SOLID STATE OPTRONICS

SDT460

DC Input
70V
Wide Body Photo-Transistor Optocoupler

Description

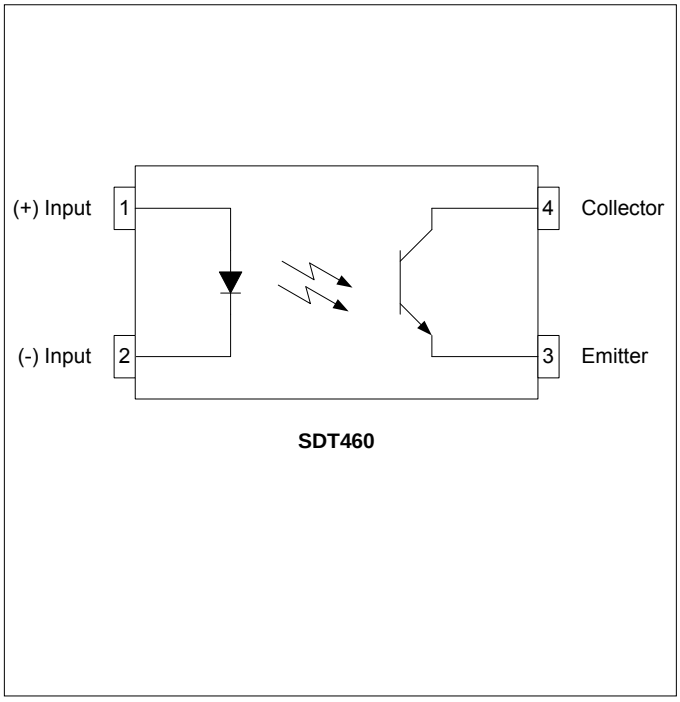
The SDT460 consists of a phototransistor optically coupled to a light emitting diode. Optical coupling between the input IR LED and output phototransistor allows for high isolation levels while maintaining low-level DC signal control capability. The SDT460 circuitry is contained in a wide body (7.5mm) body, giving the device creepage distances over 8mm. The SDT460 provides an exceptionally isolated method of controlling many interface applications such as telecommunications, industrial control and instrumentation circuitry.

The SDT460 comes standard in a 4 pin SOP, wide body package.

Applications

- Home Appliances
- Office Automation Equipment
- Vending Machines
- Digital Logic Inputs
- Power Supplies

Schematic Diagram



SDT460

Features

- 7.5mm Width 4-Pin Small Outline Package
- Creepage > 8mm
- High Input-to-Output Isolation (5kV$_{RMS}$ MIN)
- CTR Range: 50% - 600%
- High Collector-Emitter Voltage (V_{CE} = 70V MIN)
- Long Life / High Reliability
- RoHS / Pb-Free / REACH Compliant

Agency Approvals

UL / C-UL:	File # E201932
VDE:	File # 40035191 (EN 60747-5-2)

Absolute Maximum Ratings

The values indicated are absolute stress ratings. Functional operation of the device is not implied at these or any conditions in excess of those defined in electrical characteristics section of this document. Exposure to absolute Maximum Ratings may cause permanent damage to the device and may adversely affect reliability.

Storage Temperature	-55 to +110°C
Operating Temperature	-55 to +150°C
Continuous Input Current	50mA
Transient Input Current	500mA
Reverse Input Control Voltage	6V
Input Power Dissipation	70mW
Total Power Dissipation	250mW
Solder Temperature – Wave (10sec)	260°C
Solder Temperature – IR Reflow (10sec)	260°C

Ordering Information

Part Number	Description
SDT460	4 pin SOP, (100/Tube)
SDT460-TR	4 pin SOP, Tape and Reel (3000/Reel)

NOTES: Suffixes listed above are not included in marking on device for part number identification

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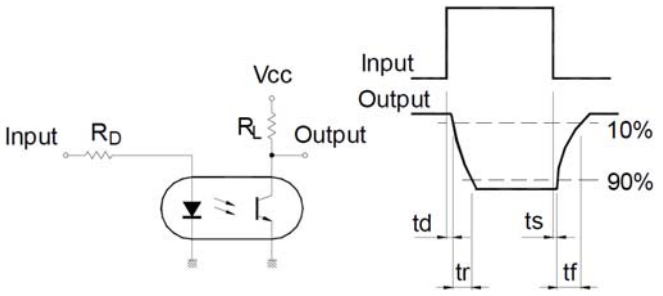
SDT460 /TR
Rev 1.00 (05/17/2013)
001575

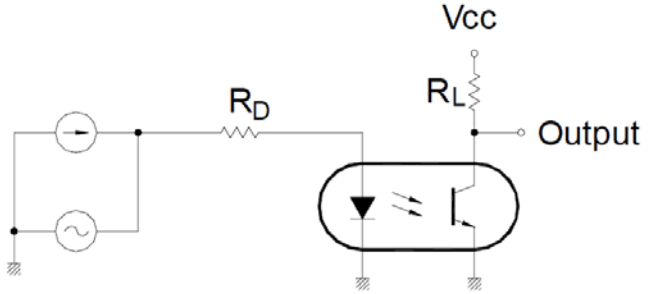
Electrical Characteristics, T_A = 25°C (unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Input Specifications						
LED Forward Voltage	V_F	-	1.25	1.6	V	I_F = 50mA
Terminal Capacitance	C_t	-	50	-	pF	V=0, f=1MHz
Reverse Current	I_R	-	-	10	μA	V_R=4V
Output Specifications						
Collector-Emitter Voltage	V_{CEO}	70	-	-	V	I_C=100μA
Emitter-Collector Voltage	V_{COE}	7	-	-	V	I_E=10μA
Collector Dark Current	I_{CEO}	-	10	100	nA	V_{CE}=20V, I_F=0mA
Floating Capacitance	C_f	-	0.3	-	pF	V=0, f=1MHz
Cut-Off Frequency	f_C	-	80	-	kHz	V_{CE}=5V, I_C=2mA, R_L=100Ω, -3dB
Saturation Voltage	$V_{CE(sat)}$	-	-	0.3	V	I_F=10mA, I_C=1mA
Coupled Specifications						
Rise Time	T_R	-	3	18	μS	I_C=2mA, V_{CC}=5V, R_L=100Ω
Fall Time	T_F	-	4	18	μS	I_C=2mA, V_{CC}=5V, R_L=100Ω
Current Transfer Ratio (Open Bin / No Suffix)	CTR	50	-	600	%	I_F=5mA, V_{CE}=5V
(-A Binning)	CTR	63	-	125	%	I_F=10mA, V_{CE}=5V
(-B Binning)	CTR	100	-	200	%	I_F=10mA, V_{CE}=5V
(-C Binning)	CTR	50	-	150	%	I_F=5mA, V_{CE}=5V
(-D Binning)	CTR	100	-	300	%	I_F=5mA, V_{CE}=5V
(-E Binning)	CTR	80	-	160	%	I_F=5mA, V_{CE}=5V
(-F Binning)	CTR	130	-	260	%	I_F=5mA, V_{CE}=5V
(-G Binning)	CTR	200	-	400	%	I_F=5mA, V_{CE}=5V
Isolation Specifications						
Isolation Voltage	V_{ISO}	5000	-	-	V_{RMS}	RH ≤ 50%, t=1min
Input-Output Resistance	R_{I-O}	-	10^{12}	-	Ω	V_{I-O} = 500V_{DC}

Test Circuit: *Response Time*



Test Circuit: *Frequency Response*



SDT460 Performance & Characteristics Plots, T_A = 25°C (unless otherwise specified)

Figure 1: *Forward Current (I_F) vs. Temperature (°C)*

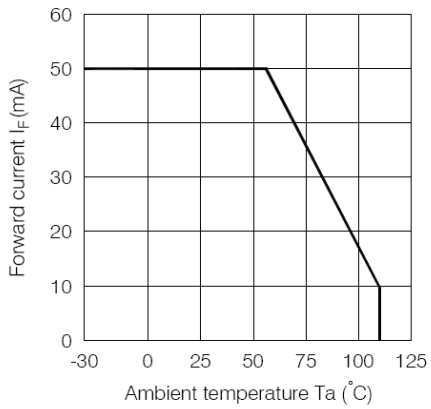


Figure 2: *Collector Power Dissipation (P_C) vs. Temperature (°C)*

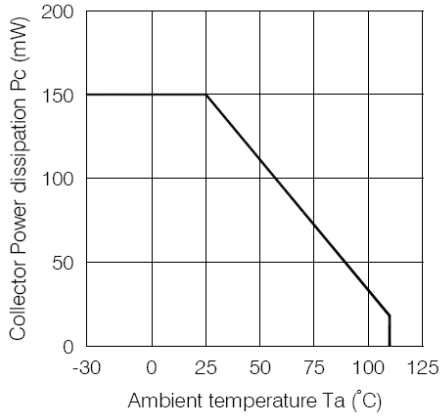


Figure 3: *Collector-Emitter Saturation Voltage ($V_{CE(SAT)}$) vs. Forward Current (I_F)*

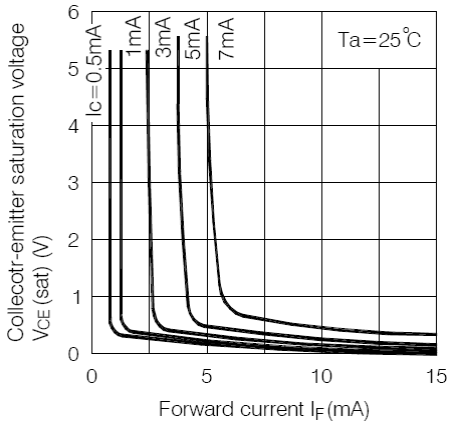


Figure 4: *Forward Current (I_F) vs. Forward Voltage (V_F)*

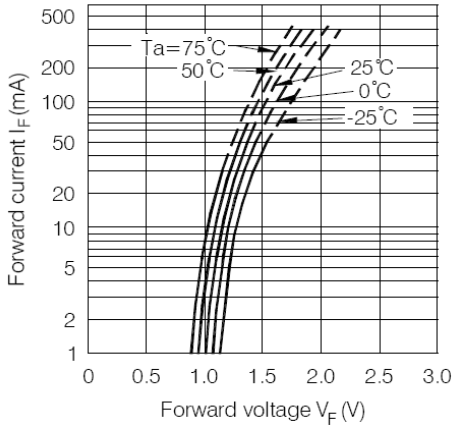


Figure 5: *Collector Current (I_C) vs. Collector-Emitter Voltage (V_{CE})*

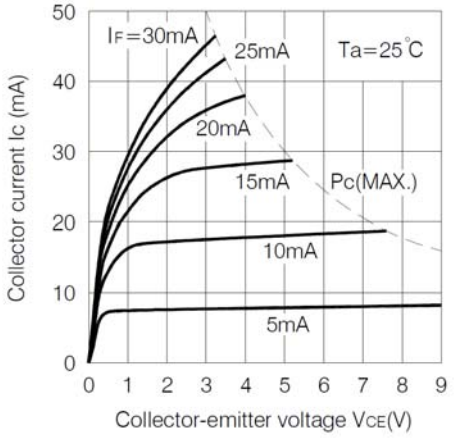
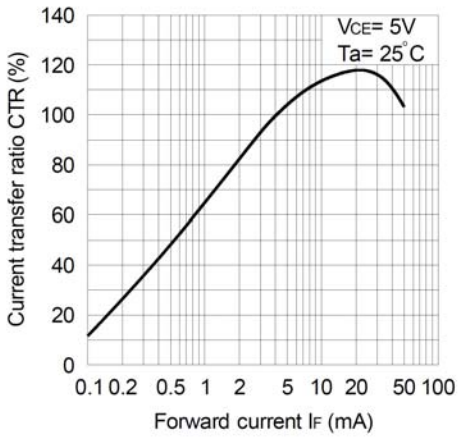


Figure 6: *Current Transfer Ratio (CTR) vs. Forward Current (I_F)*



SDT460 Performance & Characteristics Plots, T_A = 25°C (unless otherwise specified)

Figure 7: *Relative CTR (%) vs. Temperature (°C)*

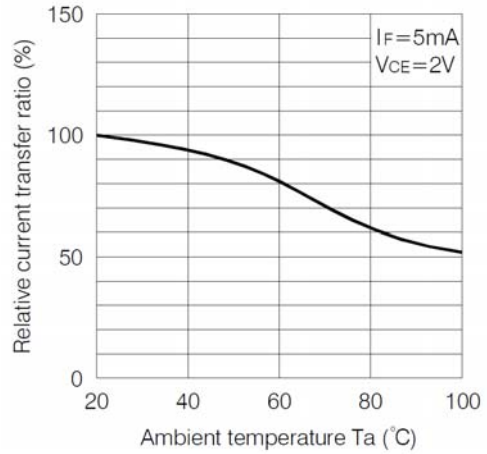


Figure 8: *Collector-Emitter Saturation Voltage ($V_{CE(SAT)}$) vs. Temperature (°C)*

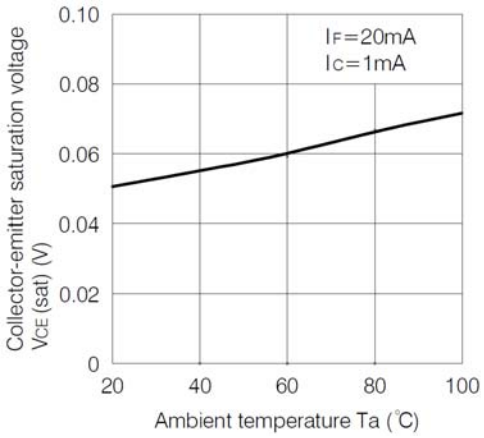


Figure 9: *Collector Dark Current (I_{CEO}) vs. Temperature (°C)*

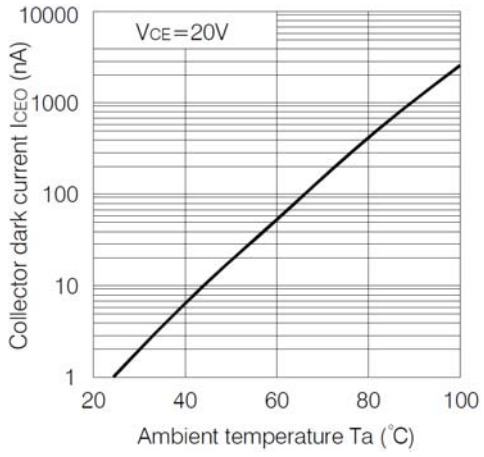


Figure 10: *Response Times vs. Load Resistance (R_L)*

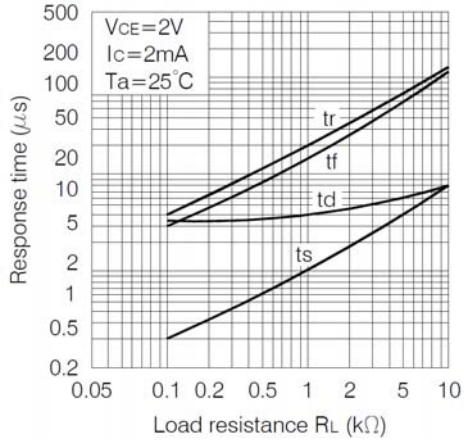
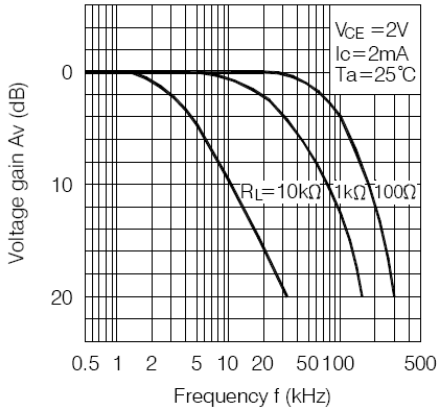


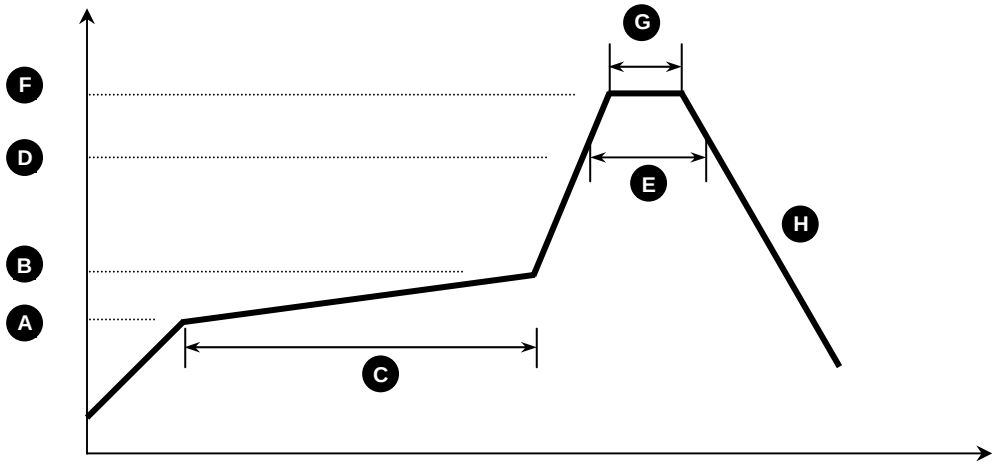
Figure 11: *Frequency Response Characteristics*



SDT460 Solder Reflow Temperature Profile Recommendations

(1) *Infrared Reflow:*

Refer to the following figure as an example of an optimal temperature profile for single occurrence infrared reflow. Soldering process should not exceed temperature or time limits expressed herein. Surface temperature of device package should not exceed 250ºC:



Process Step	Description	Parameter
A	Preheat Start Temperature (ºC)	150ºC
B	Preheat Finish Temperature (ºC)	180ºC
C	Preheat Time (s)	90 - 120s
D	Melting Temperature (ºC)	230ºC
E	Time above Melting Temperature (s)	30s
F	Peak Temperature, at Terminal (ºC)	260ºC
G	Dwell Time at Peak Temperature (s)	10s
H	Cool-down (ºC/s)	<6ºC/s

(2) *Wave Solder:*

Maximum Temperature: 260ºC (at terminal)
Maximum Time: 10s
Pre-heating: 100 - 150ºC (30 - 90s)
Single Occurrence

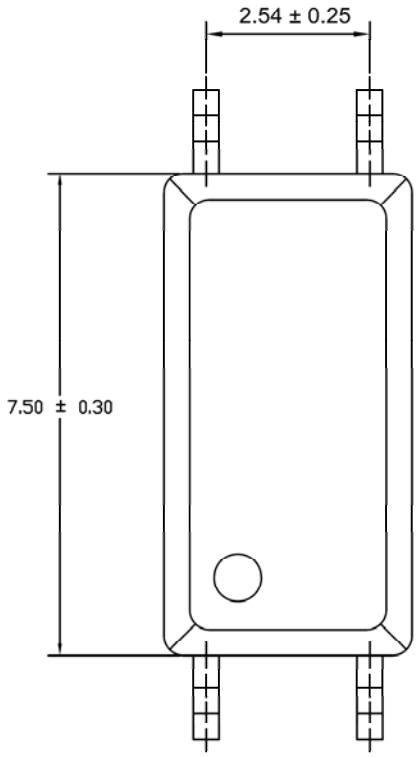
(3) *Hand Solder:*

Maximum Temperature: 350ºC (at tip of soldering iron)
Maximum Time: 3s
Single Occurrence

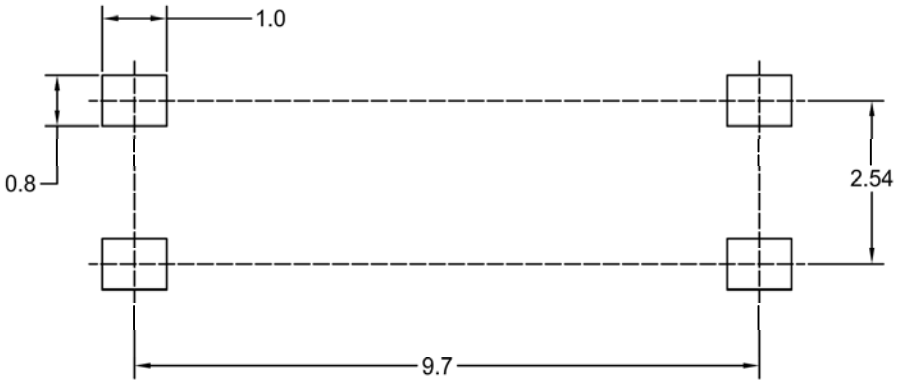
SDT460 Package Dimensions

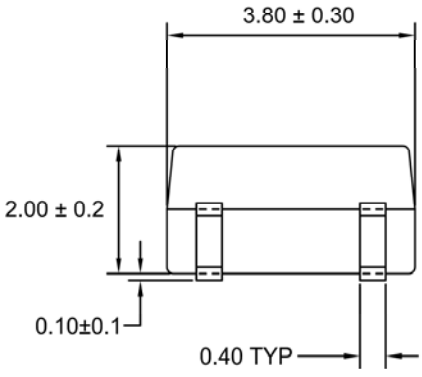
4 PIN SOP (WIDE) Package

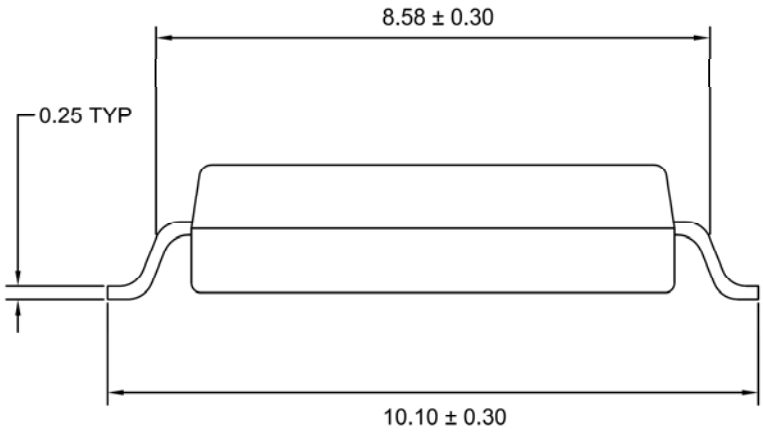
Note: *All dimensions in millimeters [mm]*



4 PIN SOP (WIDE) Footprint



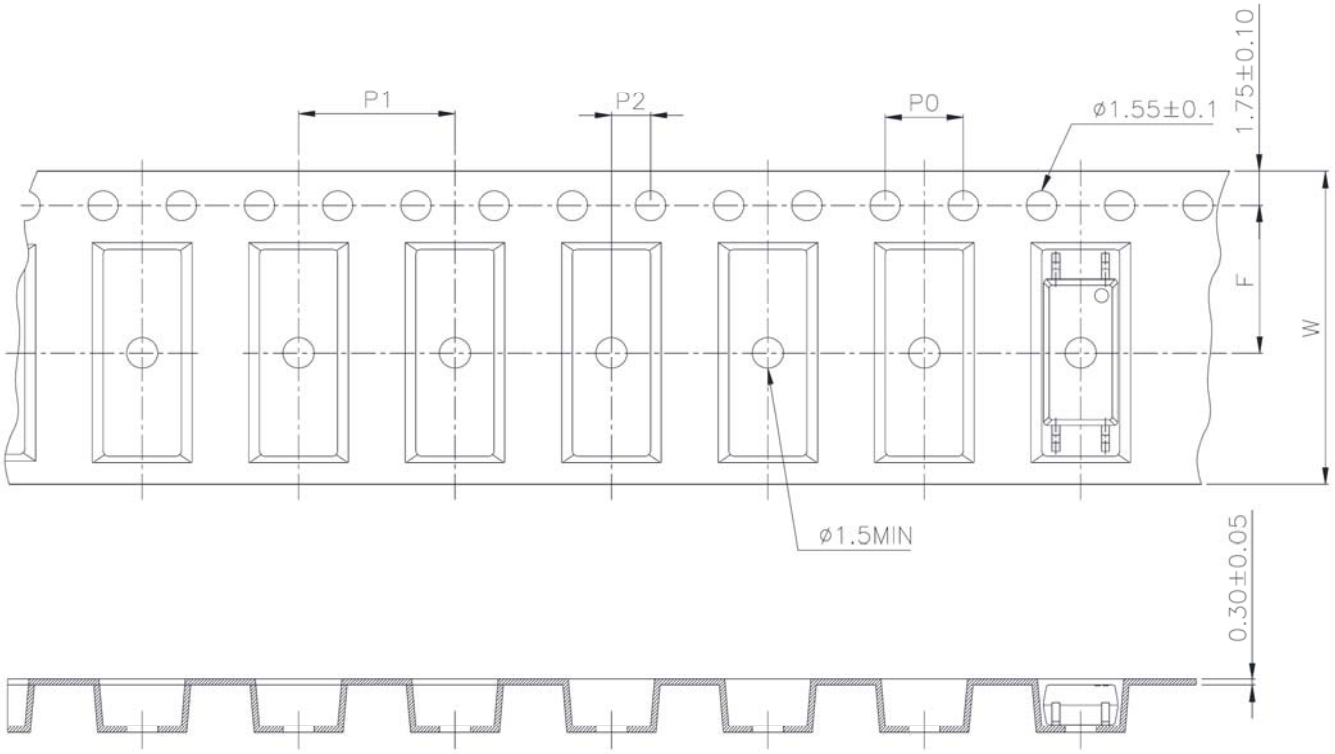




SDT460 Packaging Specifications

Tape & Reel Specifications (T&R)

Note: *All dimensions in millimeters [mm]*



Specification	Symbol	Dimensions, mm (inches)
Tape Width	W	16 ± 0.3 (0.63)
Sprocket Hole Pitch	P0	4 ± 0.1 (0.15)
Compartment Location	F P2	7.5 ± 0.1 (0.295) 2 ± 0.1 (0.079)
Compartment Pitch	P1	8 ± 0.1 (0.315)

SDT460 Package Marking