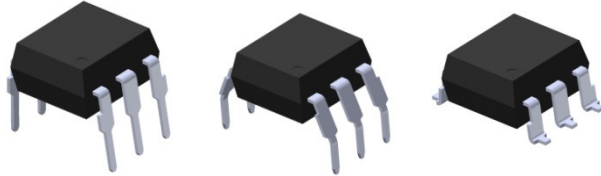
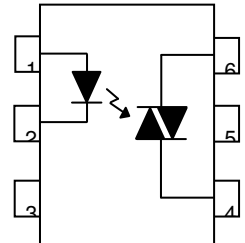


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6 PIN DIP RANDOM-PHASE TRIAC DRIVER PHOTOCOUPLER



Schematic



Features:

- Peak breakdown voltage
 - 250V: MOC301X
 - 400V: MOC302X
 - 600V: MOC305X
- High isolation voltage between input and output (Viso=5000 V rms)
- Compact dual-in-line package
- Pb free and RoHS compliant.
- UL approved (No. E214129)
- VDE approved (No.132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CSA approved

Pin Configuration

1. Anode
2. Cathode
3. No Connection
4. Terminal
5. Substrate (do not connect)
6. Terminal

Description

The MOC301X, MOC302X and MOC305X series of devices each consist of a GaAs infrared emitting diode optically coupled to a monolithic silicon random phase photo Triac.

They are designed for interfacing between electronic controls and power triacs to control resistive and inductive loads for 115 to 240 VAC operations.

Applications

- Solenoid/valve controls
- Lamp ballasts
- Static AC power switch
- Interfacing microprocessors to 115 to 240Vac peripherals
- Incandescent lamp dimmers
- Temperature controls
- Motor controls

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6 PIN DIP RANDOM-PHASE TRIAC DRIVER PHOTOCOUPLER

Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	60	mA
	Reverse voltage	V_R	6	V
	Power dissipation Derating factor (above $T_a = 85^\circ\text{C}$)	P_D	100 3.8	mW mW / °C
Output	Off-state Output Terminal Voltage	V_{DRM}	MOC301X 250	V
			MOC302X 400	
			MOC305X 600	
	Peak Repetitive Surge Current (pw=100µs,120pps)	I_{TSM}	1	A
	On-State RMS Current	$I_{T(RMS)}$	100	mA
	Power dissipation Derating factor (above $T_a = 85^\circ\text{C}$)	P_C	300 7.4	mW mW/°C
	Total power dissipation	P_{TOT}	330	mW
Isolation voltage *1	V_{ISO}	5000	Vrms	
Operating temperature	T_{OPR}	-55 to 100	°C	
Storage temperature	T_{STG}	-55 to 125	°C	
Soldering Temperature*2	T_{SOL}	260	°C	

Notes:

*1 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2&3 are shorted together, and pins 4, 5 & 6 are shorted together.

*2 For 10 seconds

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6 PIN DIP RANDOM-PHASE TRIAC DRIVER PHOTOCOUPLER

Electro-Optical Characteristics (Ta=25°C unless specified otherwise)

Input

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Forward Voltage	V_F	-	1.18	1.5	V	$I_F = 10\text{mA}$
Reverse Leakage current	I_R	-	-	10	μA	$V_R = 6\text{V}$

Output

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Peak Blocking Current	I_{DRM}	-	-	100	nA	$V_{\text{DRM}} = \text{Rated } V_{\text{DRM}}$ $I_F = 0\text{mA}$
Peak On-state Voltage	V_{TM}	-	-	2.5	V	$I_{\text{TM}} = 100\text{mA peak}$, $I_F = \text{Rated } I_{\text{FT}}$
Critical Rate of Rise off-state Voltage	dv/dt	-	100	-	$\text{V}/\mu\text{s}$	$V_{\text{PEAK}} = \text{Rated } V_{\text{DRM}}$, $I_F = 0$ (Fig. 8)
	MOC301X	1000	-	-		$V_{\text{PEAK}} = 400\text{V}$, $I_F = 0$ (Fig. 8)
	MOC302X					
	MOC305X					

Transfer Characteristics

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition	
LED Trigger Current	MOC3020			30	mA	Main terminal Voltage=3V	
	MOC3010						
	MOC3021	-	-	15			
	MOC3051						
	MOC3011	I_{FT}					
	MOC3022		-	-			10
	MOC3052						
	MOC3012			5			
	MOC3023						
	MOC3053						
Holding Current	I_H	-	250	-	μA		

* Typical values at $T_a = 25^\circ\text{C}$

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6 PIN DIP RANDOM-PHASE TRIAC DRIVER PHOTOCOUPLER

Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

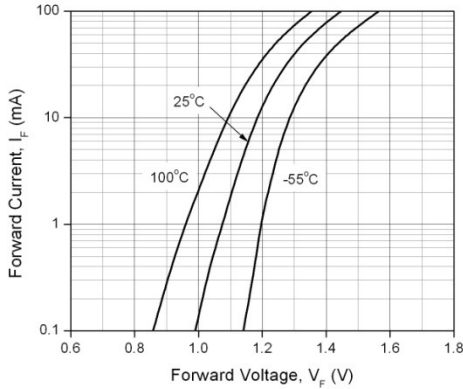


Figure 2. On-State Characteristics

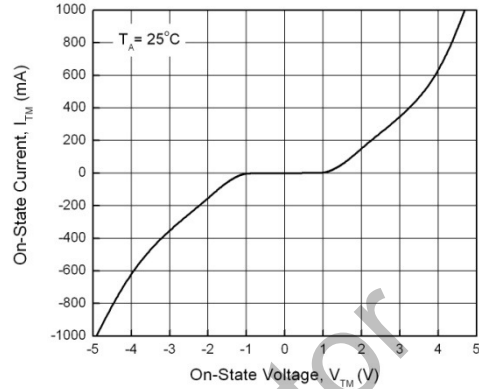


Figure 3. Holding Current vs. Ambient Temperature

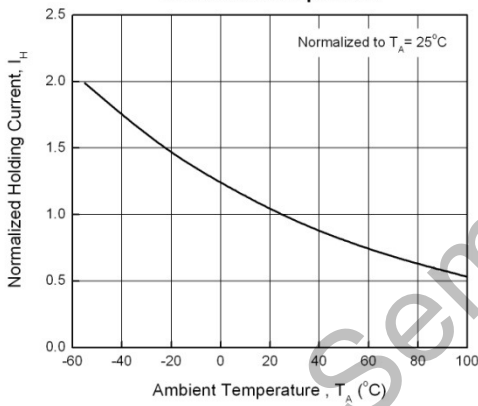


Figure 4. LED Current Required to Trigger vs. LED Pulse Width

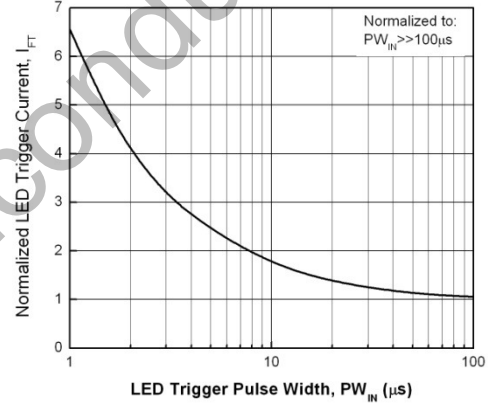


Figure 5. Leakage Current vs. Ambient Temperature

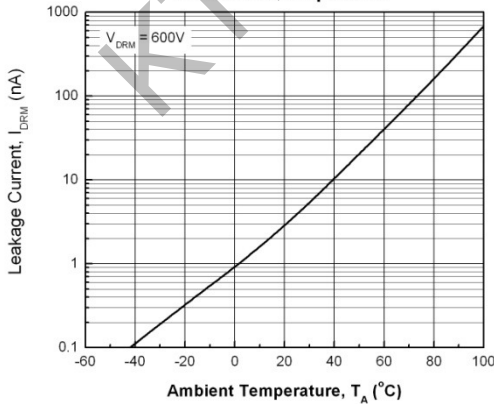
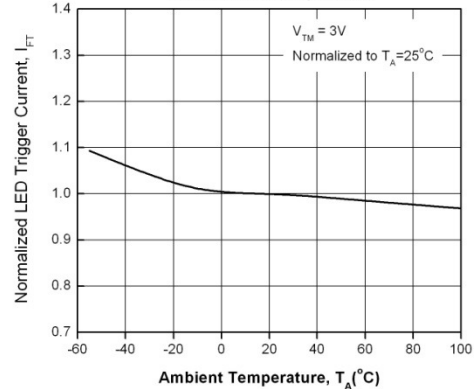


Figure 6. LED Trigger Current vs. Ambient Temperature



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6 PIN DIP RANDOM-PHASE TRIAC DRIVER PHOTOCOUPLER

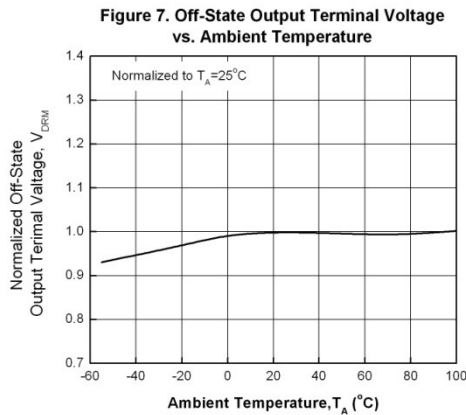
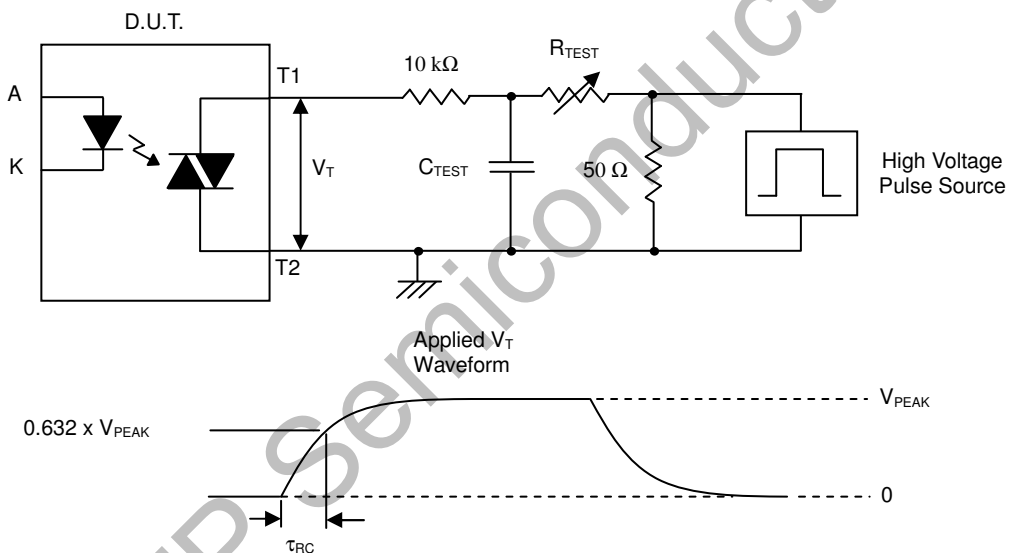


Figure 8. Static dv/dt Test Circuit & Waveform



Measurement Method

The high voltage pulse is set to the required V_{PEAK} value and applied to the D.U.T. output side through the RC circuit above. LED current is not applied. The waveform V_T is monitored using a x100 scope probe. By varying R_{TEST} , the dv/dt (slope) is increased, until the D.U.T. is observed to trigger (waveform collapses). The dv/dt is then decreased until the D.U.T. stops triggering. At this point, τ_{RC} is recorded and the dv/dt calculated.

$$dv/dt = \frac{0.632 \times V_{PEAK}}{\tau_{RC}}$$

For example, $V_{PEAK} = 400V$ for MOC302X series. The dv/dt value is calculated as follows:

$$dv/dt = \frac{0.63 \times 400}{\tau_{RC}} = \frac{252}{\tau_{RC}}$$

DATASHEETL**6 PIN DIP RANDOM-PHASE TRIAC DRIVER PHOTOCOUPLER****Order Information****Part Number**

MOC301XY(Z)-V
or **MOC302XY(Z)-V**
or **MOC305XY(Z)-V**

Note

- X = Part No. for MOC301x (0, 1 or 2)
X = Part No. for MOC302x, MOC305x (1, 2 or 3)
Y = Lead form option (S, S1, M or none)
Z = Tape and reel option (TA, TB or none).
V = VDE safety approved (optional)

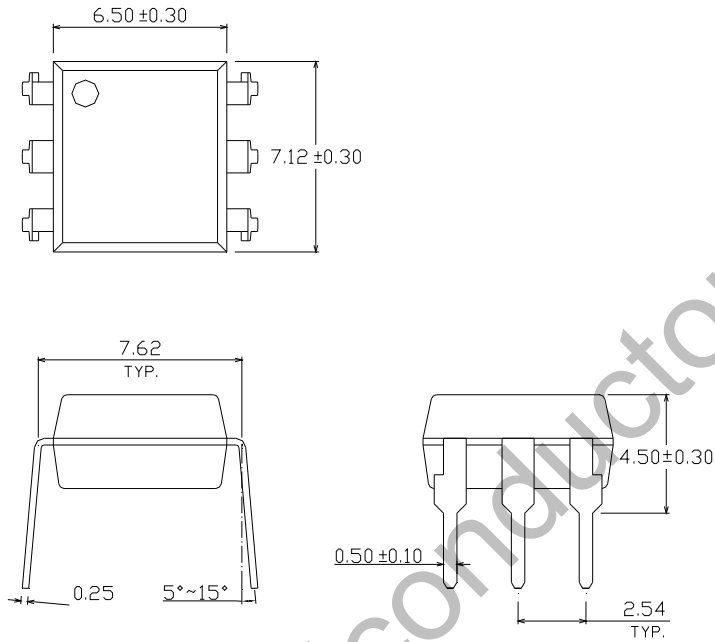
Option	Description	Packing quantity
None	Standard DIP-6	65 units per tube
M	Wide lead bend (0.4 inch spacing)	65 units per tube
S (TA)	Surface mount lead form + TA tape & reel option	1000 units per reel
S (TB)	Surface mount lead form + TB tape & reel option	1000 units per reel
S1 (TA)	Surface mount lead form (low profile) + TA tape & reel option	1000 units per reel
S1 (TB)	Surface mount lead form (low profile) + TB tape & reel option	1000 units per reel

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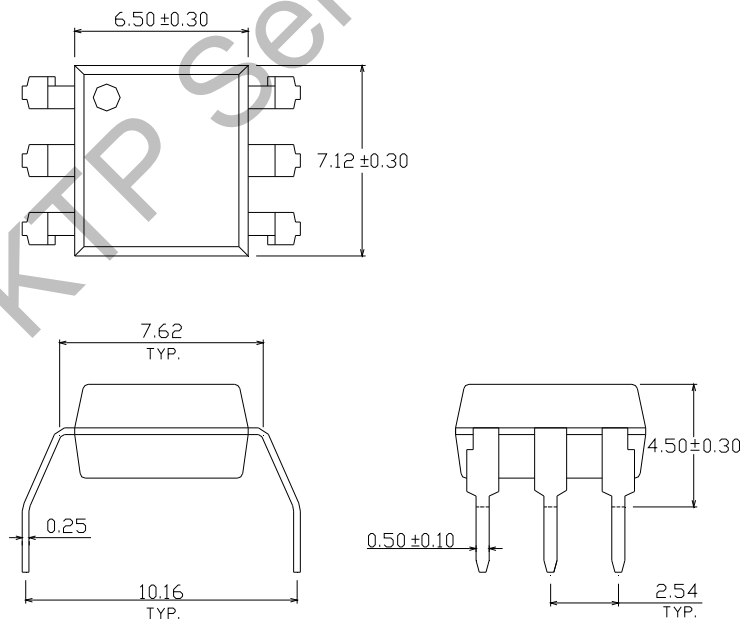
6 PIN DIP RANDOM-PHASE TRIAC DRIVER PHOTOCOUPLER

Package Dimension (Dimensions in mm)

Standard DIP Type



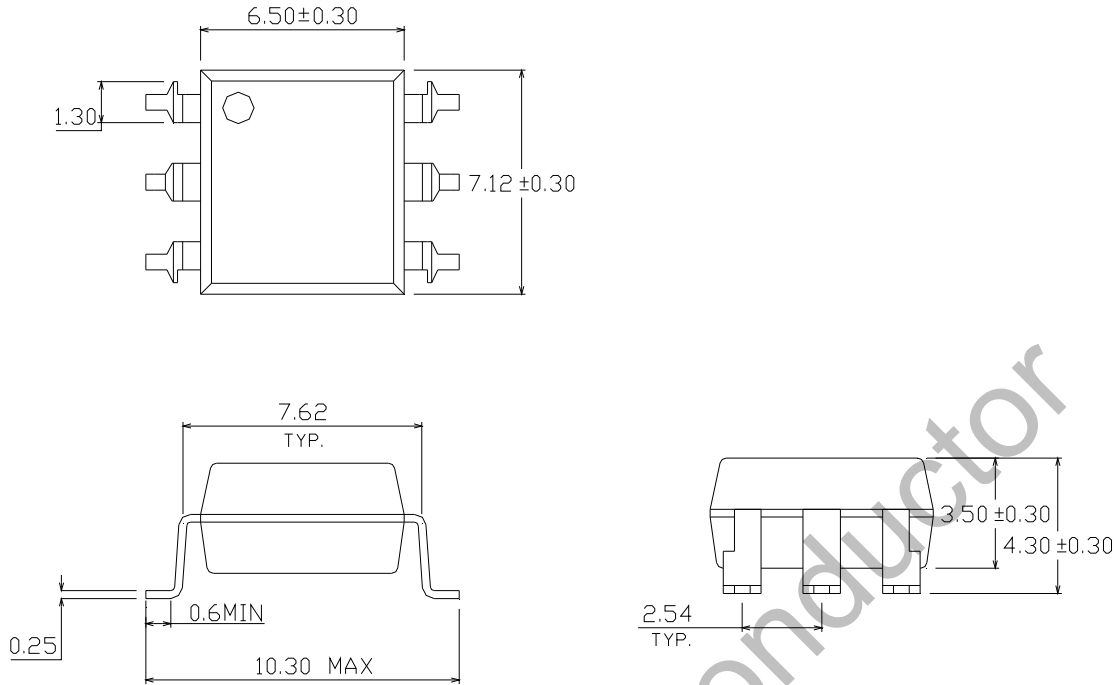
Option M Type



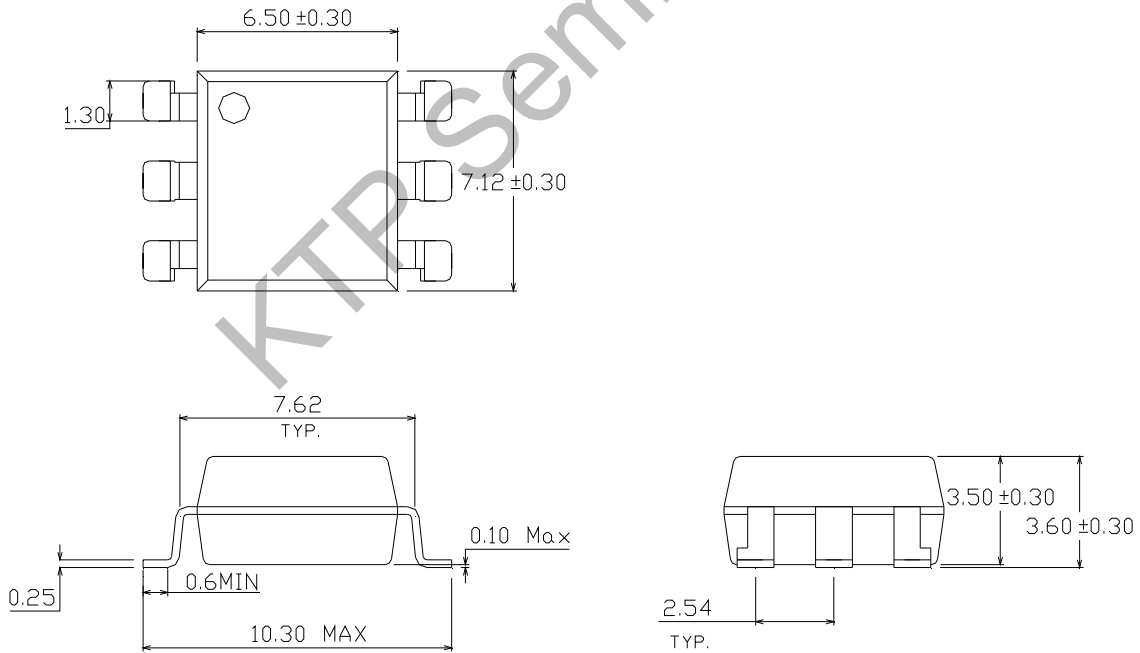
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Option S Type



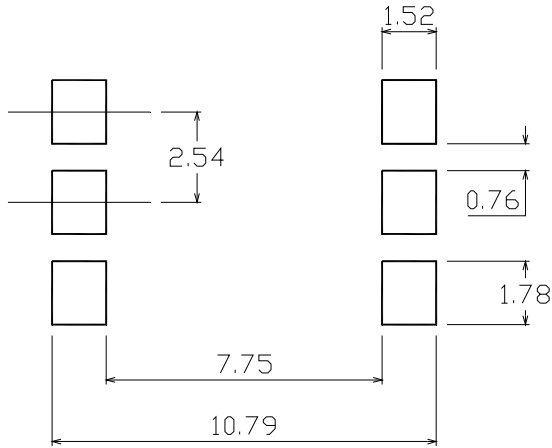
Option S1 Type



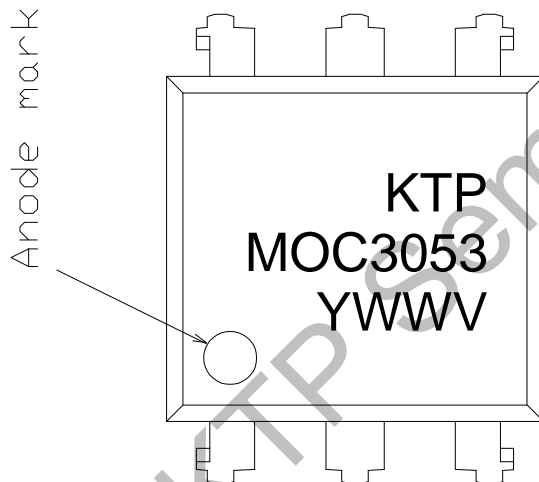
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6 PIN DIP RANDOM-PHASE TRIAC DRIVER PHOTOCOUPLER

Recommended pad layout for surface mount leadform



Device Marking



Notes

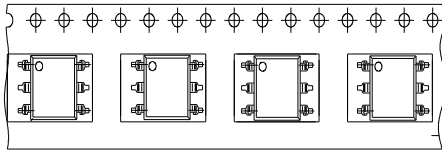
- KTP denotes Brand LOGO
- 3053 denotes Device Number
- Y denotes 1 digit Year code
- WW denotes 2 digit Week code
- V denotes VDE (optional)

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6 PIN DIP RANDOM-PHASE TRIAC DRIVER PHOTOCOUPLER

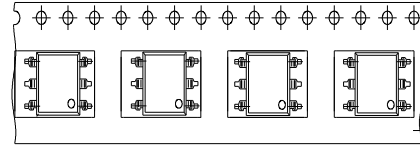
Tape & Reel Packing Specifications

Option TA



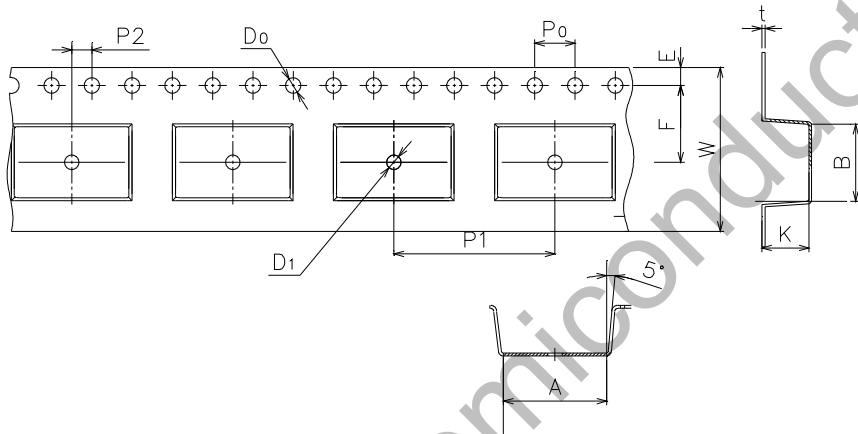
Direction of feed from reel

Option TB



Direction of feed from reel

Tape dimensions



Dimension No.	A	B	Do	D1	E	F
Dimension (mm)	10.4±0.1	7.5±0.1	1.5±0.1	1.5+0.1/-0	1.75±0.1	7.5±0.1

Dimension No.	Po	P1	P2	t	W	K
Dimension (mm)	4.0±0.15	12±0.1	2.0±0.1	0.35±0.03	16.0±0.2	4.5±0.1

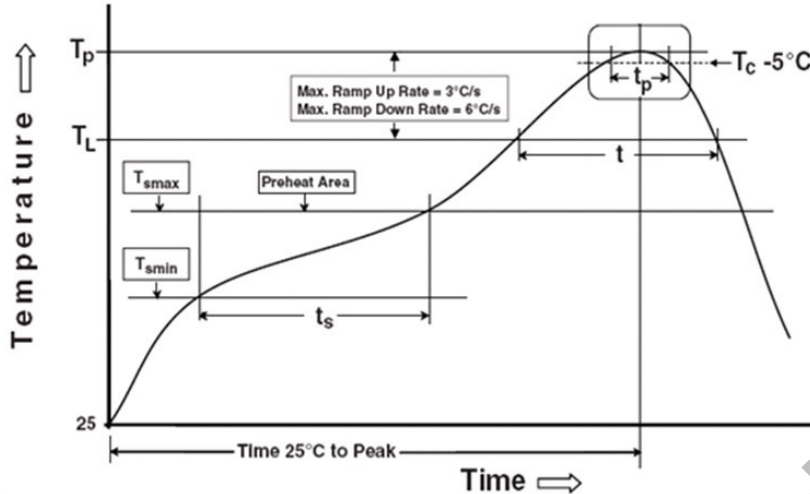
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6 PIN DIP RANDOM-PHASE TRIAC DRIVER PHOTOCOUPLER

Precautions for Use

1. Soldering Condition

1.1 (A) Maximum Body Case Temperature Profile for evaluation of Reflow Profile



Note:

Reference: IPC/JEDEC J-STD-020D

Preheat

Temperature min (T_{smin})	150 °C
Temperature max (T_{smax})	200 °C
Time (T_{smin} to T_{smax}) (t_s)	60-120 seconds
Average ramp-up rate (T_{smax} to T_p)	3 °C/second max

Other

Liquidus Temperature (T_L)	217 °C
Time above Liquidus Temperature (t_L)	60-100 sec
Peak Temperature (T_p)	260 °C
Time within 5 °C of Actual Peak Temperature: $T_p - 5 °C$	30 s
Ramp- Down Rate from Peak Temperature	6 °C /second max.
Time 25 °C to peak temperature	8 minutes max.
Reflow times	3 times.

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DISCLAIMER

1. Above specification may be changed without notice. KTP will reserve authority on material change for above specification.
2. When using this product, please observe the absolute maximum ratings and the instructions for using outlined in these specification sheets. KTP assumes no responsibility for any damage resulting from use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets.

KTP Semiconductor