芯伯乐®
XINBOLE

Product Specification

PC357X

4-Pin SOP Phototransistor Optocouplers

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Descriptions

The PC357X series contains an infrared emitting diode, optically coupled to a phototransistor detector. The devices in a 4-pin small outline SOP package.

Features

- DC Input Response
- Current Transfer Ratio in Selected Groups
  - PC357: 50–600%
  - PC357A: 80–160%
  - PC357B: 130–260%
  - PC357C: 200–400%
  - PC357D: 300–600%
- Minimum BV_{CEO} of 70 V Guaranteed
- High isolation voltage between input and output (Viso=3750V rms)
- This Device is Pb−Free
- Adopting SOP-4 package

SOP−4

Applications

- Power Supply Regulators
- Digital Logic Inputs
- Microprocessor Inputs

Ordering Information

Product Model	Package Type	Marking	Packing	Packing Qty	CTR Value*
PC357-TAG	SOP-4	PC357	Tape	3000Pcs/Reel	50-600%
PC357A-TAG	SOP-4	PC357A	Tape	3000Pcs/Reel	80-160%
PC357B-TAG	SOP-4	PC357B	Tape	3000Pcs/Reel	130-260%
PC357C-TAG	SOP-4	PC357C	Tape	3000Pcs/Reel	200-400%
PC357D-TAG	SOP-4	PC357D	Tape	3000Pcs/Reel	300-600%

*Notes:I_F=5mA,V_{CE}=5V,T_A=25°C

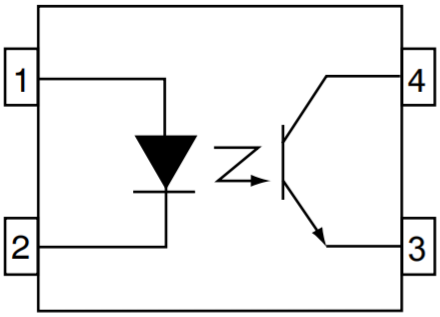
Product Model

PC357X-YG

Note

X = CTR Rank(A, B, C, D or none)
Y = Tape and reel option (TA, TB or none)
G = Halogen free

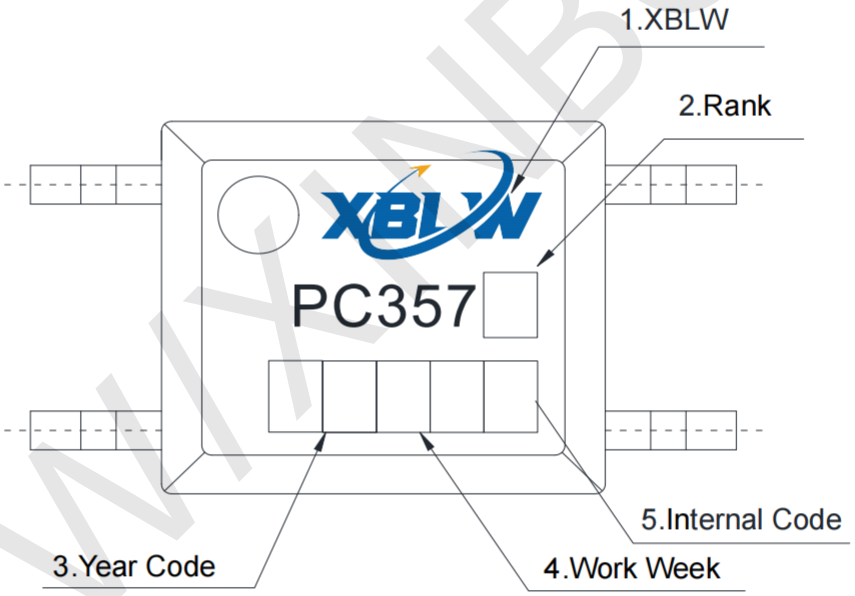
Block Diagram



Pin Configurations

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

Naming Rule



1.XBLW LOGO
2.CTR Rank
3.Year Code, Example : 2023=23
4.Work Week Ranging from '01' to '53'
5.Internal Code

ABSOLUTE MAXIMUM RATINGS T_A = 25°C unless otherwise specified.

Symbol	Parameter	Value	Unit
TOTAL DEVICE			
T_{STG}	Storage Temperature	−55 to +150	℃
T_{OPR}	Operating Temperature	−55 to +110	
T_J	Junction Temperature	−55 to +125	
T_{SOL}	Lead Solder Temperature	260 for 10 s	
θ_{JC}	Junction−to−Case Thermal Resistance	210	℃/W
P_{TOT}	Total Device Power Dissipation	200	mW

Symbol	Parameter	Value	Unit
EMITTER			
I_F	Continuous Forward Current	50	mA
V_R	Reverse Voltage	6	V
P_D	Power Dissipation	70	mW
	Derate Above 100 ℃	1.7	mW/℃
DETECTOR			
V_{CEO}	Collector−Emitter Voltage	70	V
V_{ECO}	Emitter−Collector Voltage	6	
I_C	Continuous Collector Current	50	mA
P_C	Collector Power Dissipation	150	mW
	Derate Above 90 ℃	2.9	mW/℃

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

ELECTRICAL CHARACTERISTICS T_A = 25°C unless otherwise specified.

INDIVIDUAL COMPONENT CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Emmiter						
V_F	Forward Voltage	I_F = 20 mA	–	1.2	1.4	V
I_R	Reverse Current	V_R = 4.0 V			10	μA
C_t	Terminal Capacitance	V = 0, f = 1 kHz		30	250	pF
Detector						
I_{CEO}	Collector Dark Current	V_{CE} = 20 V, IF = 0	–		100	nA
BV_{CEO}	Collector−Emitter Breakdown Voltage	I_C = 0.1 mA, I_F = 0	70	–		V
BV_{ECO}	Emitter−Collector Breakdown Voltage	I_E = 10 μA, I_F = 0	6	–	–	

DC TRANSFER CHARACTERISTICS

Symbol	Parameter	Device	Test Conditions	Min	Typ	Max	Unit
CTR	Current Transfer Ratio (Note 1)	PC357	I_F = 5 mA, V_{CE} = 5 V	50	–	600	%
		PC357A		80		160	
		PC357B		130	–	260	
		PC357C		200	–	400	
		PC357D		300		600	
$V_{CE(SAT)}$	Collector–Emitter Saturation Voltage	PC357 Series	I_F = 20 mA, I_C = 1 mA	–	0.1	0.2	V

ELECTRICAL CHARACTERISTICS TA = 25°C unless otherwise specified. (continued)

AC TRANSFER CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
f_C	Cut–Off Frequency	V_{CE} = 5 V, I_C = 2 mA, R_L = 100 Ω, –3 dB	15	80	–	kHz
t_r	Response Time (Rise)	V_{CE} = 2 V, I_C = 2 mA, R_L = 100 Ω (Note 2)	–	4	18	μs
t_f	Response Time (Fall)		–	3	18	

ISOLATION CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{ISO}	Input–Output Isolation Voltage (Note 3)	f = 60 Hz, t = 1 min, I_{I-O} ≤ 2 μA	5000			VAC_{RMS}
R_{ISO}	Isolation Resistance	V_{I-O} = 500 V_{DC}	$5x10^{10}$	$1x10^{11}$	–	Ω
C_{ISO}	Isolation Capacitance	V_{I-O} = 0, f = 1 MHz	–	0.6	1.0	pf

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. Current Transfer Ratio (CTR) = IC / I_F x 100%
2. For test circuit setup and waveforms, refer to page 6 to 8 .
3. For this test, Pins 1 and 2 are common, and Pins 3 and 4 are common.

TYPICAL ELECTRICAL/OPTICAL CHARACTERISTICS CURVES

TA = 25 ℃ unless otherwise specified.

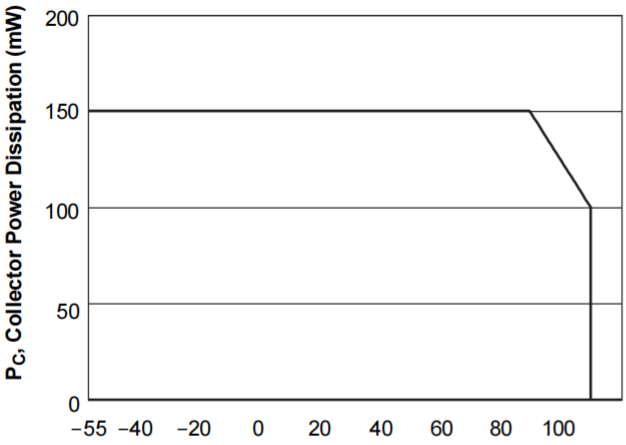


Figure 1 . Collector Power Dissipation vs. Ambient Temperature

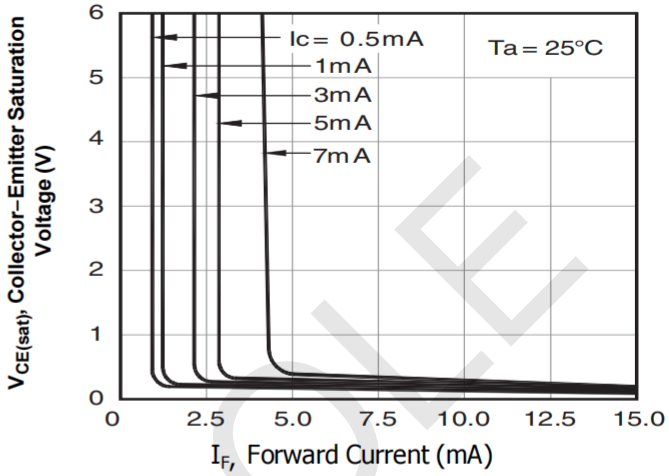


Figure 2 . Collector−Emitter Saturation Voltage vs.

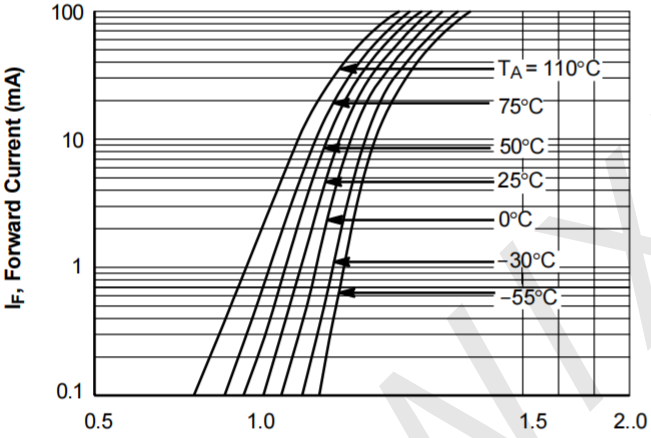


Figure 3 . Forward Current vs. Forward Voltage

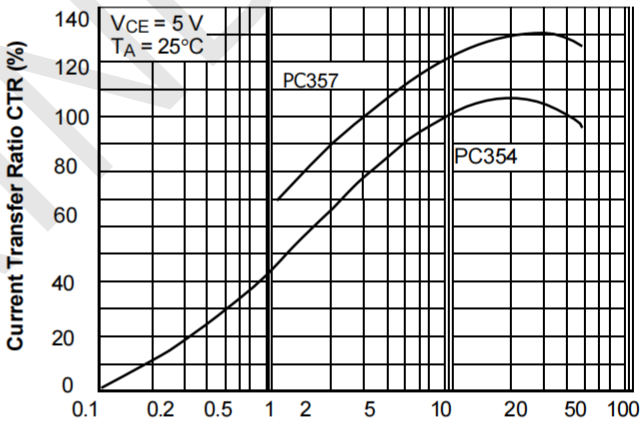


Figure 4 . Current Transfer Ratio vs. Forward Current

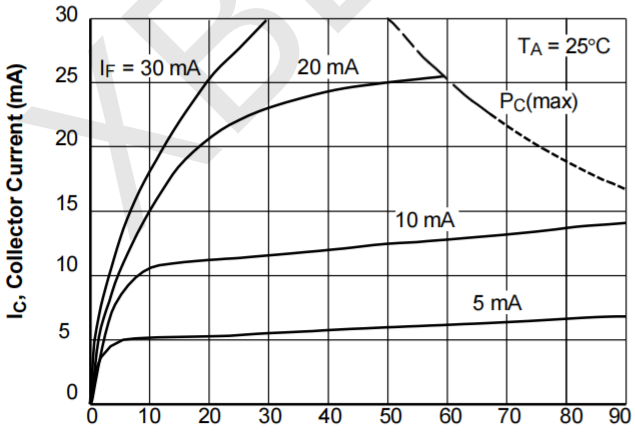


Figure 5 . Collector Current vs.Collector-Emitor Voltage

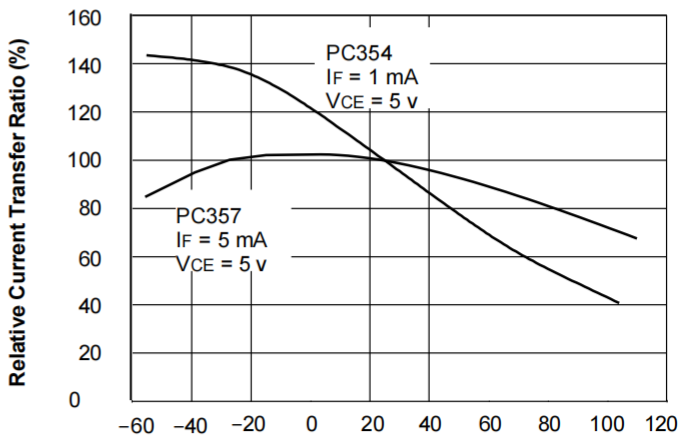
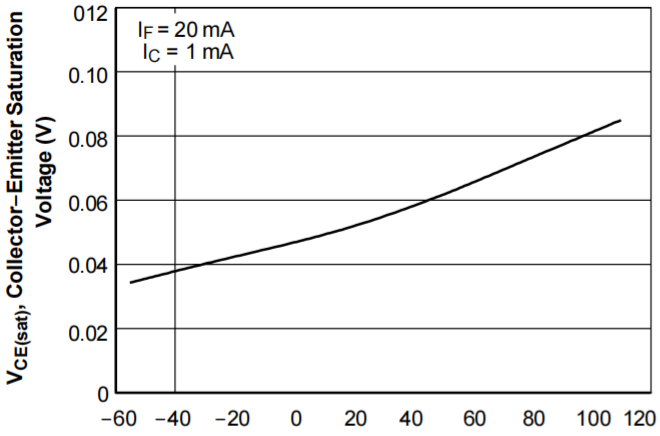
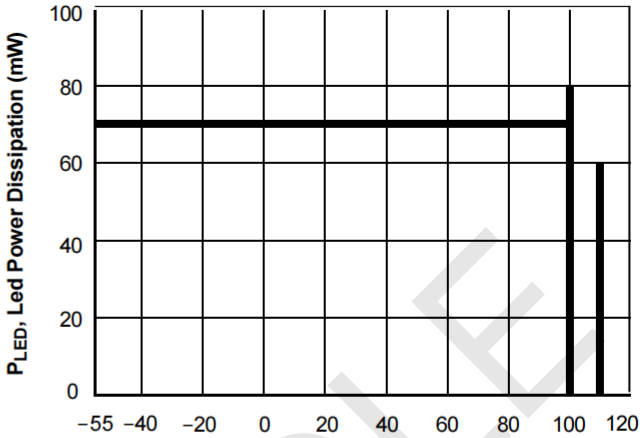


Figure 6. Relative Current Transfer Ratio vs.Ambient Temperature



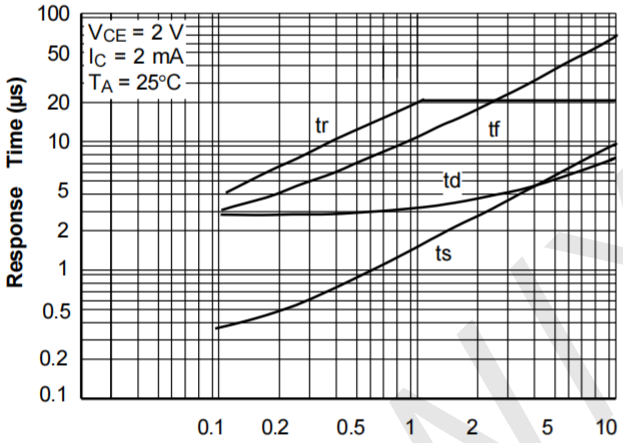
T_A, Ambient Temperature (°C

Figure 7 . Collector−Emitter Saturation Voltage vs. Ambient Temperature



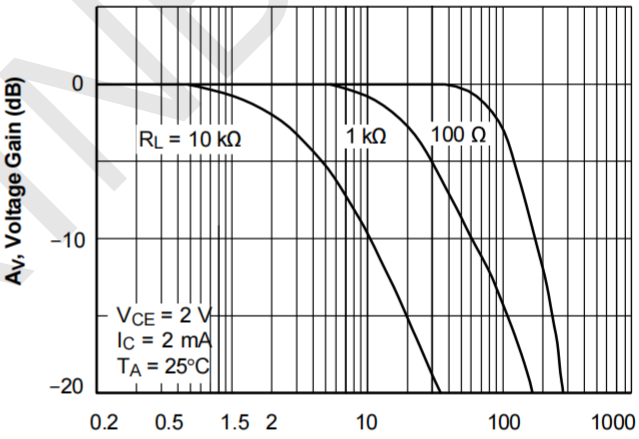
T_A, Ambient Temperature (°C)

Figure 8 . Led Power Dissipation vs. Ambient Temperature



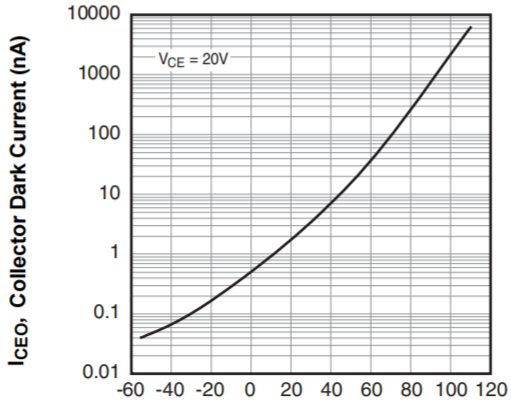
R_L, Load Resistance (kΩ)

Figure 9 . Response Time vs. Load Resistance



f, Frequency (kHz)

Figure 10. Frequency Response



TA, Ambient Temperature (°C)

Figure 11. Collector Dark Current vs.Ambient Temperature

REFLOW PROFILE

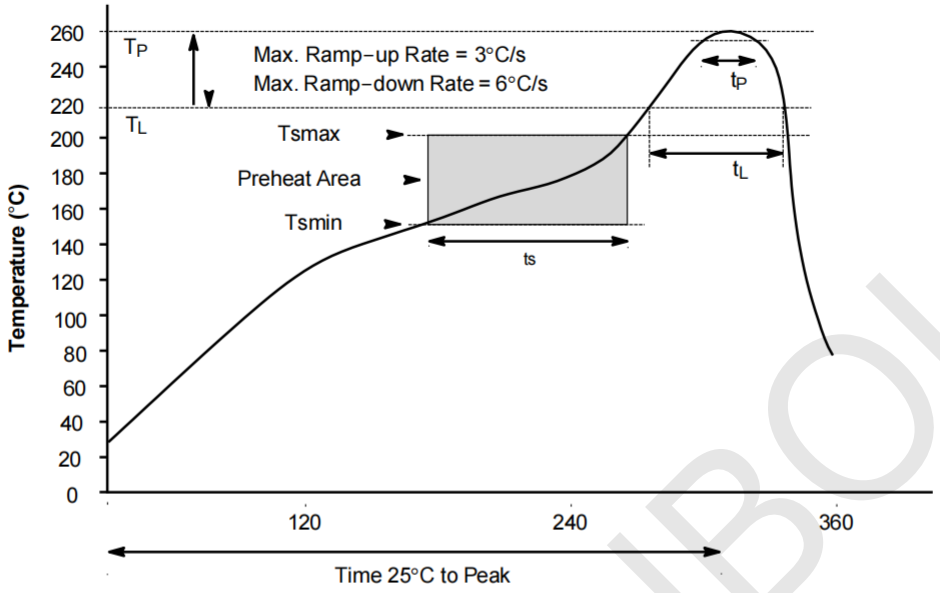


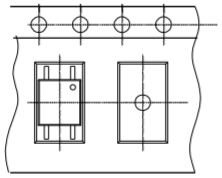
Figure 12.
Reflow Profile

REFLOW PROFILE

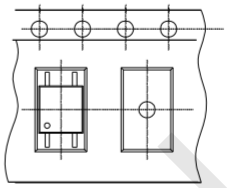
Profile Feature	Pb−Free Assembly Profile
Temperature Min. (Tsmin)	150 °C
Temperature Max. (Tsmax)	200 °C
Time (tS) from (Tsmin toTsmax)	60−120 s
Ramp−up Rate (t_L to tP)	3 °C /s max.
Liquidous Temperature (T_L)	217 °C
Time (t_L) Maintained Above (T_L)	60−150 s
Peak Body Package Temperature	260 °C +0 °C / −5 °C
Time (t_P) within 5 °C of 260 °C	30 s
Ramp−down Rate (T_P to T_L)	6 °C/s max.
Time 25°C to Peak Temperature	8 min max.

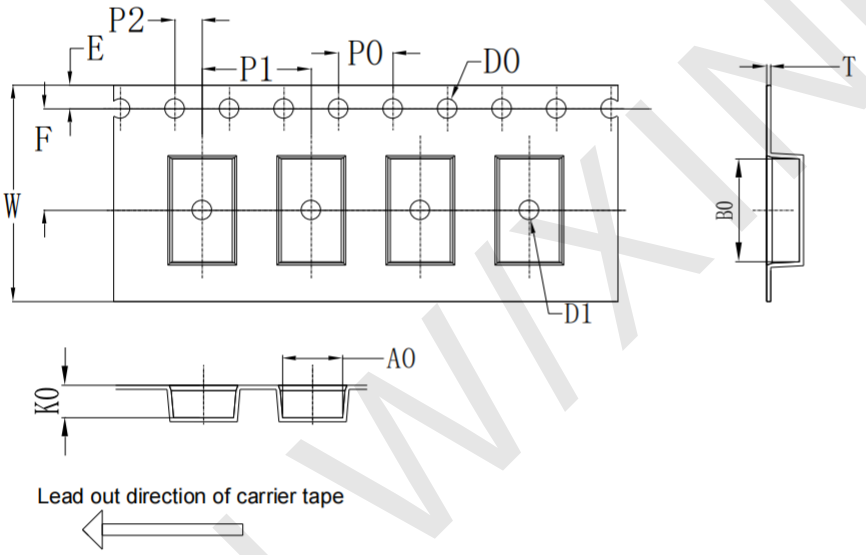
Tape & Reel Packing Specifications

Option TA



Option TB



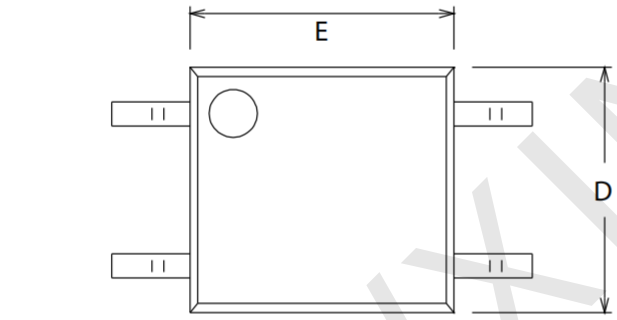


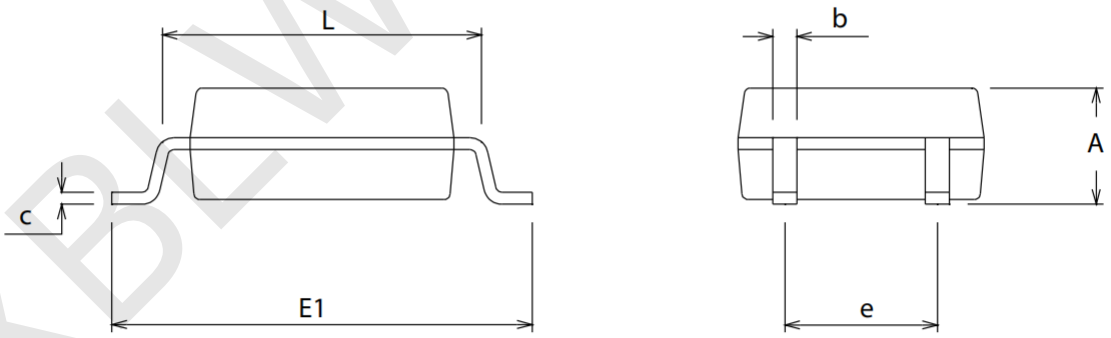
ITEM	DIM(mm)
W	16±0.20
A_0	4.4±0.10
B_0	7.60±010
K_0	2.40±0.10
P1	8.00±0.10
F	7.50±0.10
E	1.75±0.10
D_0/D_1	1.50+0.10
P_0	4.00±0.10
P_2	2.00±0.10
T	0.30±0.03

Package Dimension

- SOP-4-2.54mm

SIZE / SYMBOL	Dimensions In Millimeters DIM(mm)	SIZE / SYMBOL	Dimensions In Inches DIM(in)
A	MAX2.0	A	0.0787
L	5.2±0.2	L	0.205±0.00787
e	2.54±0.02	e	0.1±0.000787
b	0.4±0.1	b	0.0157±0.00394
c	0.2	c	0.0078
D	4.0±0.2	D	0.0157±0.00787
E	4.4±0.05	E	0.173±0.00197
E1	7.0±0.3	E1	0.276±0.0118





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