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# 4 PIN SOP PHOTOTRANSISTOR PHOTOCOUPLER

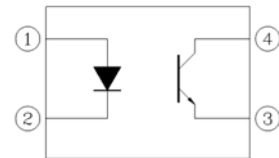
## EL357 Series

### Features:

- Current transfer ratio  
(CTR: 50~600% at  $I_F = 5\text{mA}$ ,  $V_{CE} = 5\text{V}$ )
- High isolation voltage between input and output ( $V_{iso} = 3750\text{ V rms}$ )
- Compact small outline package
- Pb free and RoHS compliant.
- UL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved (No. 7161608)
- NEMKO approved (No. P06206474)
- DEMKO approved (No. 313924)
- FIMKO approved (No. FI 22807)
- CSA approved (No. 1969127)



### Schematic



### Pin Configuration

1. Anode
2. Cathode
3. Emitter
4. Collector

### Description

The EL357 series contains an infrared emitting diode, optically coupled to a phototransistor. It is packaged in a 4-pin small outline SMD package.

### Applications

- Programmable controllers
- System appliances, measuring instruments
- Telecommunication equipments
- Home appliances, such as fan heaters, etc.
- Signal transmission between circuits of different potentials and impedances



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### Absolute Maximum Ratings ( $T_a=25^{\circ}\text{C}$ )

Parameter		Symbol	Rating	Unit
Input	Forward current	$I_F$	50	mA
	Peak forward current (1us, pulse)	$I_{FP}$	1	A
	Reverse voltage	$V_R$	6	V
	Power dissipation No derating required up to $T_a = 100^{\circ}\text{C}$	$P_D$	70	mW
Output	Power dissipation Derating factor (above $T_a = 80^{\circ}\text{C}$ )	$P_C$	150	mW
			3.7	mW/ $^{\circ}\text{C}$
	Collector current	$I_C$	80	mA
	Collector-Emitter voltage	$V_{CEO}$	80	V
	Emitter-Collector voltage	$V_{ECO}$	7	V
Total power dissipation		$P_{TOT}$	200	mW
Isolation voltage <sup>*1</sup>		$V_{ISO}$	3750	V rms
Operating temperature		$T_{OPR}$	-55 ~ +100	$^{\circ}\text{C}$
Storage temperature		$T_{STG}$	-55 ~ +125	$^{\circ}\text{C}$
Soldering temperature <sup>*2</sup>		$T_{SOL}$	260	$^{\circ}\text{C}$

#### Notes

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

\*2 For 10 seconds.



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### Electrical Characteristics (T<sub>a</sub>=25°C unless specified otherwise)

#### Input

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Forward voltage	V <sub>F</sub>	-	1.2	1.4	V	I <sub>F</sub> = 20mA
Reverse current	I <sub>R</sub>	-	-	10	μA	V <sub>R</sub> = 4V
Input capacitance	C <sub>in</sub>	-	30	250	pF	V = 0, f = 1kHz

#### Output

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Collector-Emitter dark current	I <sub>CEO</sub>	-	-	100	nA	V <sub>CE</sub> = 20V, I <sub>F</sub> = 0mA
Collector-Emitter breakdown voltage	BV <sub>CEO</sub>	80	-	-	V	I <sub>C</sub> = 0.1mA
Emitter-Collector breakdown voltage	BV <sub>ECO</sub>	7	-	-	V	I <sub>E</sub> = 0.1mA

### Transfer Characteristics (T<sub>a</sub>=25°C unless specified otherwise)

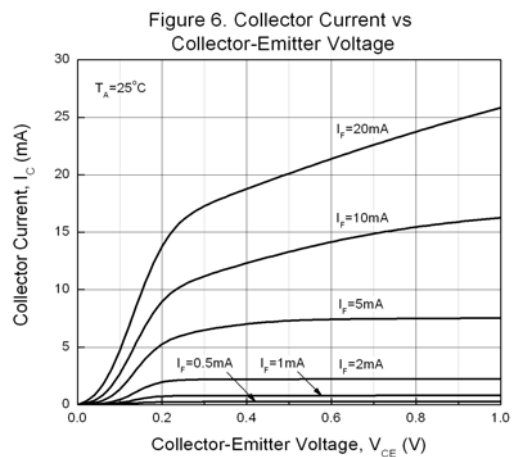
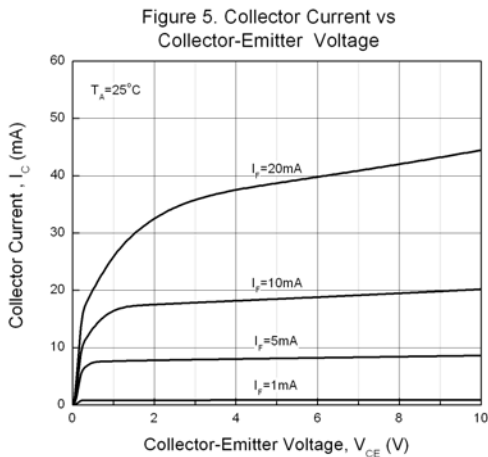
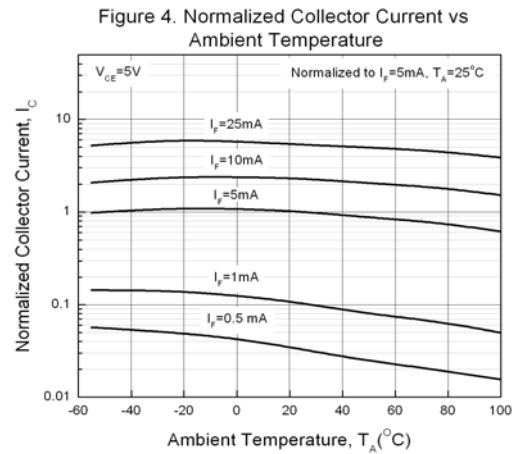
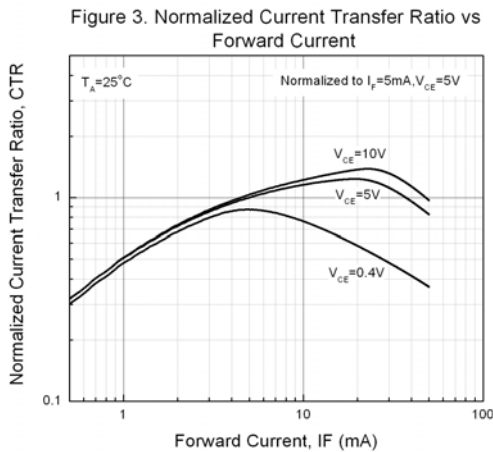
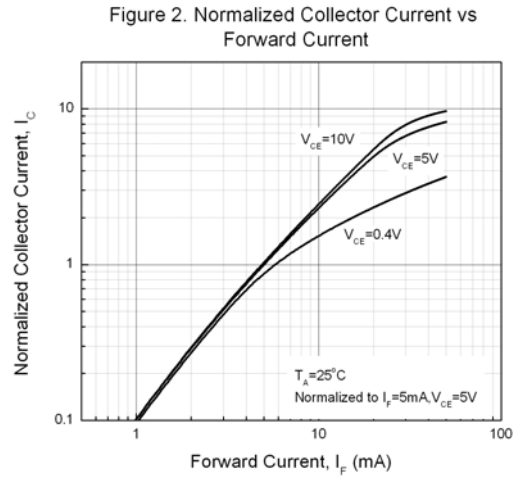
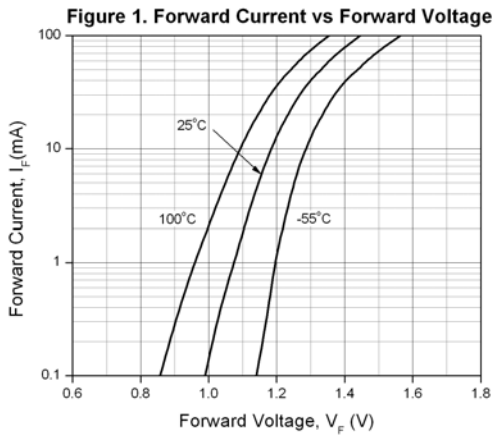
Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Current Transfer ratio	EL357	50	-	600	%	I <sub>F</sub> = 5mA, V <sub>CE</sub> = 5V
	EL357A	80	-	160		
	EL357B	130	-	260		
	EL357C	200	-	400		
	EL357D	300	-	600		
Collector-Emitter saturation voltage	V <sub>CE(sat)</sub>	-	0.1	0.2	V	I <sub>F</sub> = 1mA, I <sub>C</sub> = 20mA
Isolation resistance	R <sub>IO</sub>	5×10 <sup>10</sup>	-	-	Ω	V <sub>IO</sub> = 500Vdc, 40~60% R.H.
Floating capacitance	C <sub>IO</sub>	-	0.6	1.0	pF	V <sub>IO</sub> = 0, f = 1MHz
Cut-off frequency	f <sub>c</sub>	-	80	-	kHz	V <sub>CE</sub> = 5V, I <sub>C</sub> = 2mA R <sub>L</sub> = 100Ω, -3dB
Rise time	t <sub>r</sub>	-	6	18	μs	V <sub>CE</sub> = 2V, I <sub>C</sub> = 2mA, R <sub>L</sub> = 100Ω
Fall time	t <sub>f</sub>	-	8	18	μs	

\* Typical values at T<sub>a</sub> = 25°C

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## Typical Performance Curves



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Figure 7. Collector Dark Current vs Ambient Temperature

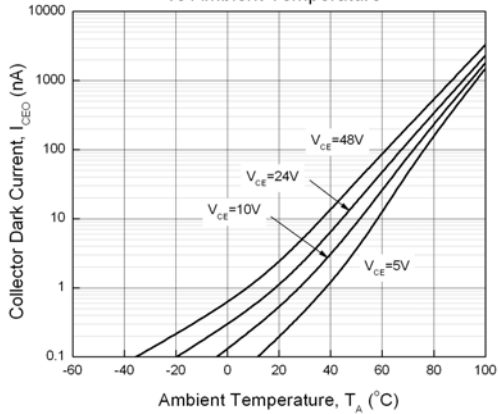


Figure 8. Switching Time vs Load Resistance

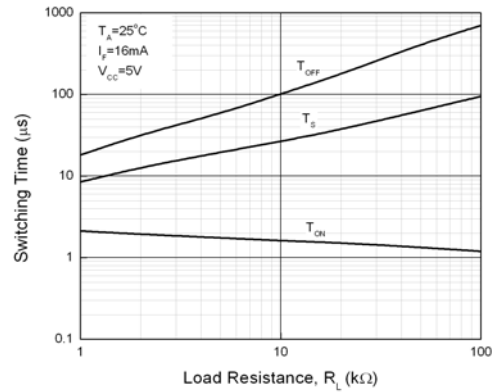


Figure 9. Collector-Emitter Saturation Voltage vs Ambient Temperature

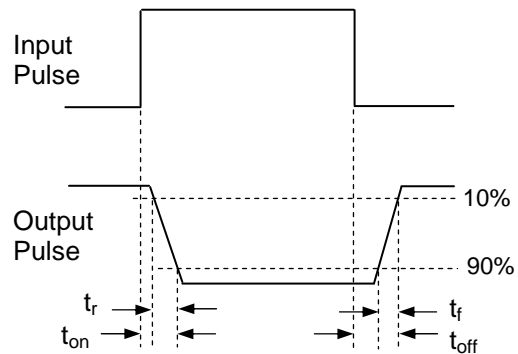
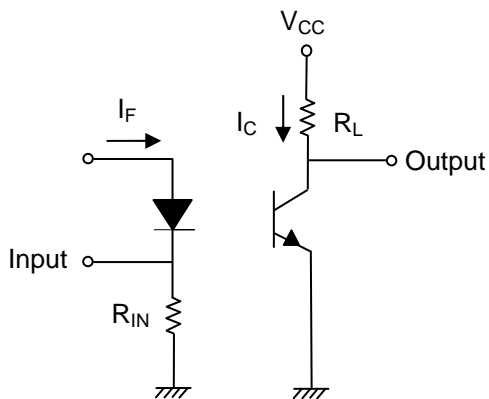
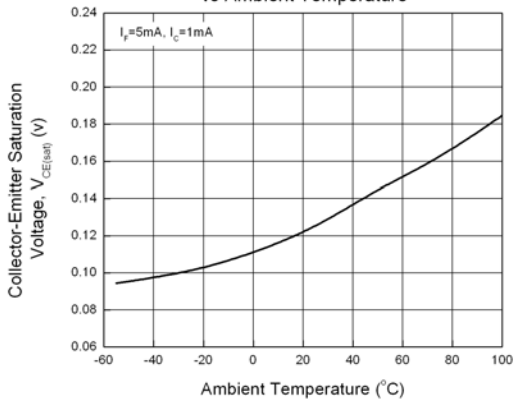


Figure 10. Switching Time Test Circuit & Waveforms



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### Order Information

Part Number

# EL357(X)(YY)-V

### Note

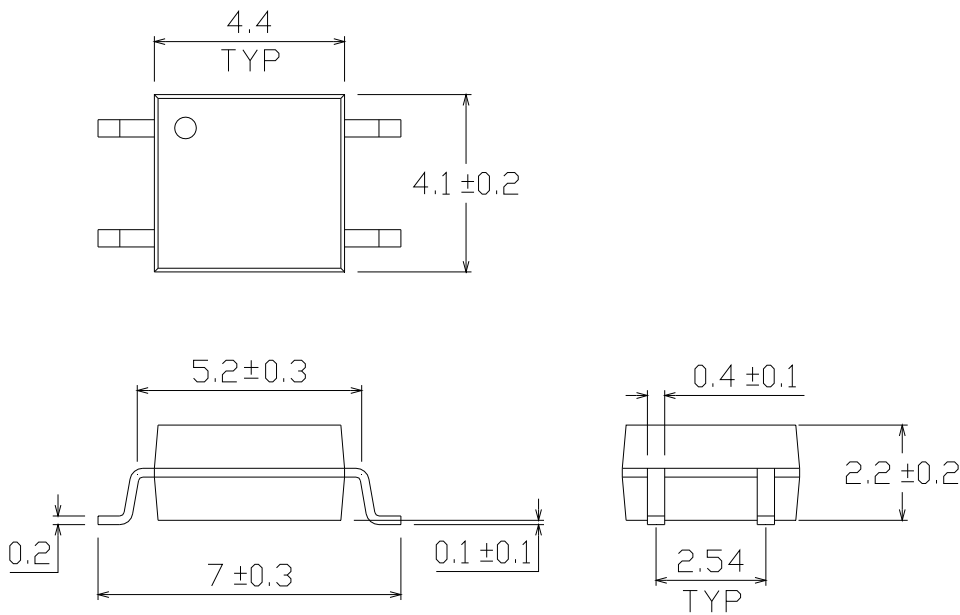
- X = CTR Rank (A, B, C, D or none)
- YY = Tape and reel option (TA, TB or none).
- V = VDE option

Option	Description	Packing quantity
None	Standard SMD option	100 units per tube
-V	Standard SMD option + VDE	100 units per tube
(TA)	TA Tape & reel option	3000 units per reel
(TB)	TB Tape & reel option	3000 units per reel
(TA)-V	TA Tape & reel option + VDE	3000 units per reel
(TB)-V	TB Tape & reel option + VDE	3000 units per reel

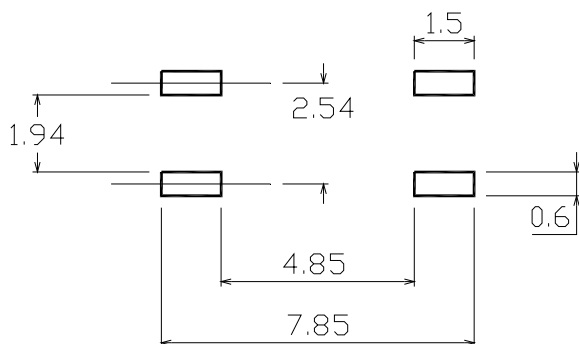
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## Package Drawing (Dimensions in mm)



## Recommended pad layout for surface mount leadform





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### Device Marking



### Notes

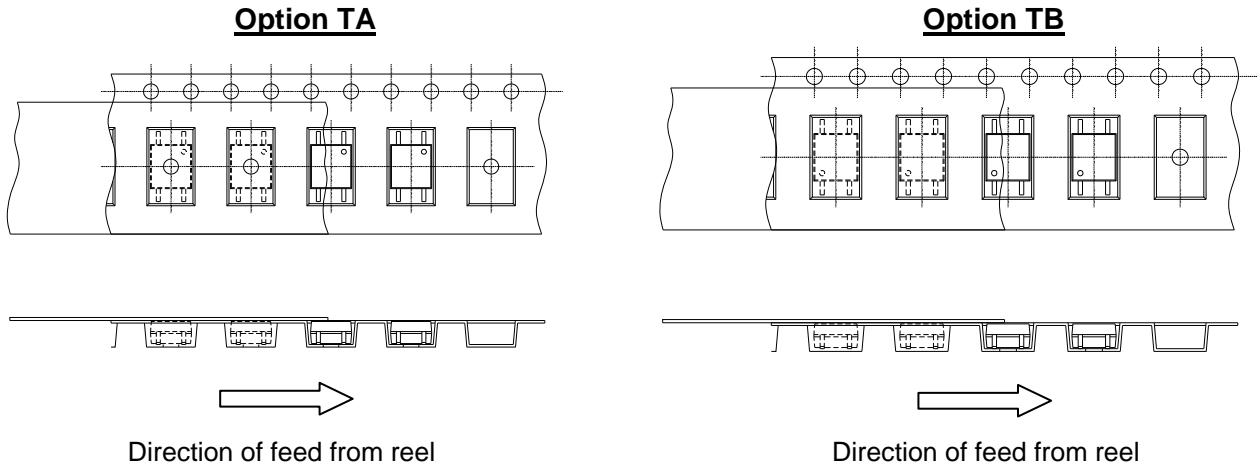
EL	denotes Everlight
357	denotes Part Number
R	denotes CTR Rank (A, B, C, D or none)
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)



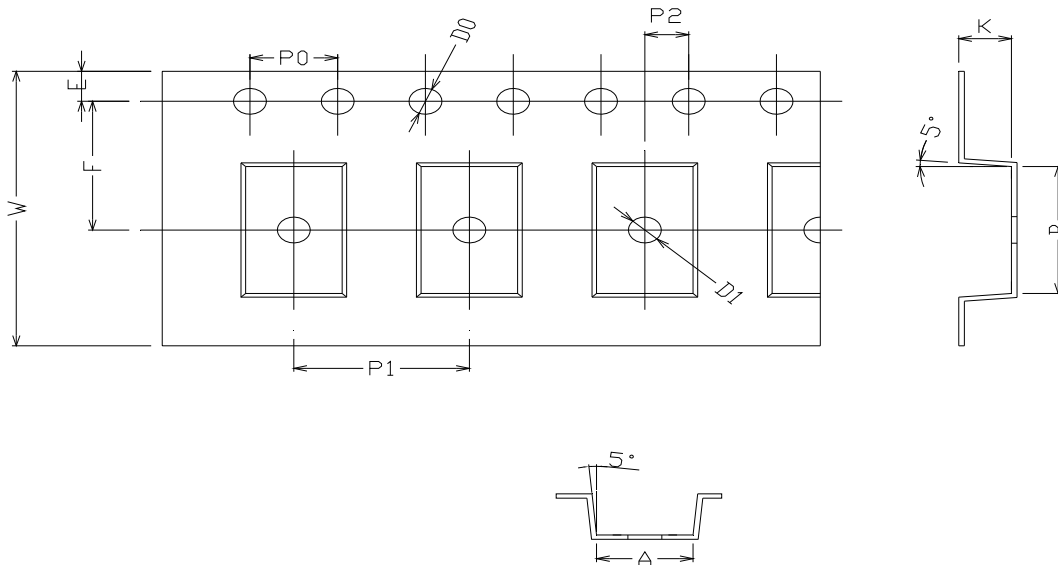
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## Tape & Reel Packing Specifications



## Tape dimensions

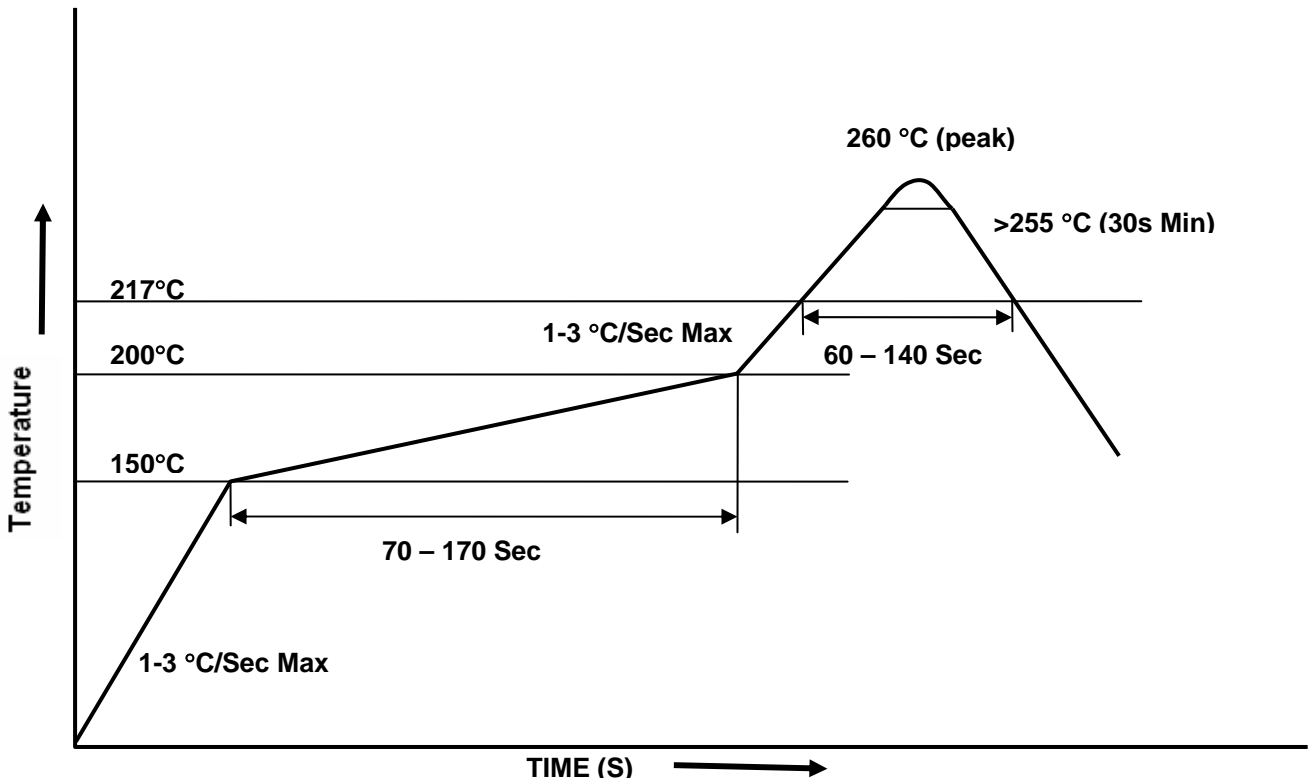


Dimension No.	<b>A</b>	<b>B</b>	<b>Do</b>	<b>D1</b>	<b>E</b>	<b>F</b>
Dimension (mm)	4.4 ± 0.1	7.4 ± 0.1	1.5 + 0.1/-0	1.5 ± 0.1	1.7 5± 0.1	7.5 ± 0.1
Dimension No.	<b>Po</b>	<b>P1</b>	<b>P2</b>	<b>t</b>	<b>W</b>	<b>K</b>
Dimension (mm)	4.0 ± 0.15	8.0 ± 0.1	2.0 ± 0.1	0.25 ± 0.03	16.0 ± 0.2	2.4 ± 0.1

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## Solder Reflow Temperature Profile





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