

SOP4, DC Input, Photo Darlington Transistor Coupler**Description**

The TWS355 series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar darlington phototransistor detector in a plastic SOP4 package.

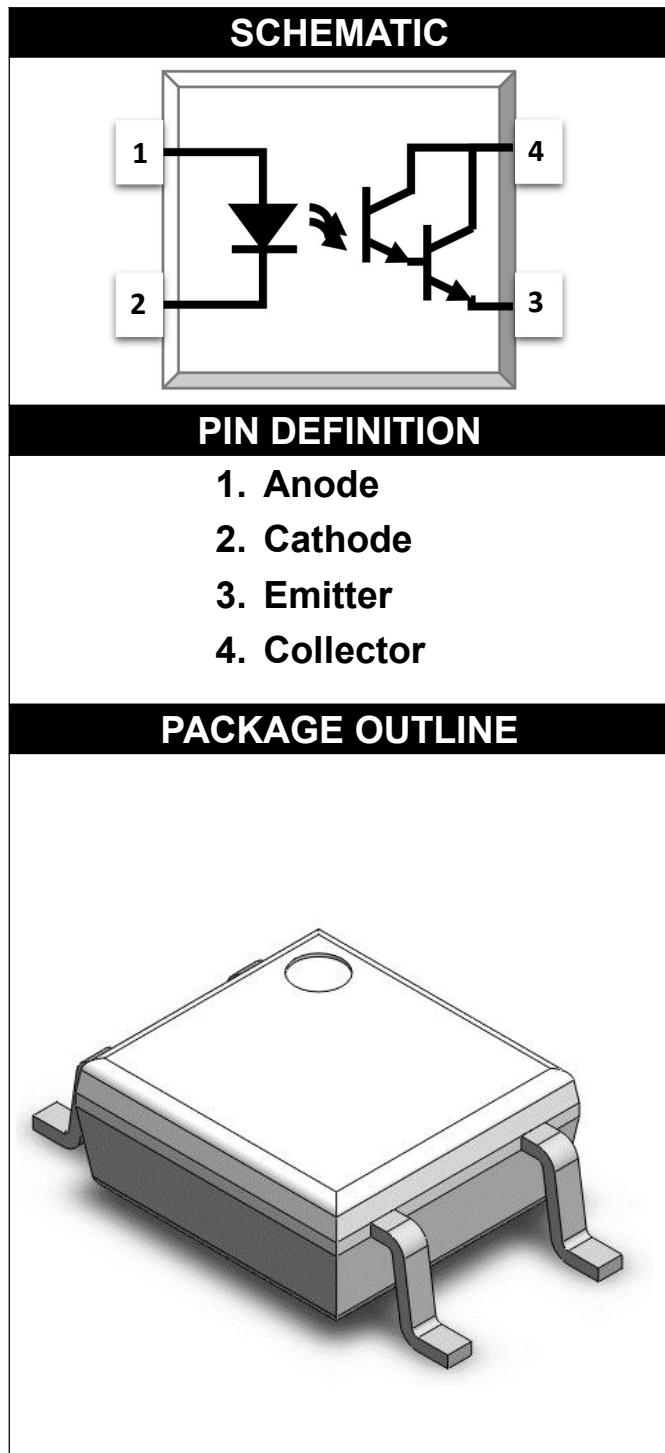
With the robust coplanar double mold structure, TWS355 series provide the most stable isolation feature.

Features

- High isolation 3750 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- Operating temperature range - 55 °C to 110 °C
- REACH compliance
- Halogen free
- MSL class 1

Applications

- Sequence controller
- Telephone/FAX
- System appliances, measuring instrument
- Programmable logic controller



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ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	VALUE	UNIT	NOTE
INPUT				
Forward Current	I_F	60	mA	
Peak Forward Current	I_{FP}	1	A	1
Reverse Voltage	V_R	6	V	
Input Power Dissipation	P_I	100	mW	
OUTPUT				
Collector - Emitter Voltage	V_{CEO}	40	V	
Emitter - Collector Voltage	V_{ECO}	6	V	
Collector Current	I_c	80	mA	
Output Power Dissipation	P_o	150	mW	
COMMON				
Total Power Dissipation	P_{tot}	200	mW	
Isolation Voltage	V_{iso}	3750	Vrms	2
Operating Temperature	T_{opr}	-55~110	°C	
Storage Temperature	T_{stg}	-55~125	°C	

Note 1. 100μs pulse, 100Hz frequency

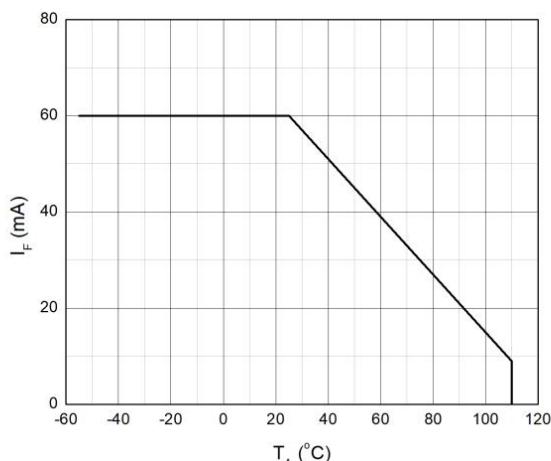
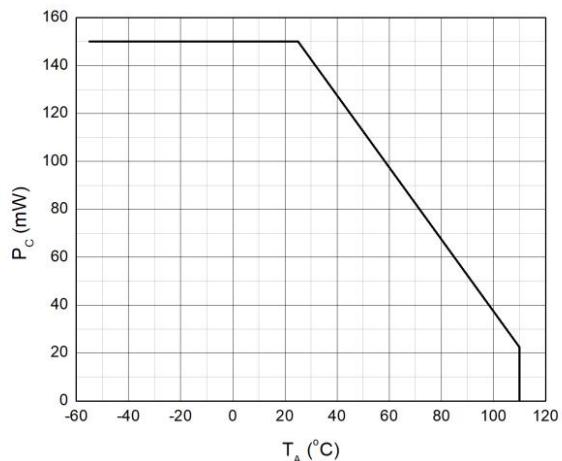
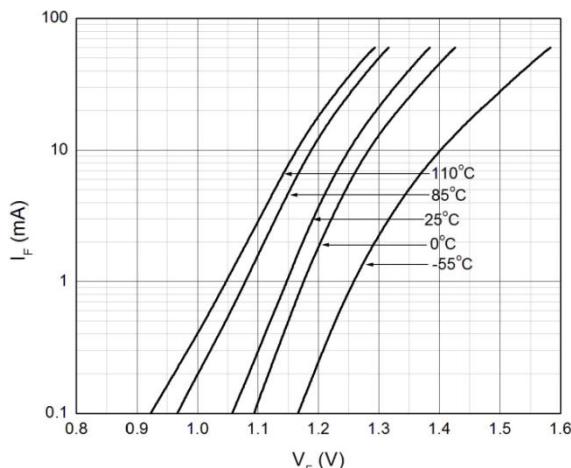
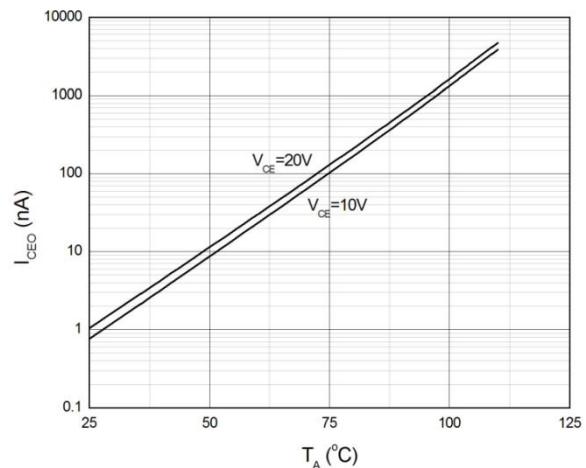
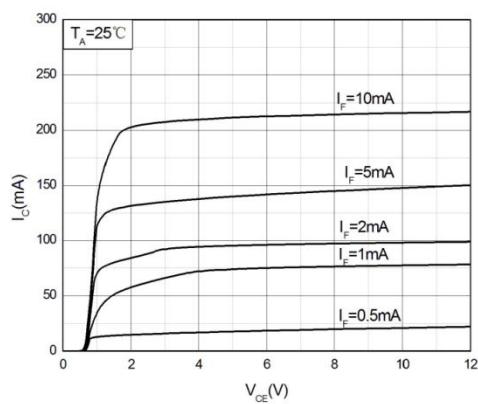
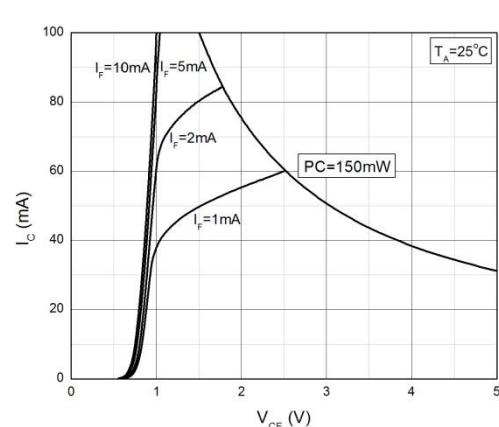
Note 2. AC For 1 Minute, R.H. = 40 ~ 60%

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ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C							
PARAMETER	SYMBOL	MIN	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
INPUT							
Forward Voltage	V _F	-	1.24	1.4	V	IF=10mA	
Reverse Current	I _R	-	-	10	μA	VR=6V	
Input Capacitance	C _{in}	-	10	-	pF	V=0, f=1kHz	
OUTPUT							
Collector Dark Current	I _{CEO}	-	-	1	uA	V _{CE} =10V, IF=0	
Collector-Emitter Breakdown Voltage	BV _{CEO}	40	-	-	V	IC=0.1mA, IF=0	
Emitter-Collector Breakdown Voltage	BV _{ECO}	6	-	-	V	IE=0.1mA, IF=0	
TRANSFER CHARACTERISTICS							
Current Transfer Ratio	CTR	600	-	7500	%	IF=1mA, V _{CE} =2V	
Collector-Emitter Saturation Voltage	V _{CE(sat)}	-	0.7	1.0	V	IF=20mA, IC=5mA	
Isolation Resistance	R _{ISO}	10 ¹²	10 ¹⁴	-	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance	C _{IO}	-	0.6	1	pF	V=0, f=1MHz	
Response Time (Rise)	tr	-	95	300	μs	V _{CE} =2V, IC=10mA	3
Response Time (Fall)	tf	-	95	250	μs		3
Cut-off Frequency	fc	-	1	-	kHz	V _{CE} =2V, IC=10mA RL=100Ω, -3dB	4

Note 3. Fig.11&12

Note 4. Fig.13

SOP4, DC Input, Photo Darlington Transistor Coupler**CHARACTERISTIC CURVES****Fig.1 Forward Current vs. Ambient Temperature****Fig.2 Collector Power Dissipation vs. Ambient Temperature****Fig.3 Forward Current vs. Forward Voltage****Fig.4 Collector Dark Current vs. Ambient Temperature****Fig.5 Voltage vs. Forward Current****Fig.6 Collector Current vs. Collector-emitter Voltage**

CHARACTERISTIC CURVES

Fig.7 Normalized Current Transfer Ratio vs. Forward Current

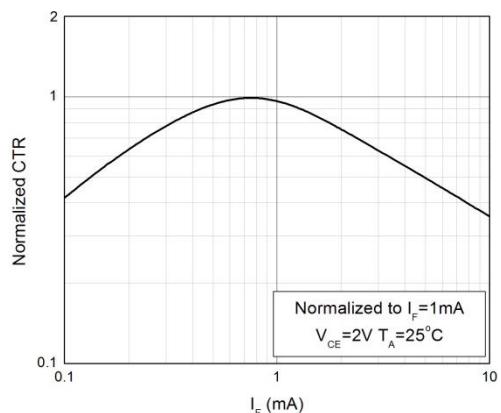


Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature

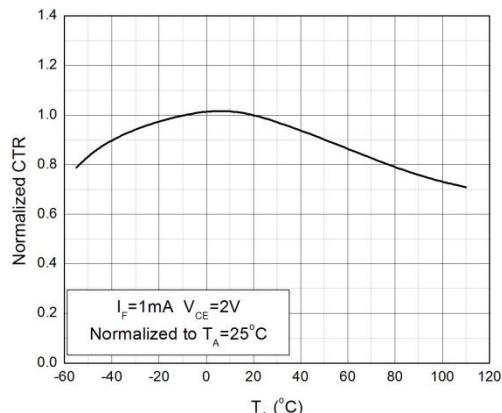


Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature

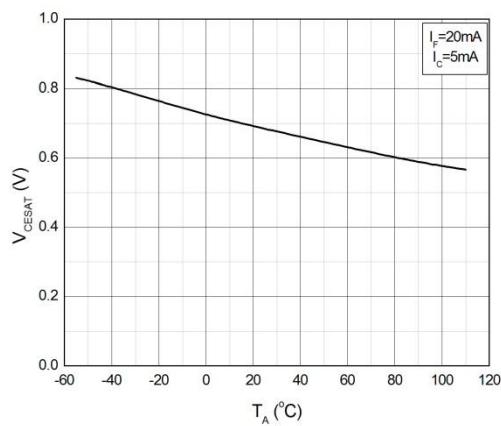


Fig.10 Switching Time vs. Load Resistance

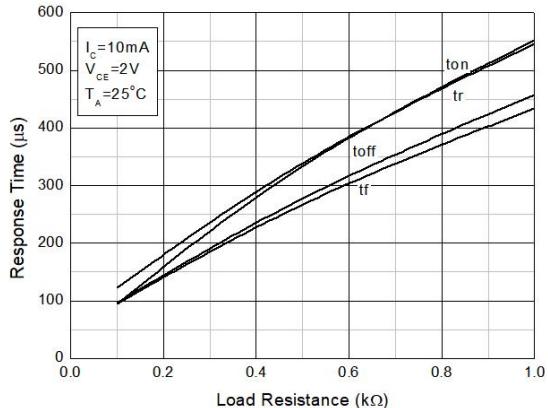
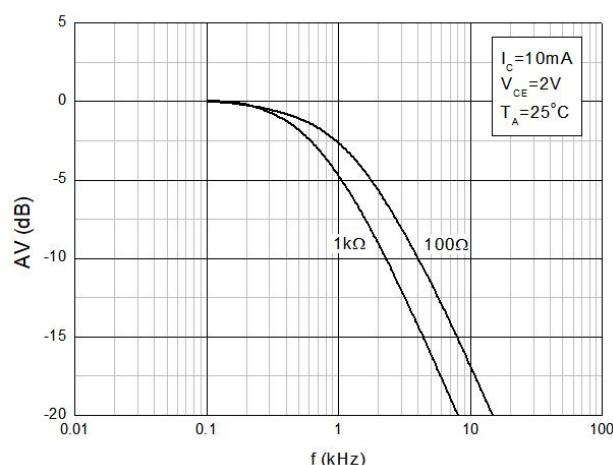


Fig.11 Frequency Response



TEST CIRCUITS

Fig.12 Test Circuits of Response Time

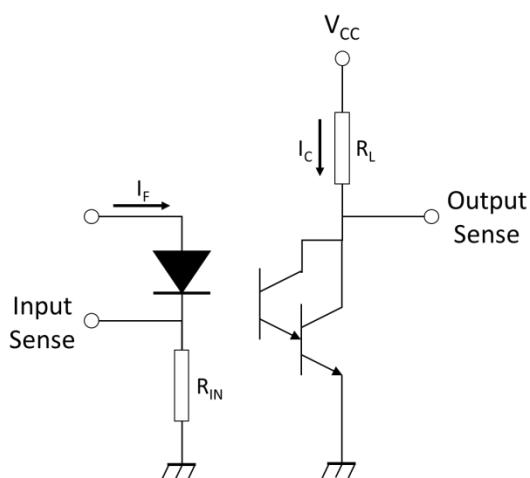


Fig.13 Curves of Response Time

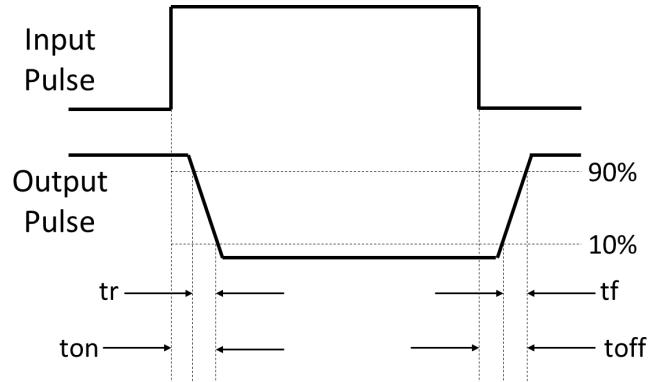
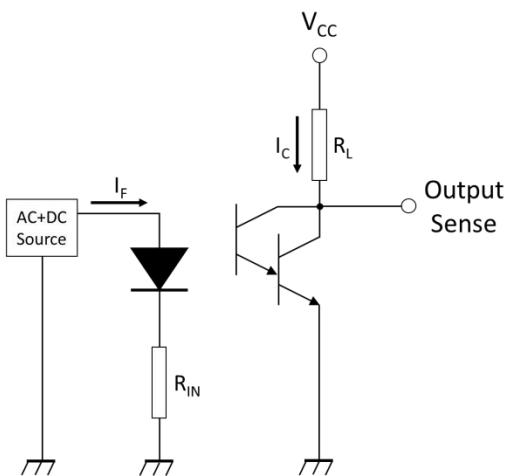
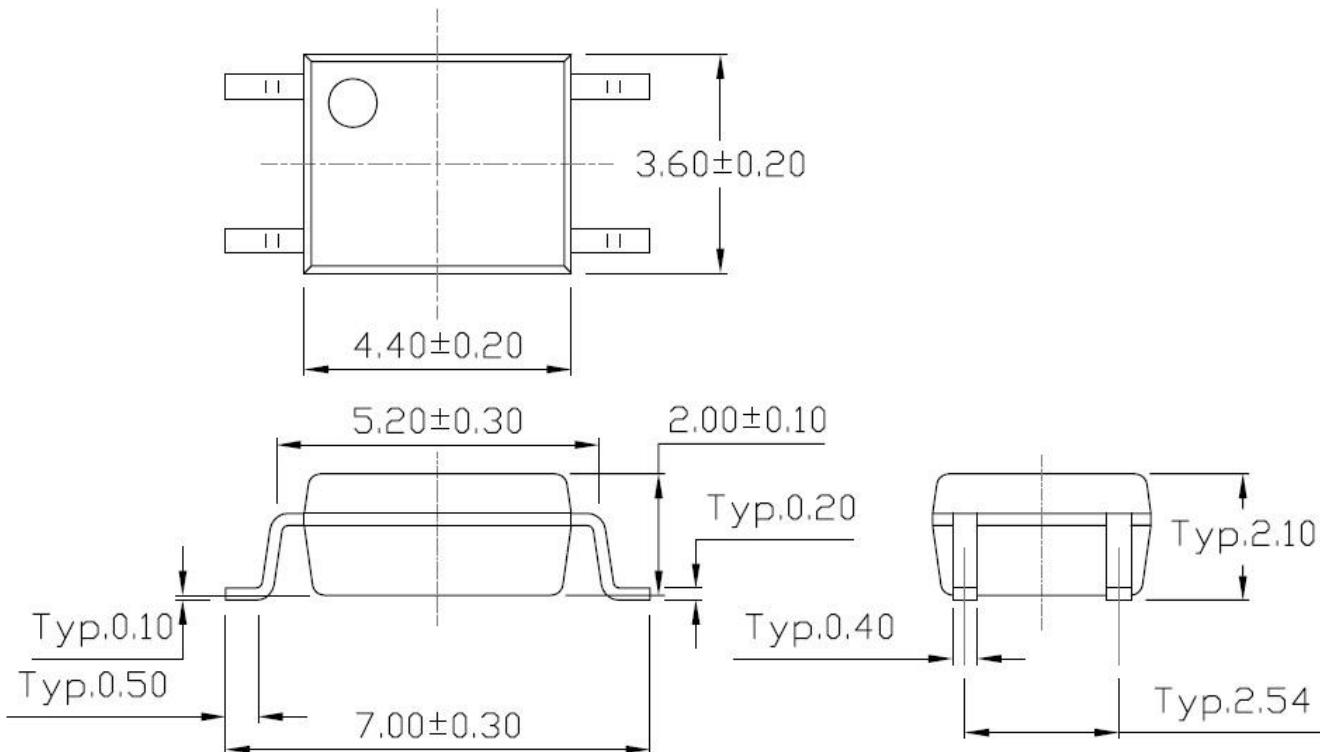
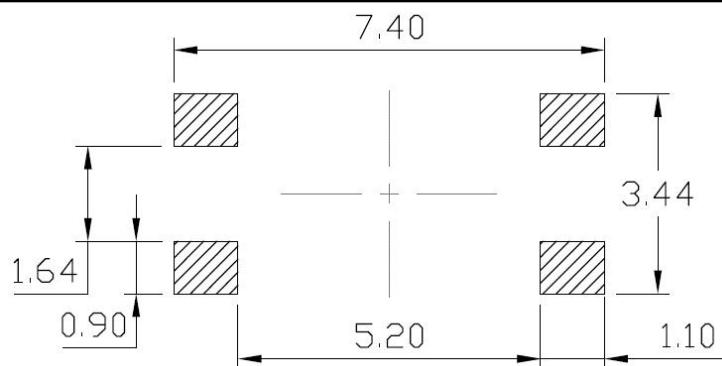
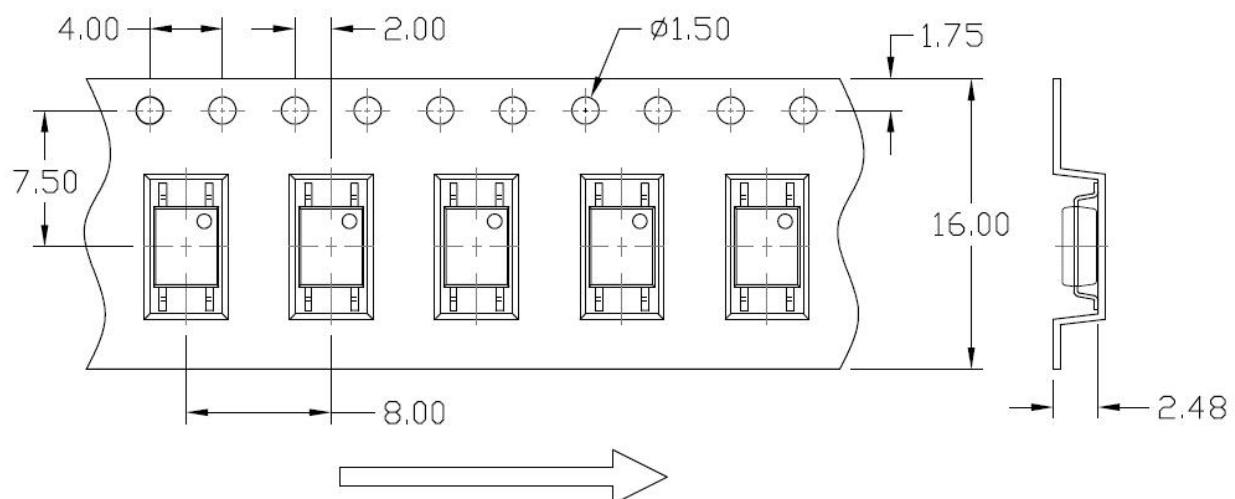
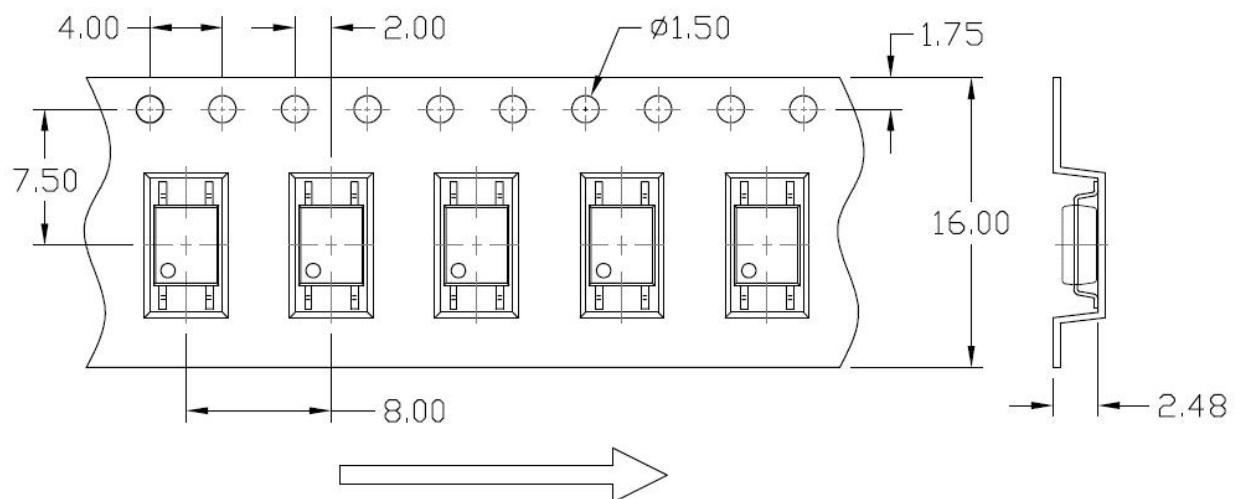
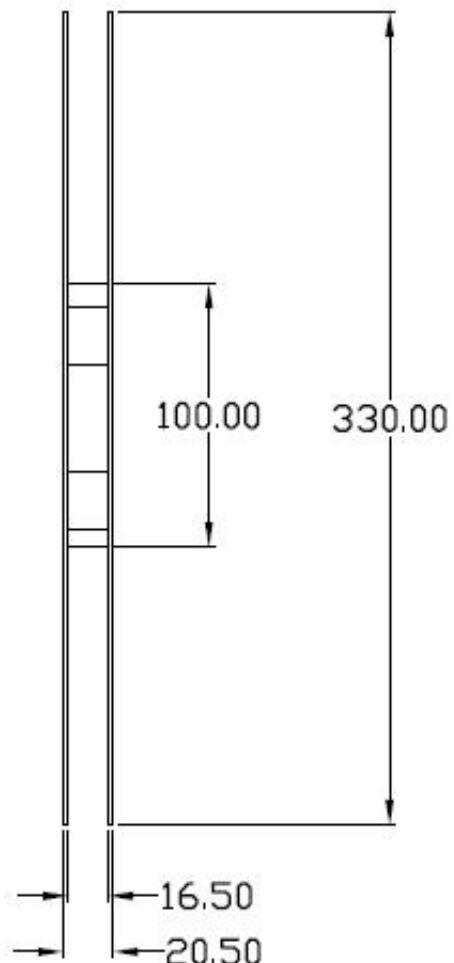
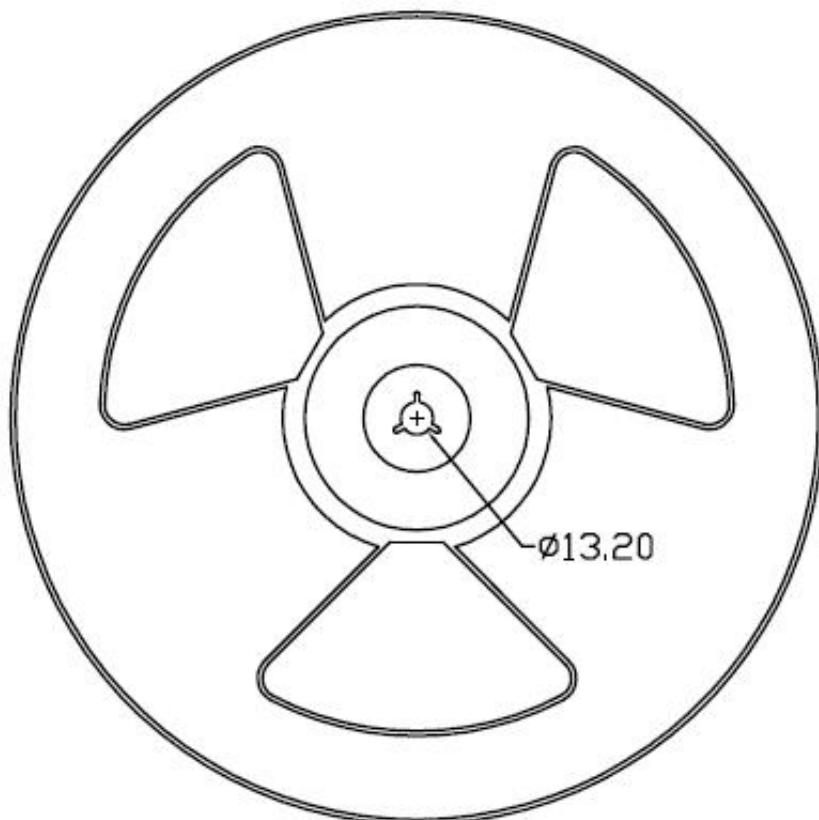


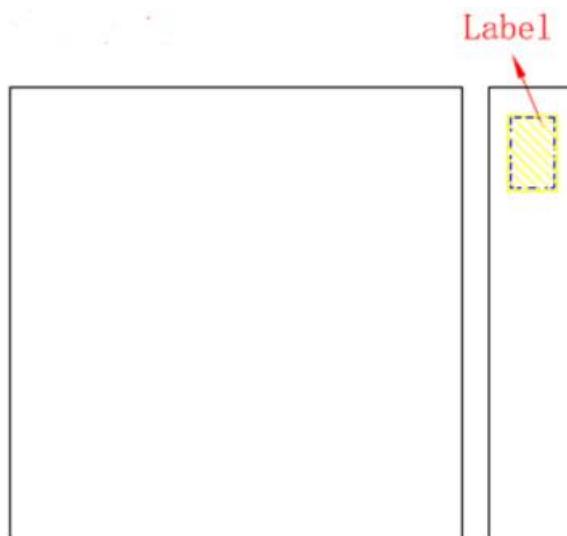
Fig.14 Test Circuits of Frequency Response



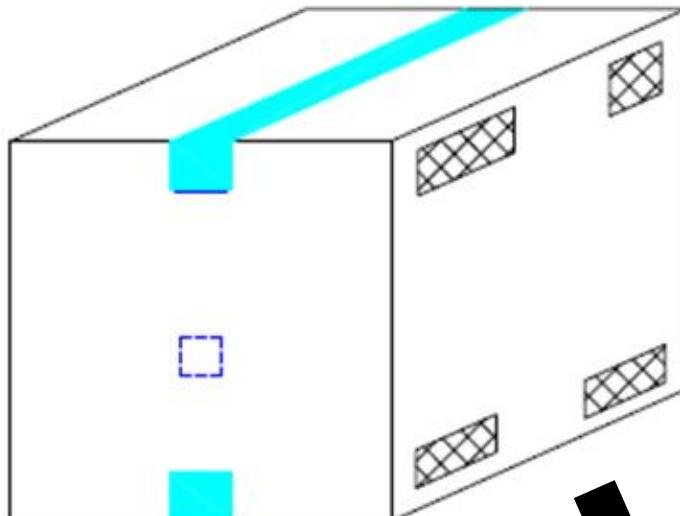
SOP4, DC Input, Photo Darlington Transistor Coupler**PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)****Recommended Solder Mask (Dimensions in mm unless otherwise stated)**

SOP4, DC Input, Photo Darlington Transistor Coupler**CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)****Option T1****Option T2**

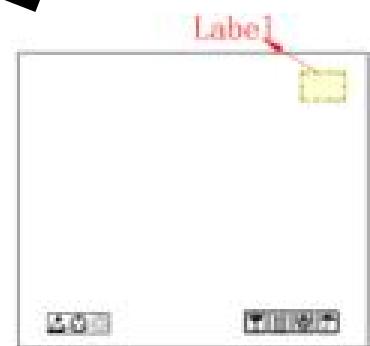
REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)**Option T1 & T2**

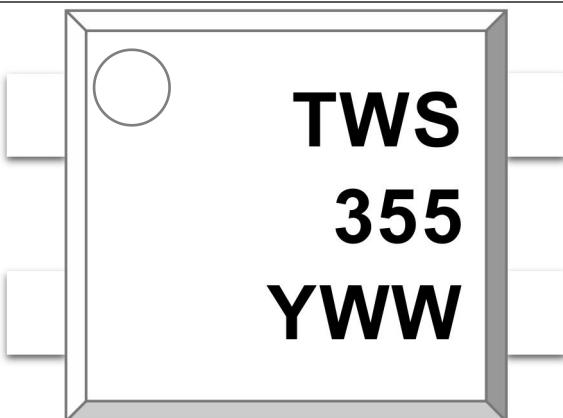
SOP4, DC Input, Photo Darlington Transistor Coupler**BOX SPECIFICATIONS (Reel Type)****Inner Box**

- $L \times W \times H = 36\text{cm} \times 36\text{cm} \times 6.9\text{cm}$

Outer Box

- Option1: $L \times W \times H = 45\text{cm} \times 38\text{cm} \times 38\text{cm}$
- Option2: $L \times W \times H = 39\text{cm} \times 38\text{cm} \times 38\text{cm}$



ORDERING AND MARKING INFORMATION**MARKING INFORMATION**

TWS : Company Abbr.
355 : Part Number
Y : Fiscal Year
WW : Work Week

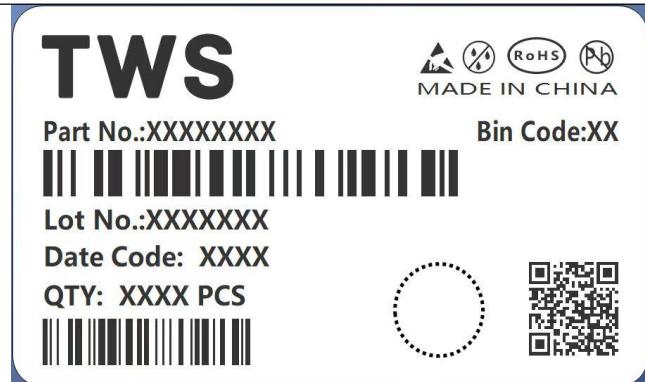
ORDERING INFORMATION**TWS355(Z)-G**

TWS – Company Abbr.

355 – Part Number

Z – Tape and Reel Option (T1/T2)

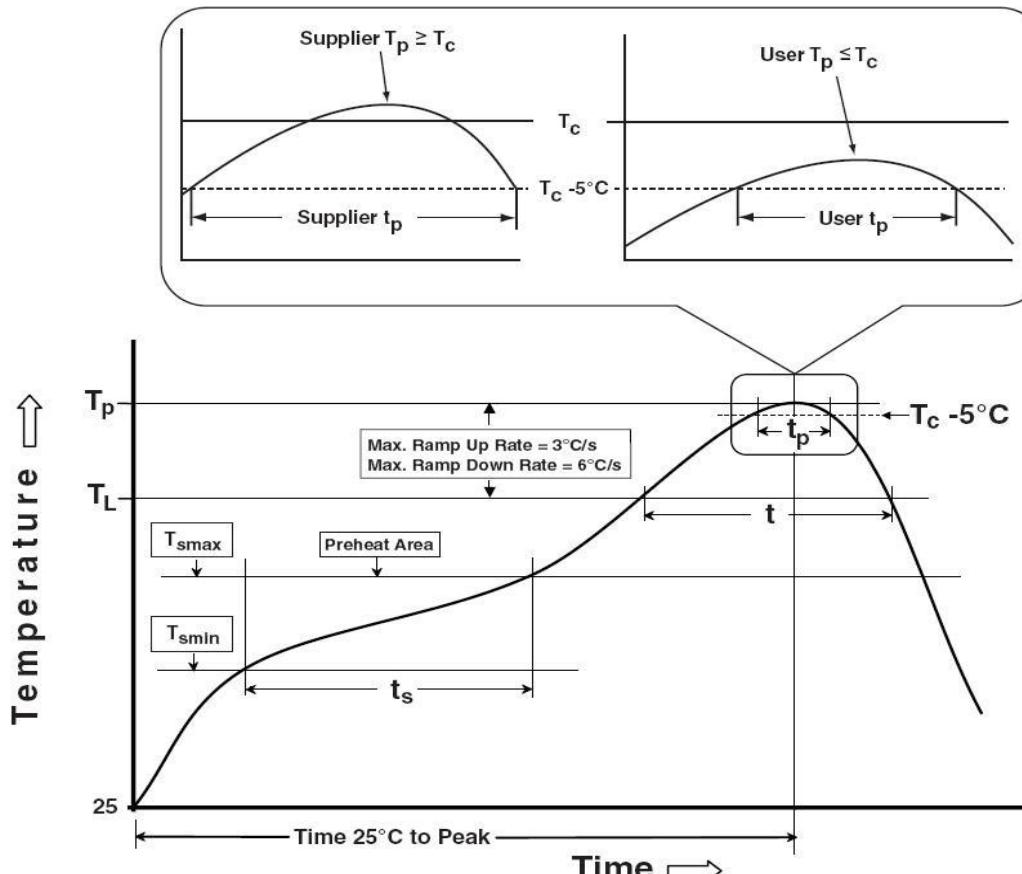
G – Green

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

REFLOW INFORMATION

REFLOW PROFILE



IPC-020d-5-1

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

DISCLAIMER

- TWS is continually improving the quality, reliability, function and design. TWS reserves the right to make changes without further notices.
- The characteristic curves shown in this datasheet are representing typical performance which are not guaranteed.
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- The products shown in this publication are designed for the general use in electronic applications such as office automation, equipment, communications devices, audio/visual equipment, electrical application and instrumentation purpose, non-infringement and merchantability.
- This product is not intended to be used for military, aircraft, automotive, medical, life sustaining or lifesaving applications or any other application which can result in human injury or death.
- Please contact TWS sales agent for special application request.
- Immerge unit's body in solder paste is not recommended.
- Parameters provided in datasheets may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated in each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify TWS's terms and conditions of purchase, including but not limited to the warranty expressed therein.
- Discoloration might be occurred on the package surface after soldering, reflow or long-time use. It neither impacts the performance nor reliability.