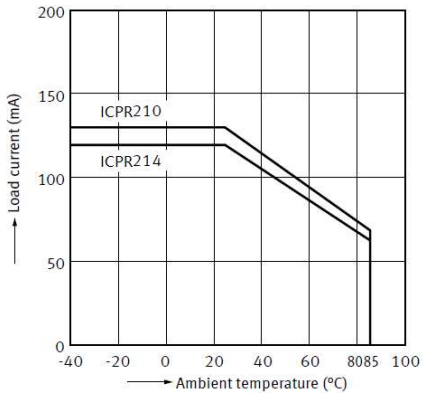
Note: The recommended value of LED forward current is IF=5 to 10mA

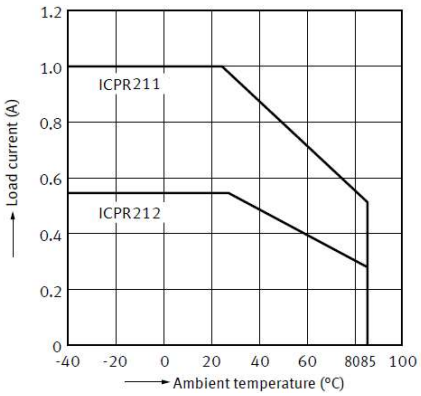
*Turn on/Turn off time



CHARACTERISTIC CURVES

Fig.1 Load current vs. ambient temperature characteristics





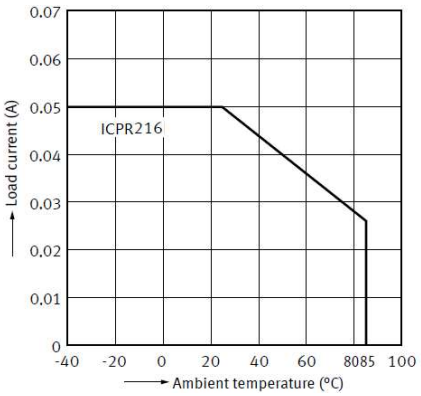
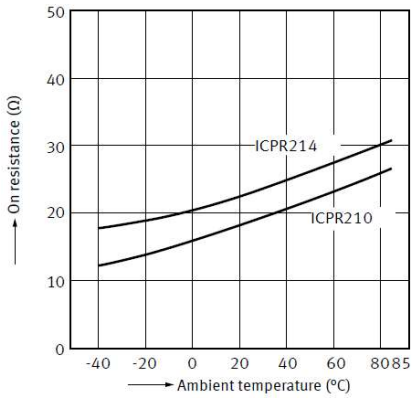
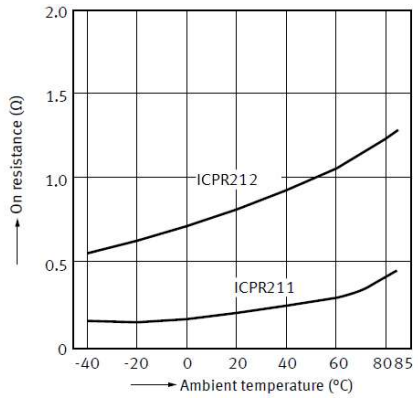


Fig.2 On resistance vs. ambient temperature characteristics





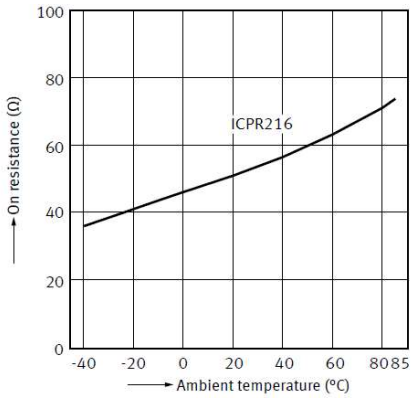
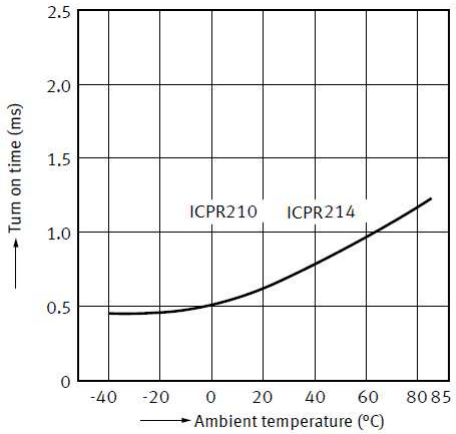
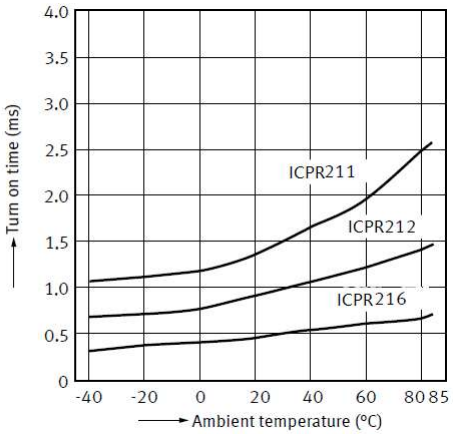


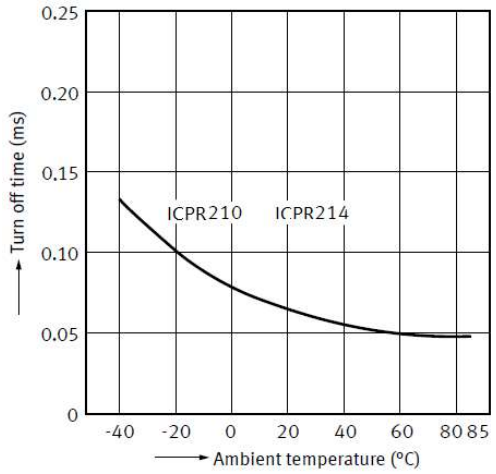
Fig.3 Turn on time vs. ambient temperature characteristics





CHARACTERISTIC CURVES

Fig.4 Turn off time vs. ambient temperature characteristics



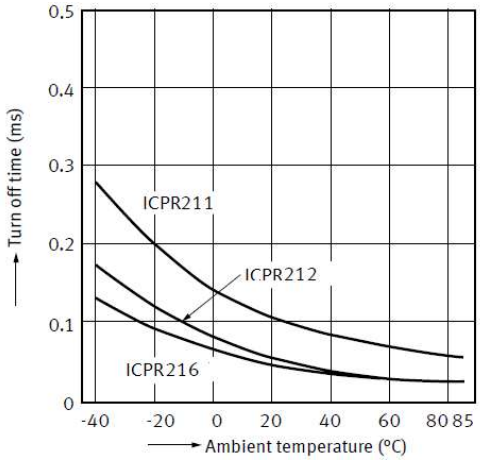


Fig.5 LED operate current vs. ambient temperature characteristics

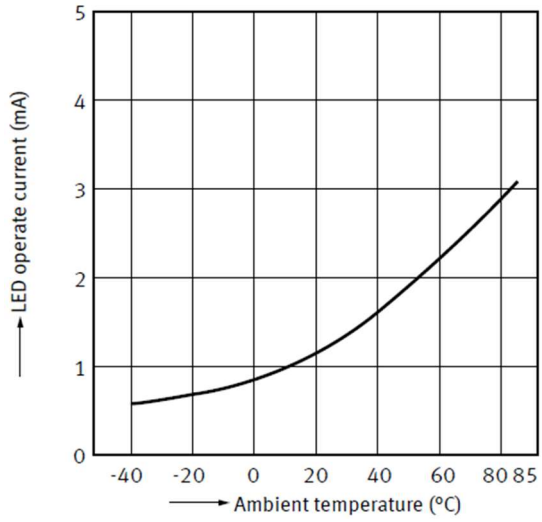


Fig.6 LED turn off current vs. ambient temperature characteristics

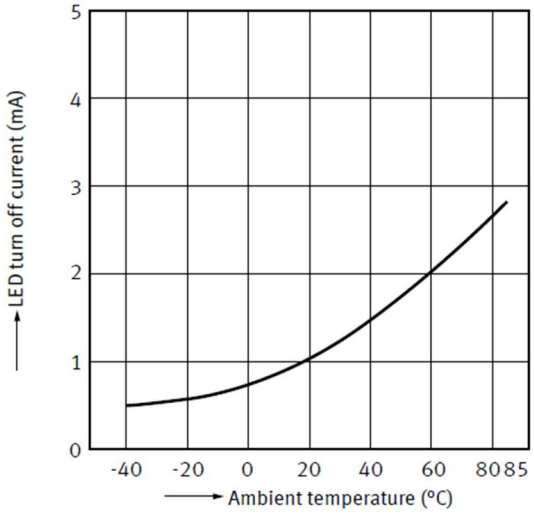
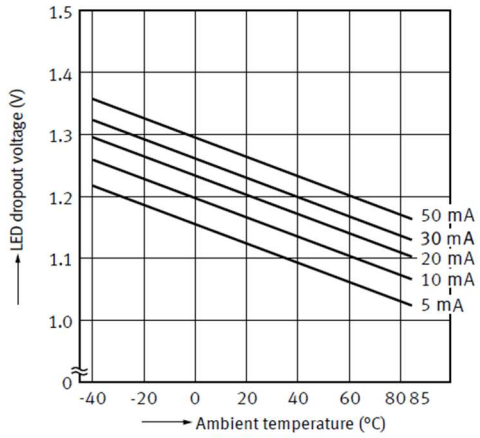


Fig.7 LED dropout voltage vs. ambient temperature characteristics



CHARACTERISTIC CURVES

Fig.8 Current vs. voltage characteristics of output at MOS portion

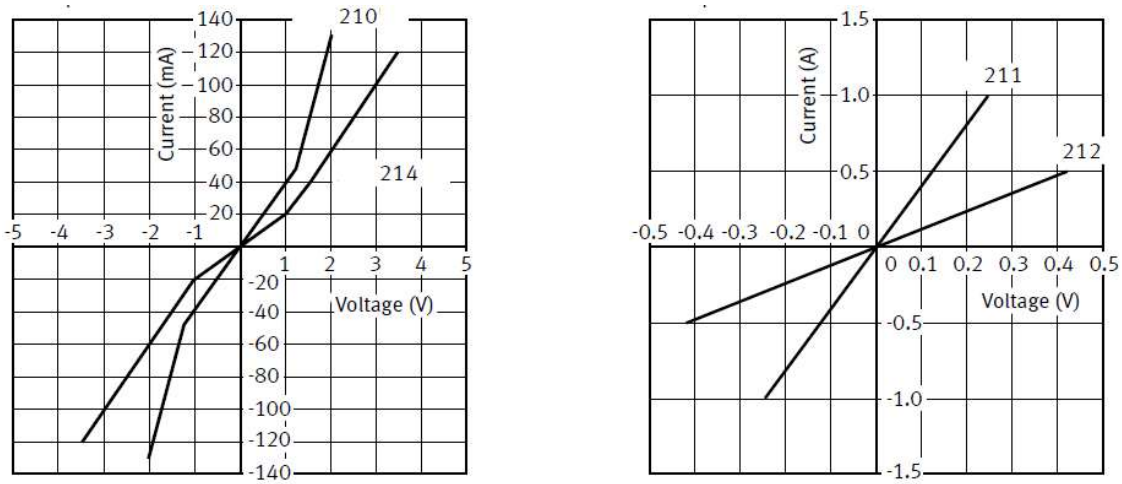


Fig.9 Off state leakage current vs. load voltage characteristics

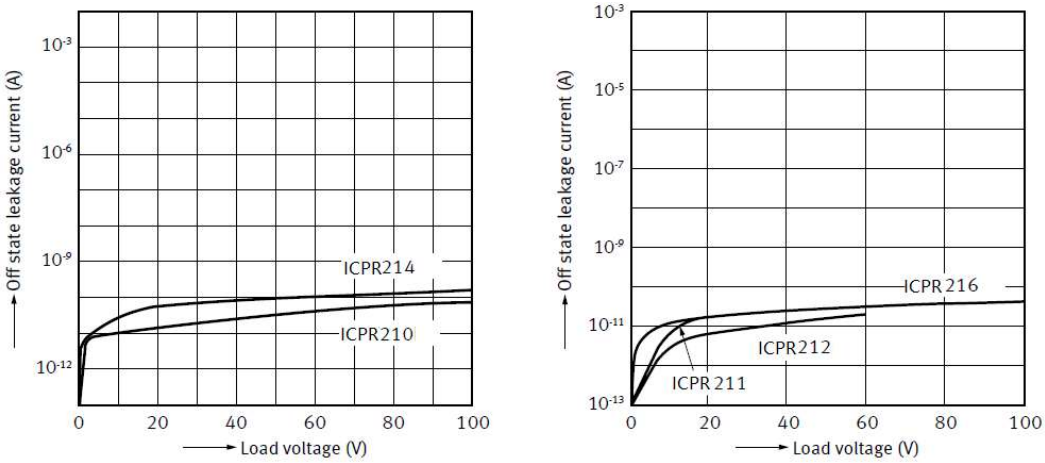
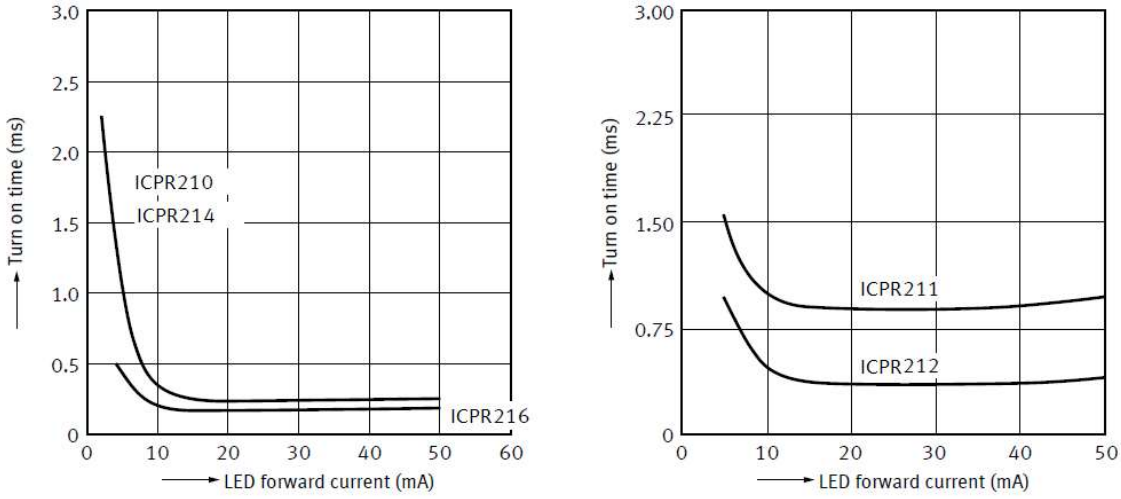
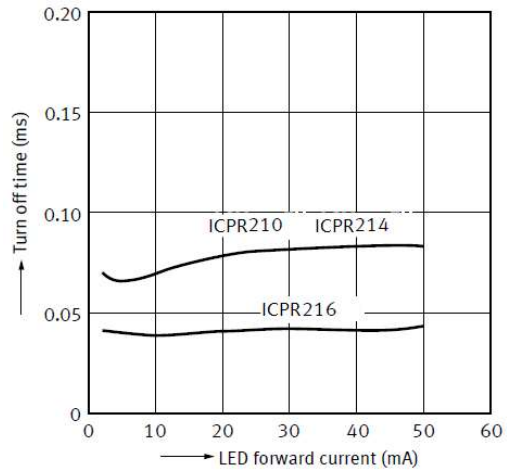


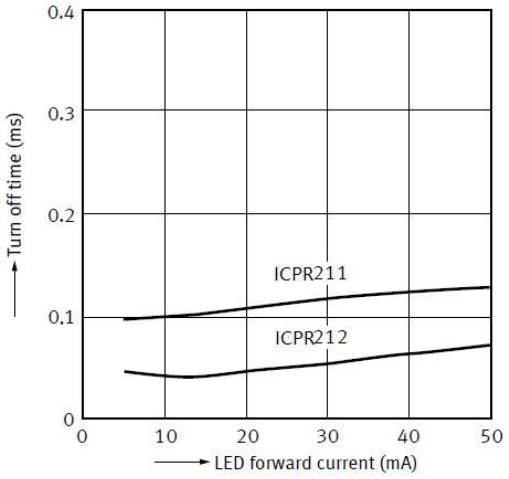
Fig.10 Turn on time vs. LED forward current characteristics



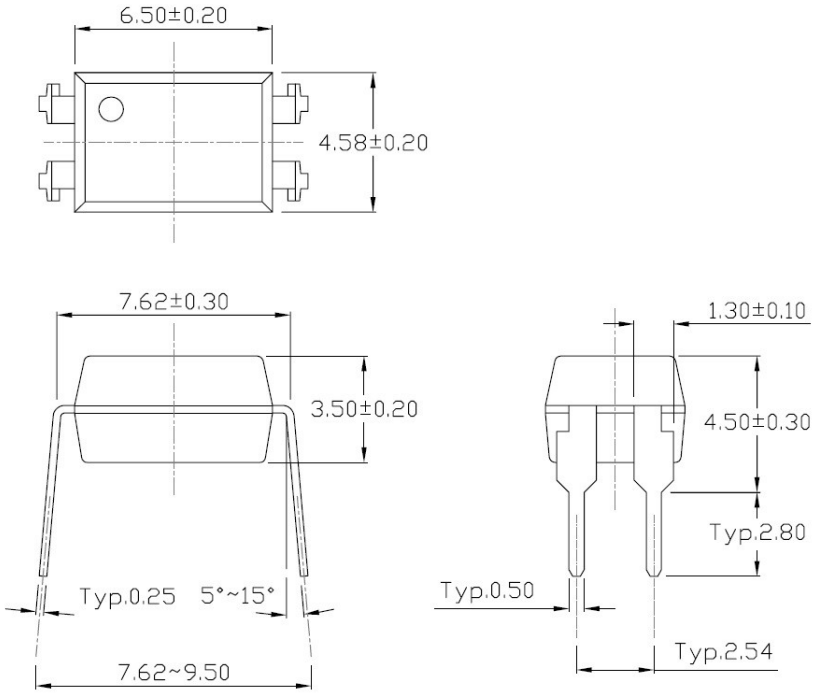
CHARACTERISTIC CURVES

Fig.11 Turn off time vs. LED forward current characteristics

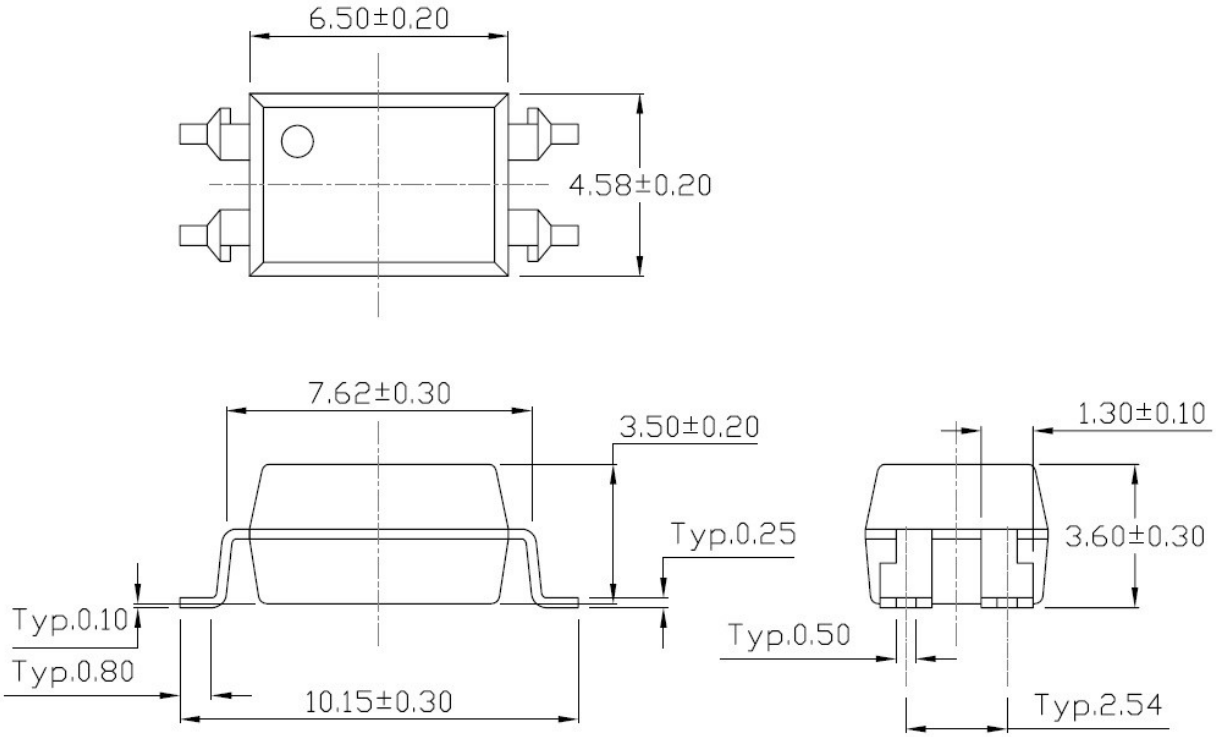




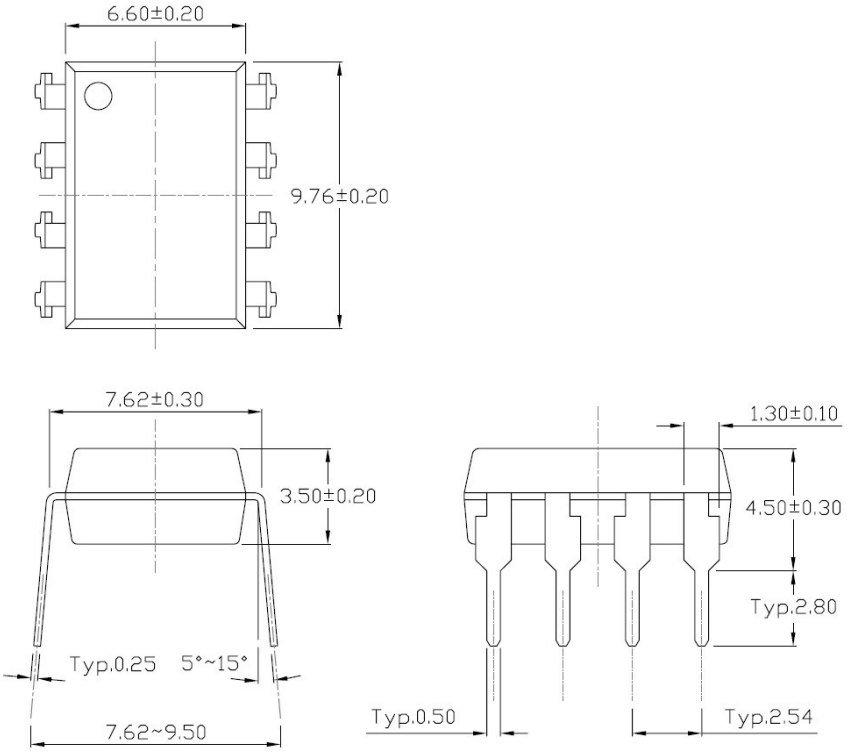
PACKAGE DIMENSIONS DIP4 (Dimensions in mm unless otherwise stated)



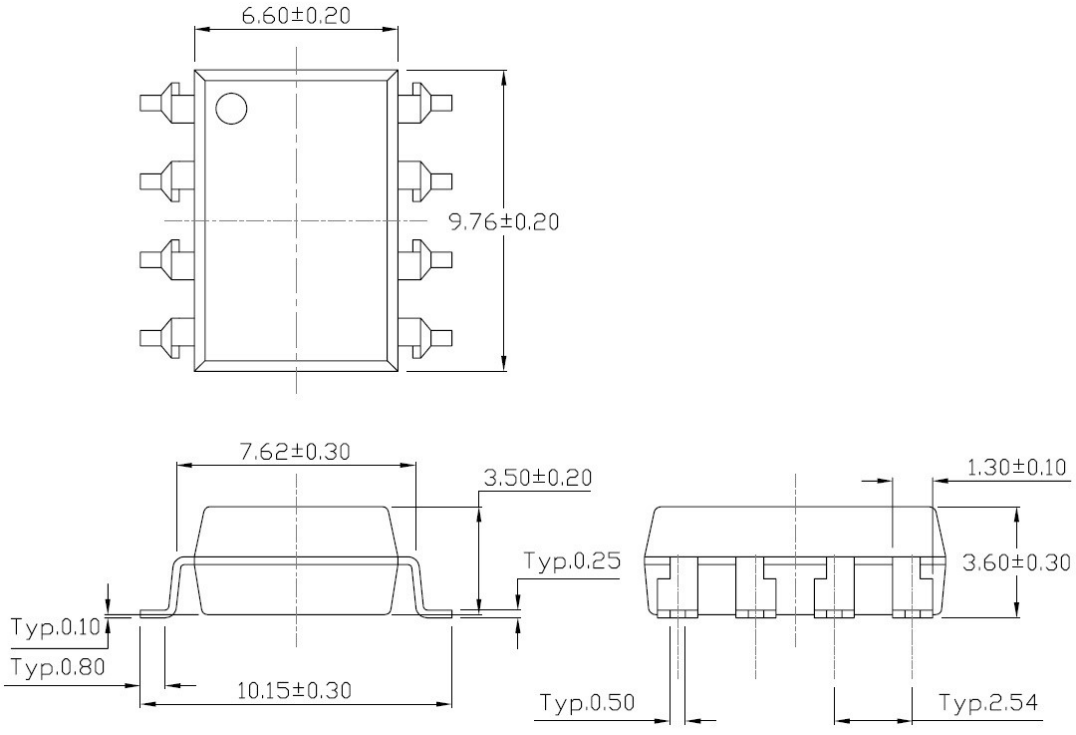
Surface Mount Lead Forming (SMD4)



PACKAGE DIMENSIONS DIP8 (Dimensions in mm unless otherwise stated)

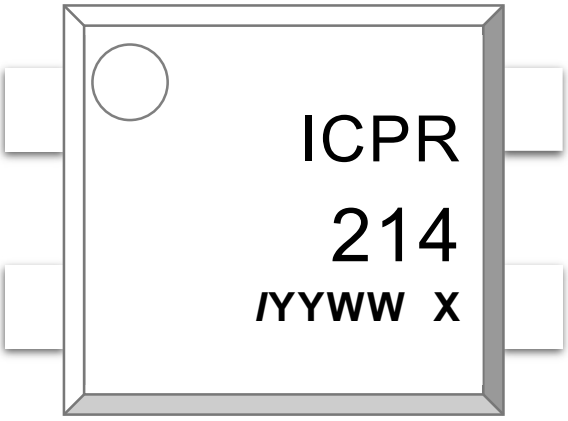


Surface Mount Lead Forming(SMD8)



ORDERING AND MARKING INFORMATION

MARKING INFORMATION



ICPR : Company Abbr.
214 : Part Number
/ : ISOCOM MICRON
YY : Fiscal Year
WW : Work Week
X : Manufacturing Code,X=A/B/C/None

ORDERING INFORMATION

ICPR 2XY-(Z) - 4 0 0 E

Company Abbr.

Part Number
X=1: Single channel
2: Dual channel
Y=0~6,Load Voltage
Z=2: 2A; None: other

Lead Forming
4: Pin4
6: Pin6
8: Pin8

Halogen free
E: Halogen-free, Lead-free
Z: Halogen, Lead-free

Performance
0: Normal, Black
1: Enhanced, White
2: Auto Level

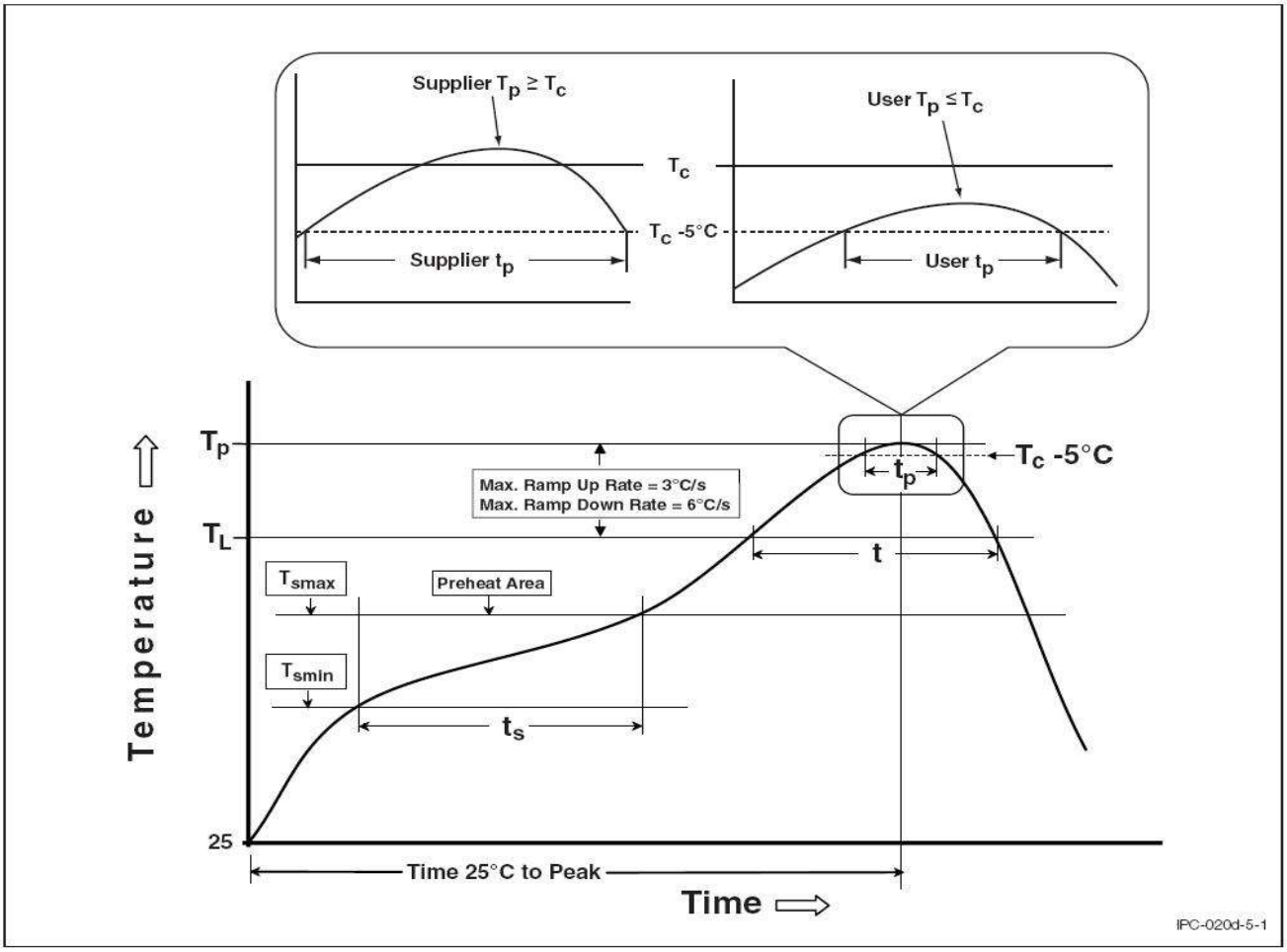
Lead Forming
0: DIP
5: SMD
6: SOP

PACKING QUANTITY

Option	Quantity	Quantity – Inner box	Quantity – Outer box
DIP4	100 Units/Tube	20 Tubes/Inner box	6 Inner box/Outer box = 12k Units
SMD4	1000 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 10k Units
DIP8	40 Units/Tube	25 Tube/ Inner box	6 Inner box/Outer box=10k Units
SMD8	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. (Tsmin)	100	150°C
Temperature Max. (Tsmax)	150	200°C
Time (ts) from (Tsmin to Tsmax)	60-120 seconds	60-120 seconds
Ramp-up Rate (tL to tP)	3°C/second max.	3°C/second max.
Liquidous Temperature (TL)	183°C	217°C
Time (tL) Maintained Above (TL)	60 – 150 seconds	60 – 150 seconds
Peak Body Package Temperature	235°C +0°C / -5°C	260°C +0°C / -5°C
Time (tP) within 5°C of 260°C	20 seconds	30 seconds
Ramp-down Rate (TP to TL)	6°C/second max	6°C/second max
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.

DISCLAIMER

- ISOCOM MICRON is continually improving the quality, reliability, function and design. ISOCOM MICRON reserves the right to make changes without further notices.
- The characteristic curves shown in this datasheet are representing typical performance which are not guaranteed.
- ISOCOM MICRON 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, ISOCOM MICRON 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 ISOCOM MICRON 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 ISOCOM MICRON'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.