



MPCS-LR41XN Series

SOP4, DC Input, Normally Open PhotoMOS Opto-Relay

Description

The MPCS-LR41XN series combine an LED which is optically coupled to a photovoltaic chip to drive two MOSFET in a plastic SOP4 package. With the patenting stack die structure, MPCS-LR41XN series provide the finest trigger current and faster switching time performance.

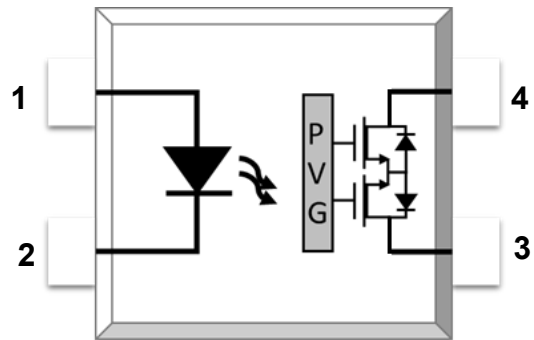
Features

- Low trigger current and high switching time
- High isolation 3750 V_{RMS}
- Guaranteed performance over temperature -40°C ~ +110°C.
- RoHS & REACH Compliance
- Regulatory Approvals
 - UL - UL1577
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC – GB4943.1, GB8898

Applications

- Computer peripheral interface
- Telephone equipment
- Data communication equipment
- Computers

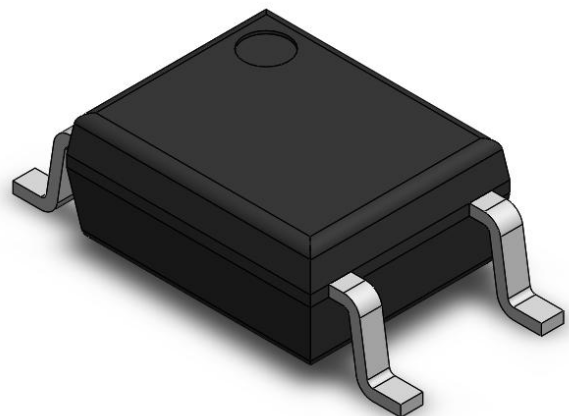
SCHEMATIC



PIN DEFINITION

1. Anode
2. Cathode
3. Terminal 1
4. Terminal 2

PACKAGE OUTLINE





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ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	MIN.	MAX.	UNIT	NOTE
INPUT CHARACTERISTICS						
Average Forward Input Current		I _F	-	20	mA	-
Peak Transient Current		I _{F(trans)}	-	1	A	1
Reverse Input Voltage		V _R	-	5	V	-
Input Power Dissipation		P _I	-	45	mW	-
OUTPUT CHARACTERISTICS						
Output IC Power Dissipation		P _O	-	500	mW	-
Load Voltage	LR411N	V _L	-	60	V	-
	LR412N			250		
	LR413N			400		
	LR414N			600		
	LR415N			100		
Continuous Load Current	LR411N	I _L	-	0.55	A	-
	LR412N			0.15		
	LR413N			0.12		
	LR414N			0.05		
	LR415N			0.25		
Peak Load Current	LR411N	I _{PEAK}	-	1.2	A	-
	LR412N			0.5		
	LR413N			0.3		
	LR414N			0.15		
	LR415N			0.75		
COMMON CHARACTERISTICS						
Storage Temperature		T _{stg}	-55	125	°C	-
Operating Temperature		T _{opr}	-40	110	°C	-
Isolation Voltage		V _{iso}	3750	-	V _{rms}	2
Total Power Dissipation		P _O	-	550	mW	-
Lead Solder Temperature		T _{sol}	-	260	°C	-

Note 1. $\leq 1\mu s$ P.W, 300pps

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



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ELECTRICAL OPTICAL CHARACTERISTICS

PARAMETER		SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
INPUT CHARACTERISTICS								
Input Forward Voltage		V _F	1.6	2	2.4	V	I _F = 10mA	-
Input Reverse Voltage		I _R	-	-	10	uA	V _R = 6V	-
Input Capacitance		C _{IN}	-	60	-	pF	f = 1MHz, V _F = 0V	-
OUTPUT CHARACTERISTICS								
Off State Leakage Current		I _{LEAK}	-	-	1	μA	I _F = 0mA V _L =Rated V _L MAX	-
On State Resistance	LR411N	R _{d(ON)}	-	1.2	2.5	Ω	I _F = 5mA, I _L =Rated I _L MAX t = 1s	-
	LR412N		-	7.5	15			
	LR413N		-	23	30			
	LR414N		-	30	70			
	LR415N		-	2.5	8			
Output Capacitance		C _{OUT}	-	80	-	pF	V _L = 0V, f = 1MHz	-
TRANSFER CHARACTERISTICS								
LED operate current		I _{FON}	-	0.2	2	mA	I _L =Rated I _L MAX	-
LED turn off voltage		V _{FOFF}	0.8	1.5	-	V	I _L ≤ 10 μA	-
Turn on time		T _{ON}	-	0.1	1	ms	I _F =10mA, I _L =Rated I _L MAX	-
Turn off time		T _{OFF}	-	0.02	0.2	ms		
Input-Output Resistance		R _{I-O}	-	10 ¹²	-	Ω	V _{I-O} = 500V DC	-



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TYPICAL PERFORMANCE CURVES & TEST CIRCUITS

Fig.1 LED Forward Current vs. Forward Voltage

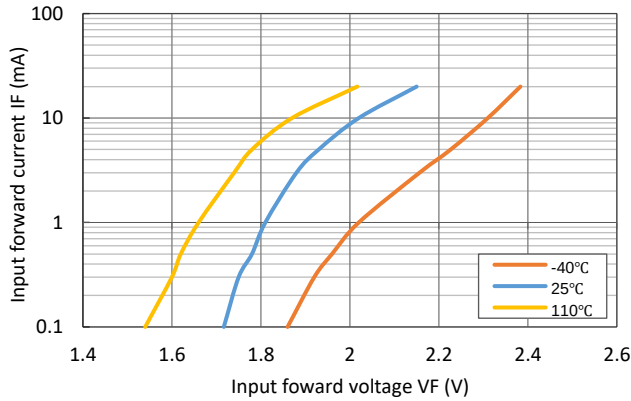


Fig.2 LED operate current vs. Temperature

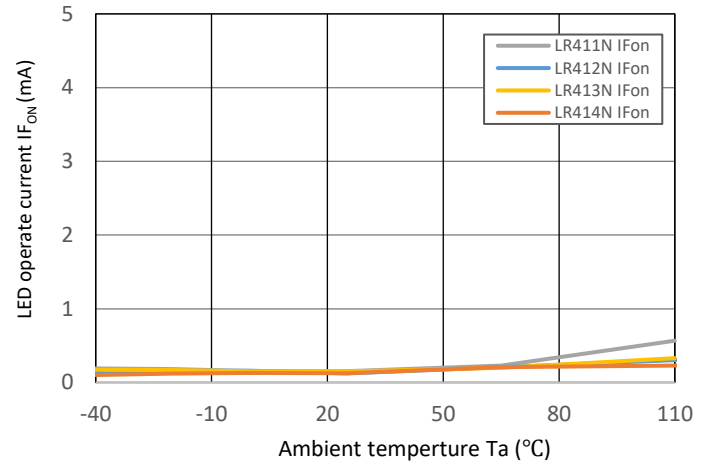


Fig.3 Output Current vs. Output Voltage-LR411N

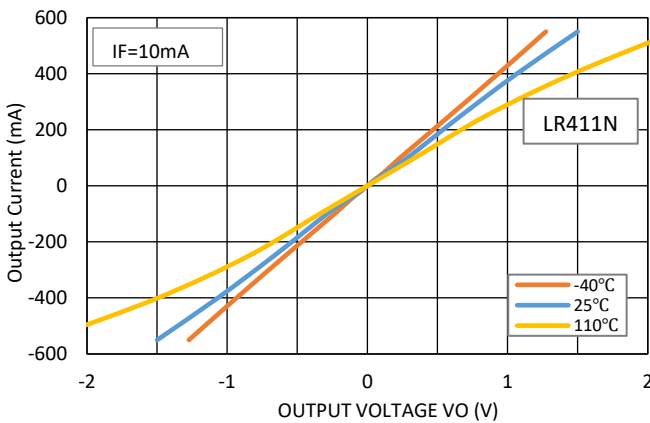


Fig.4 Output Current vs. Output Voltage-LR412N

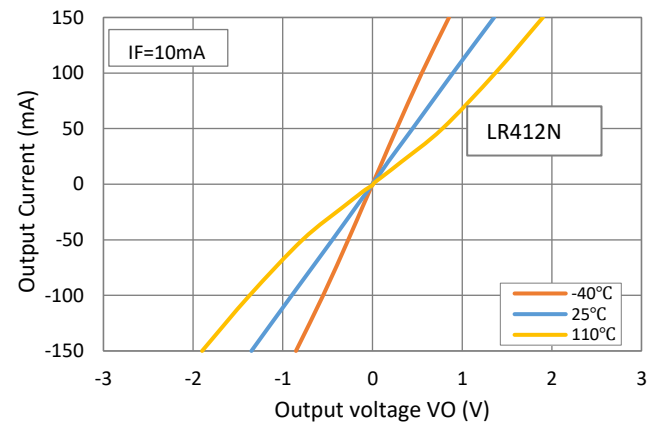


Fig.5 Output Current vs. Output Voltage-LR413N

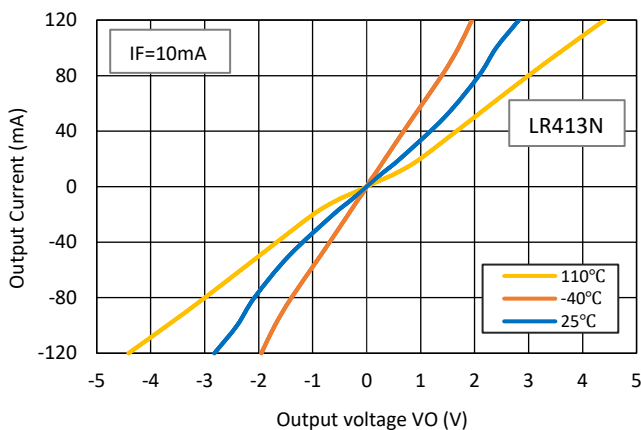
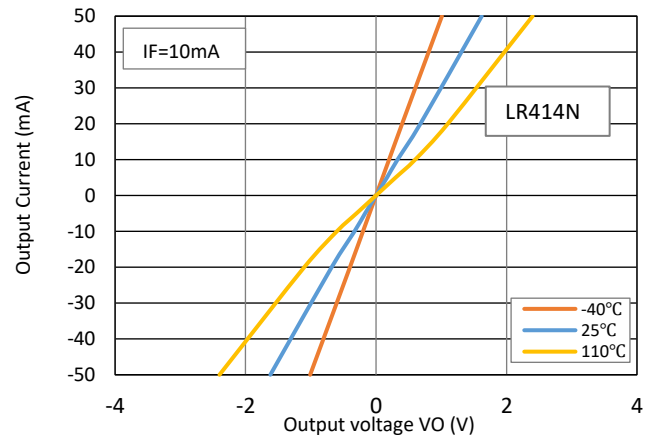


Fig.6 Output Current vs. Output Voltage-LR414N





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Fig.7 Turn on time vs. Temperature

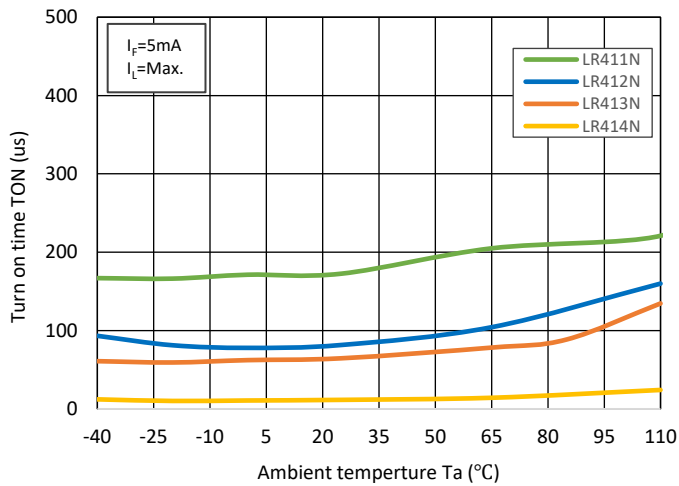


Fig.8 Turn on time vs. Temperature

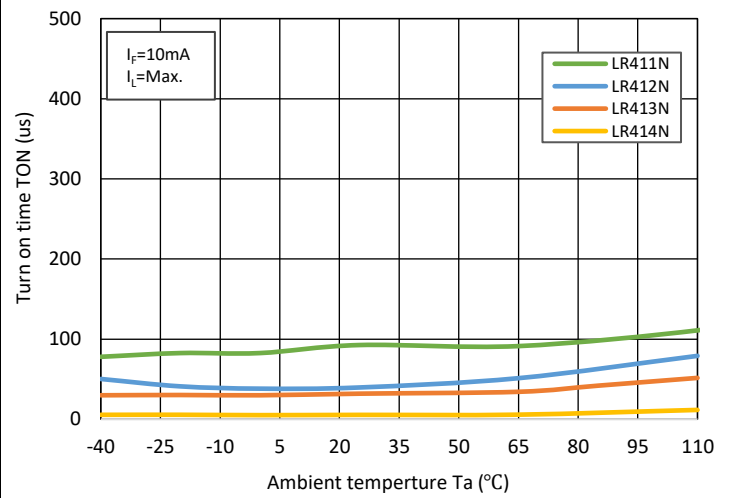


Fig.9 Turn off time vs. Temperature

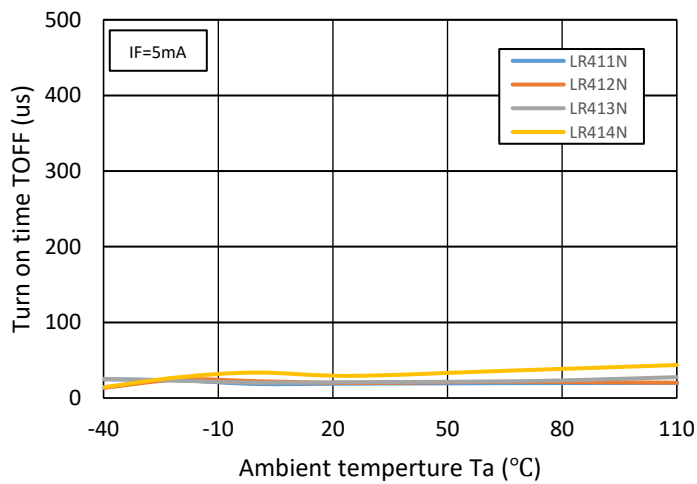


Fig.10 Turn off time vs. Temperature

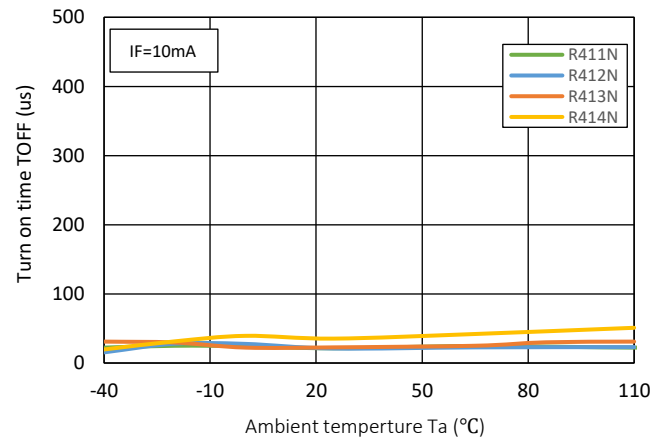


Fig.11 Turn on time vs. LED forward current

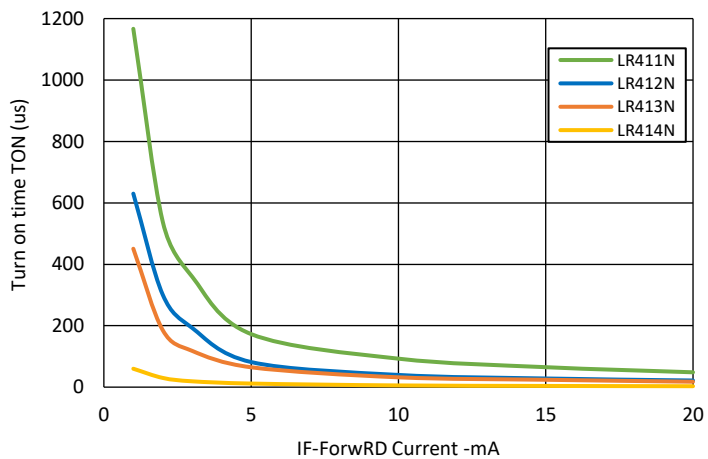
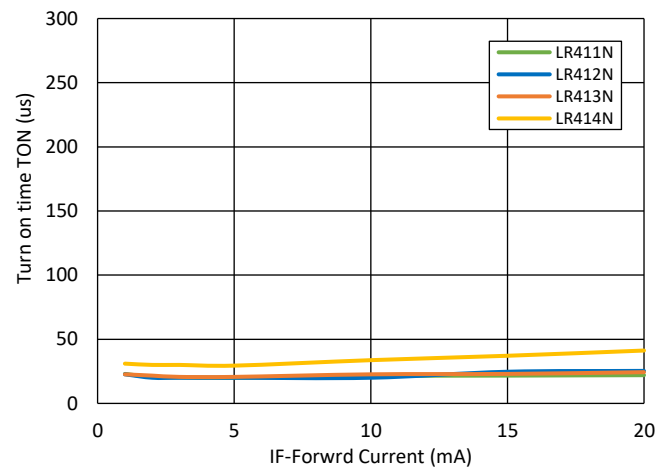


Fig.12 Turn off time vs. LED forward current

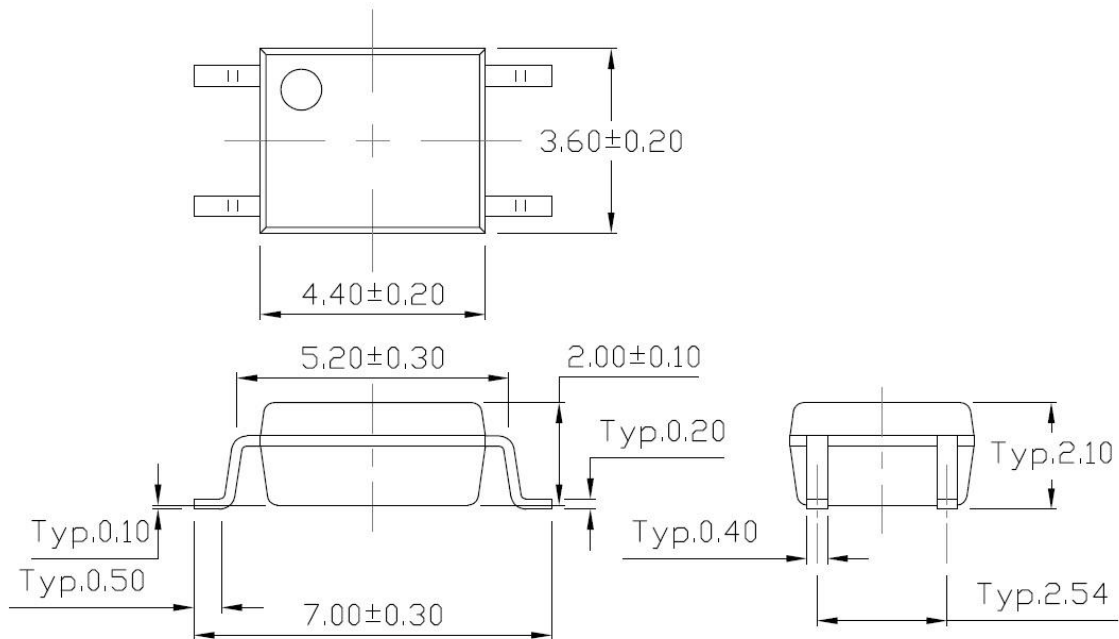




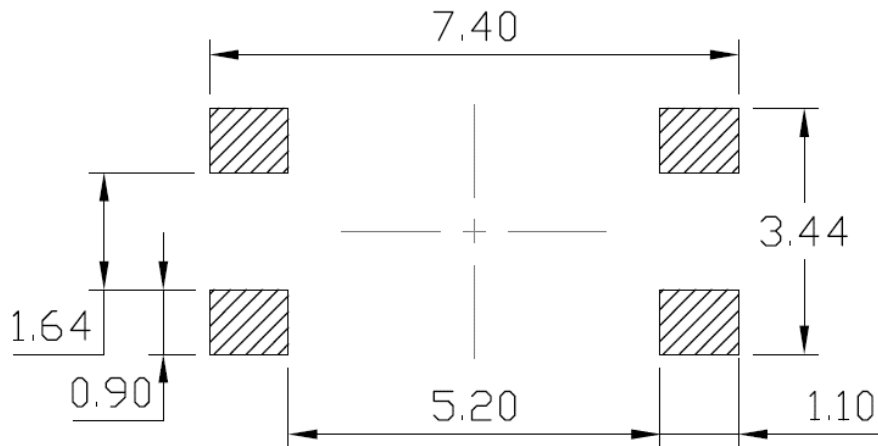
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PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)



RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)



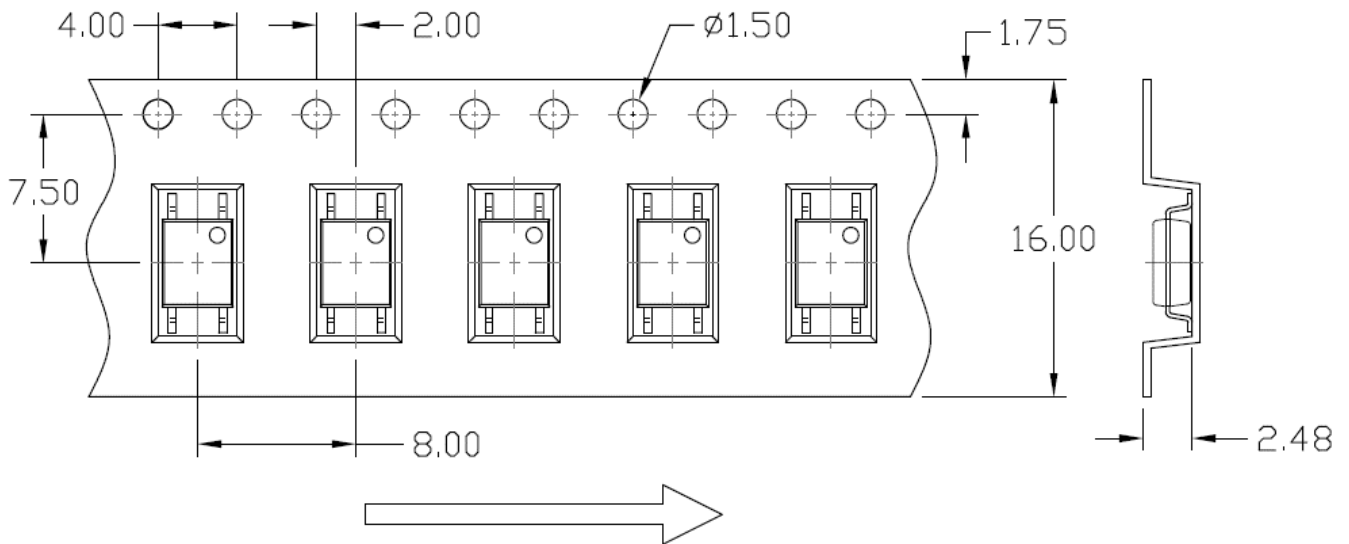


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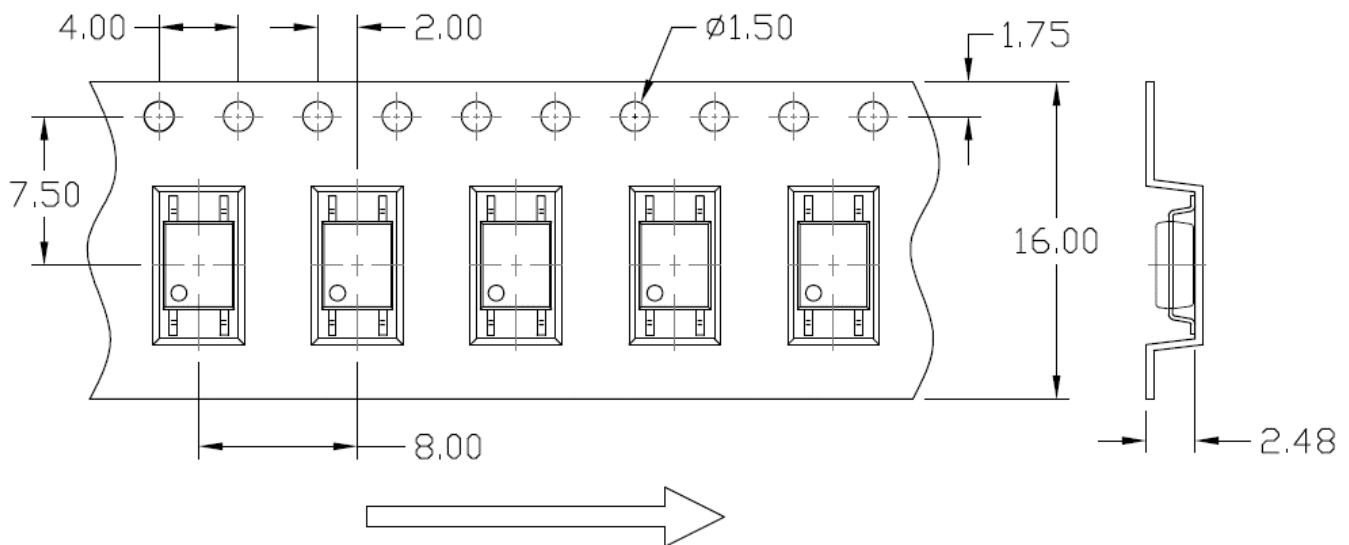
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CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option T1



Option T2

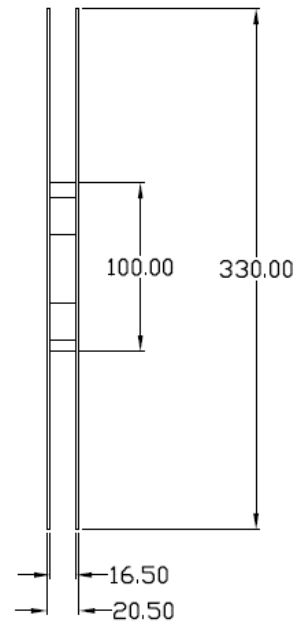
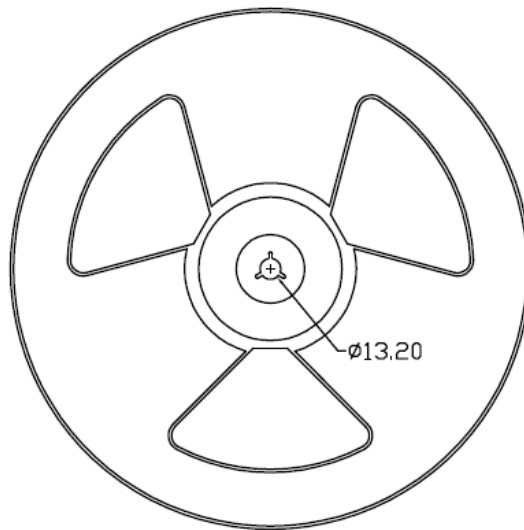




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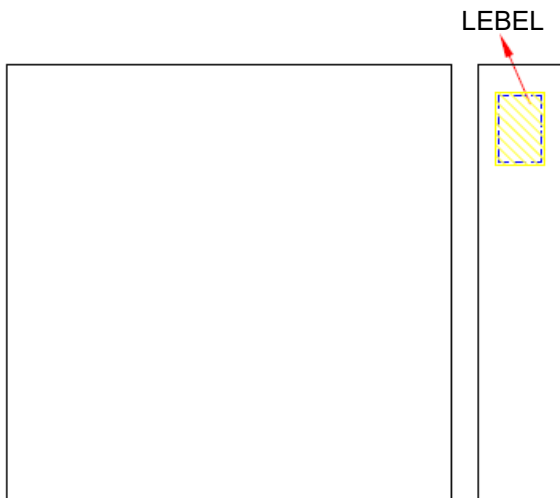
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REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)



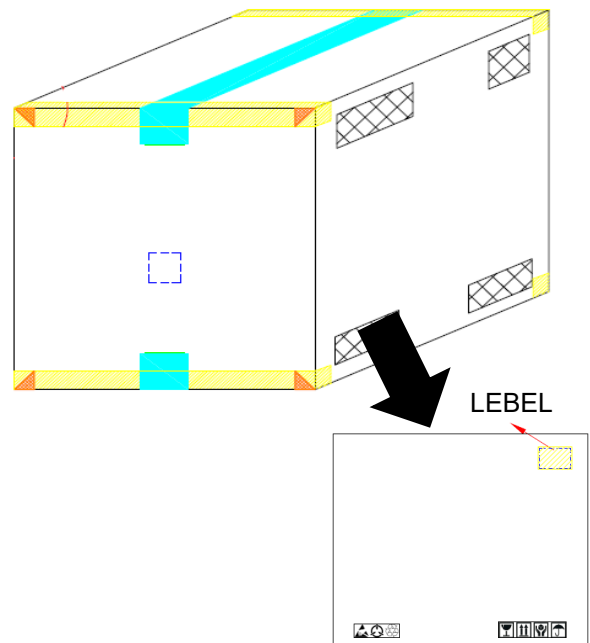
BOX SPECIFICATIONS (Reel Type)

INNER BOX



L x W x H = 36cm x 36cm x 6.9cm

OUTER BOX



L x W x H = 45cm x 38cm x 38cm



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ORDERING AND MARKING INFORMATION

MARKING INFORMATION



M : Company Abbr.
YY : Year date code
WW : 2-digit work week
R41XN : Part Number(X=Rank)
T : Factory identification mark
V : VDE Identification(Optional)

ORDERING INFORMATION

MPCS-LR41XN(Z)-GV

MPC – Company Abbr.
S – Stack
LR41XN – Part Number(X=Rank)
Z – Tape and Reel Option (T1/T2)
G – Green Part
V – VDE Option (V or None)

LABEL INFORMATION



PACKING QUANTITY

Option	Quantity	Quantity – Inner box	Quantity – Outer box
T1	3000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 45k Units
T2	3000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 45k Units

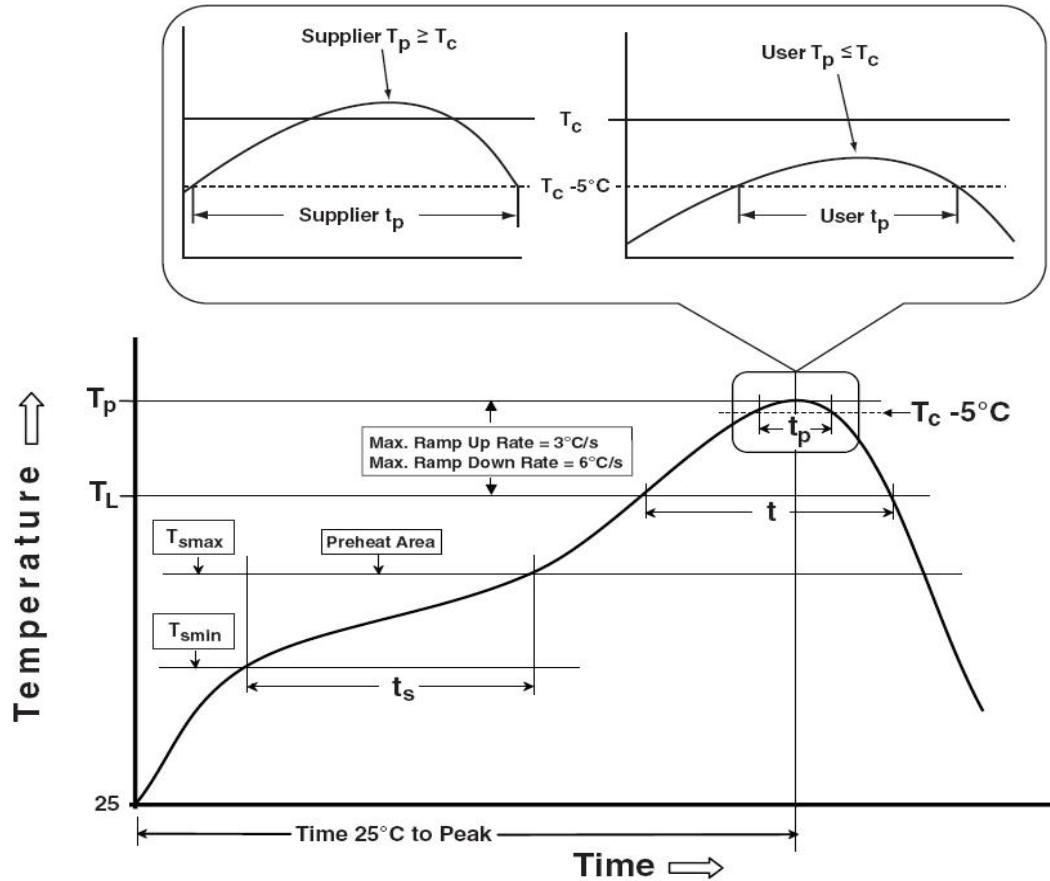


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REFLOW INFORMATION

REFLOW PROFILE



Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (T _{smin})	100°C	150°C
Temperature Max. (T _{smax})	150°C	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.

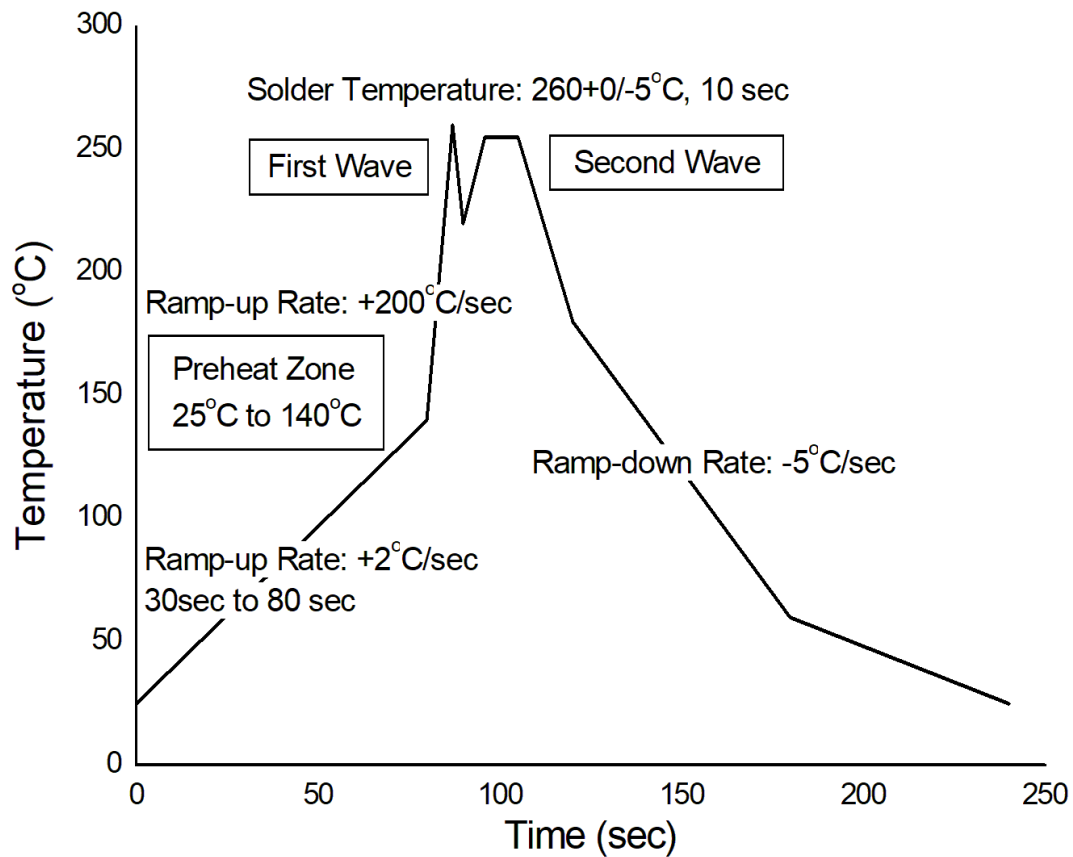


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TEMPERATURE PROFILE OF SOLDERING

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.



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DISCLAIMER

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- Please contact WISELITE sales agent for special application request.
- Immerge unit's body in solder paste is not recommended.
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- Discoloration might be occurred on the package surface after soldering, reflow or long-time use. It neither impacts the performance nor reliability.