PT3925
Single coil Hall Driver IC

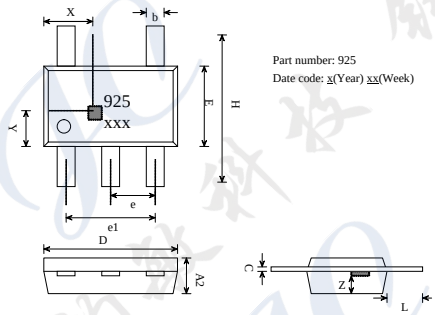
Applications

- Single coil DC brushless motor
- Support pre-driver application

Features

- Built-in hall sensor
- Single phase full wave driver
- Soft switching output driver
- Motor locked protection and automatic restart
- RD output
- Built-in hysteresis comparator
- Built-in zener diode
- High balance and low thermal drift magnetic sensing
- Low power consumption and high driving efficiency

Package: TSOT25F-5pin



1. RD output
2. GND/DC ground
3. O1/First output pin
4. O2/Second output pin
5. VDD/DC power supply

SYMBOLS	DIMENSIONS IN MILLIMETERS(mm)		
	MIN	NOM	MAX
A2	0.70	0.75	0.775
b	0.35	-	0.50
C	0.10	-	0.20
D	2.70	2.90	3.10
E	1.40	1.60	1.80
H	3.60	3.80	4.00
e	0.80	0.95	1.1
e1	1.7	1.90	2.10
L	0.95	1.10	1.25
SENSOR LOCATION			
X	0.85	1.00	1.15
Y	0.65	0.80	0.95
Z	0.20	0.25	0.30

Specifications

Absolute Maximum Ratings (Ta=25℃)

Parameter	Symbol	Conditions	Rating	Units
Maximum supply voltage	VDDmax		17	V
Maximum RD output voltage	V_{RDmax}		17	V
Maximum RD output current	I_{RDmax}		25	mA
Allowable power dissipation	Pd		500*1	mW
Operating temperature	Ta		-40~+100	℃
Storage temperature	Ts		-50~+150	℃
Max. output current	Peak		1000	mA
	Hold	0.5sec	800*2	mA
Junction Temperature	Tj		150	℃
Thermal resistance	Raj		250	℃/W

*1: Reduced by 4.0mW for each increase in Ta of 1°C over 25°C When mounted on 50mm x 50mm x 1.6mm glass epoxy board
*2: Should not exceed Pd

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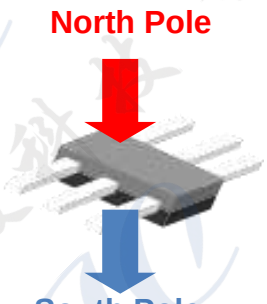
Electrical Characteristics (T_A=+25°C, V_{DD}=12V)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Units
Supply Voltage	V_{DD}		2.4		16	V
Output High Voltage	$V_{OH(ON)}$	@ I_{OUT} =200mA	V_{DD}-0.6	V_{DD}-0.3		V
Output Low Voltage	$V_{OL(ON)}$	@ I_{OUT} =200mA		0.25	0.4	V
Output Voltage Clamp	V_{BV}		18			V
Supply Current	I_{DD}	Output open		8	10	mA
RD output voltage	V_{RD}				16	V
RD sink voltage	V_{DSRD}	R_{RD}=4.7K		0.2	0.3	V
Shutdown Time	T_{SD}		2.1	2.8	3.5	S
Restart Time	T_{RS}		0.3	0.4	0.5	S
Magnetic Characteristics (T_A=+25°C, V_{DD}=12V)						
Operate Point	B_{OP}		5	15	35	G
Release Point	B_{RP}		-35	-15	-5	G
Hysteresis	B_{HYS}		20	30	50	G
Symmetry	$\|B_{OP}\|-\|B_{RP}\|$				20	G

Truth Table

Parameter	Test Condition	O1	O2	Mode
South Pole to Marking side	B>Bop	H	L	During rotation
North Pole to Marking side	B<Brp	L	H	



O1 Output = Low

General Specifications

The PT3925 is designed for magnetic actuating using a bipolar magnetic field. The built-in dynamic offset cancellation of pre-amplifier stage achieves optimal symmetrical magnetic sensing. The output driver provides a linear drive to eliminate switching noise. This Hall-effect IC is optimal for DC brushless fan application. The supply voltage range is from 2.4V to 16V and the output current is 450mA.

Lock Protection

In order to protect the motor, the driver IC will be shutdown to drive the coil when the motor is locked over 0.4 seconds. Then, it restarts to drive the motor after 2.8 seconds. Figure 1 shows the timing diagram between the hall input signal and driver's output state.

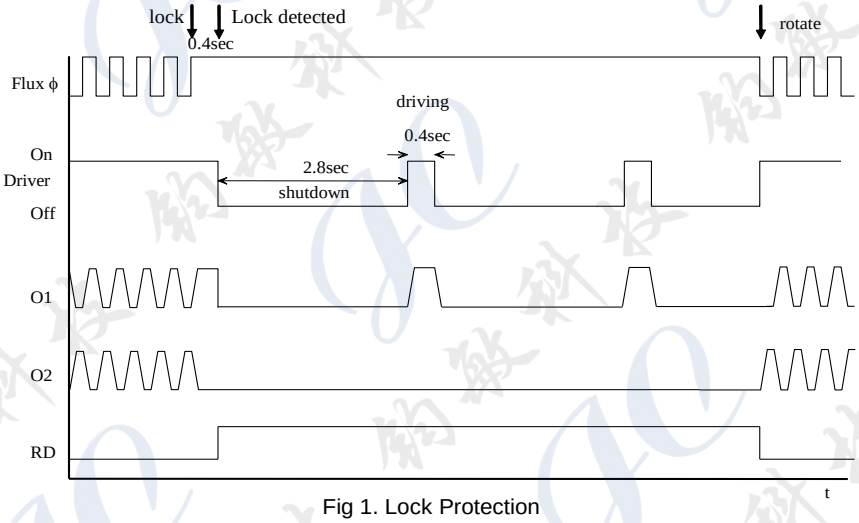


Fig 1. Lock Protection

Hall Sensor

This Hall effect sensor IC integrates the sensor, pre-amplifier with dynamic offset cancellation and the hysteresis comparator in single chip. The hysteresis characteristic is illustrated in Fig. 2 and the threshold of the magnetic flux density is +-15 Gauss.

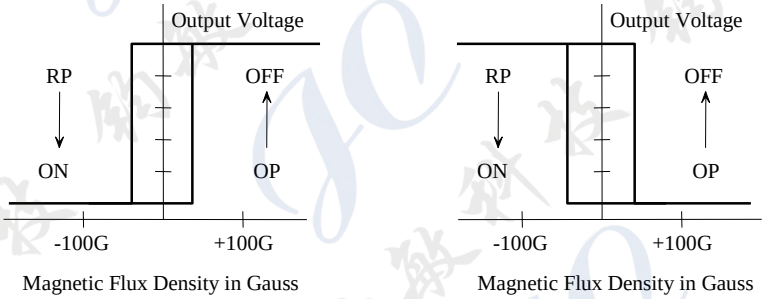


Fig 2. Magnetic Hysteresis Characteristics

The Hall IC architecture block diagram is shown in Fig. 3.

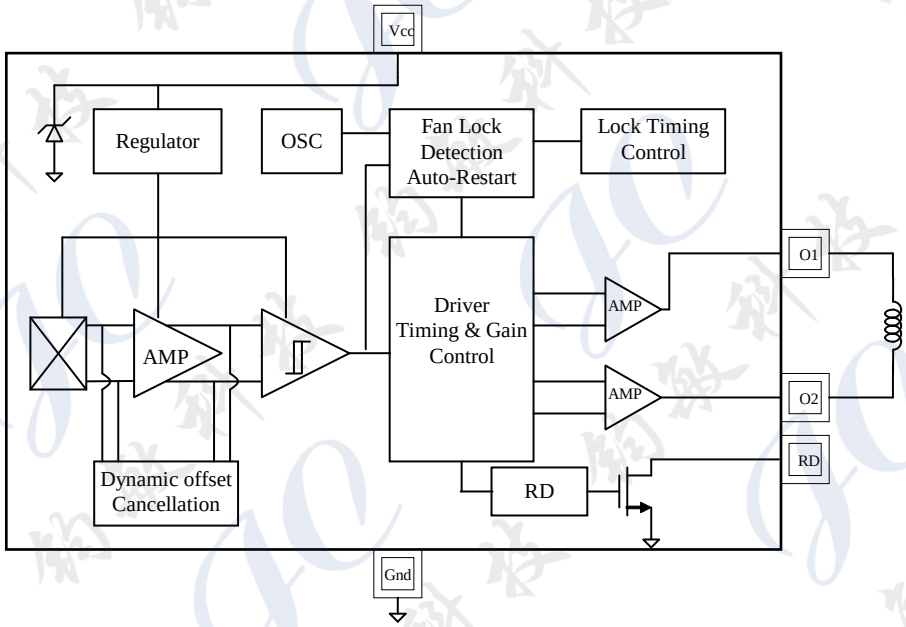
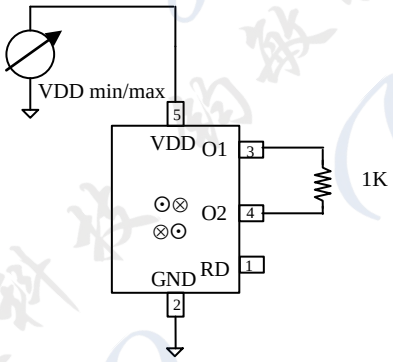


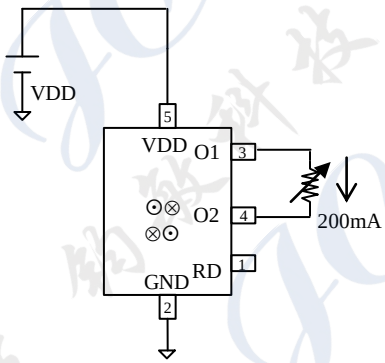
Fig. 3 Hall IC Architecture

Test circuit

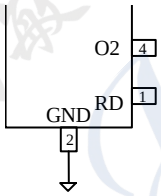
VDD Min./Max.



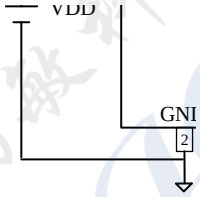
VOH(ON)/VOL(ON)



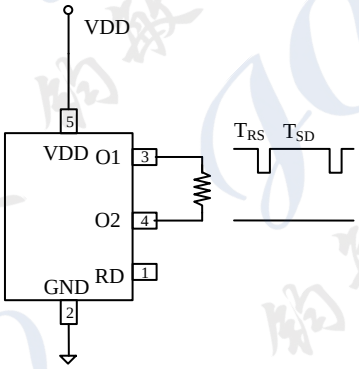
Supply Current IDD



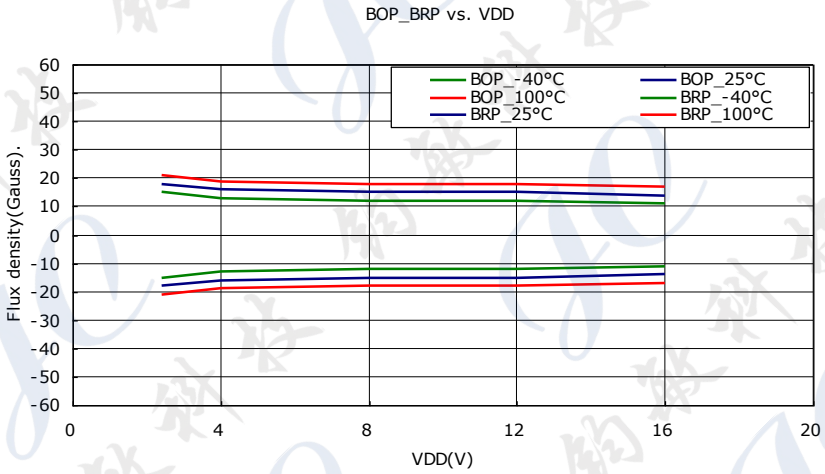
RD Sink Voltage V_{DSRD}

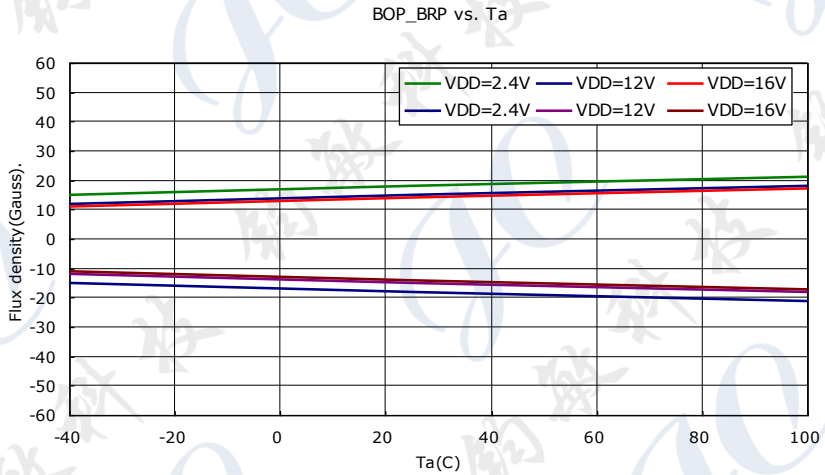


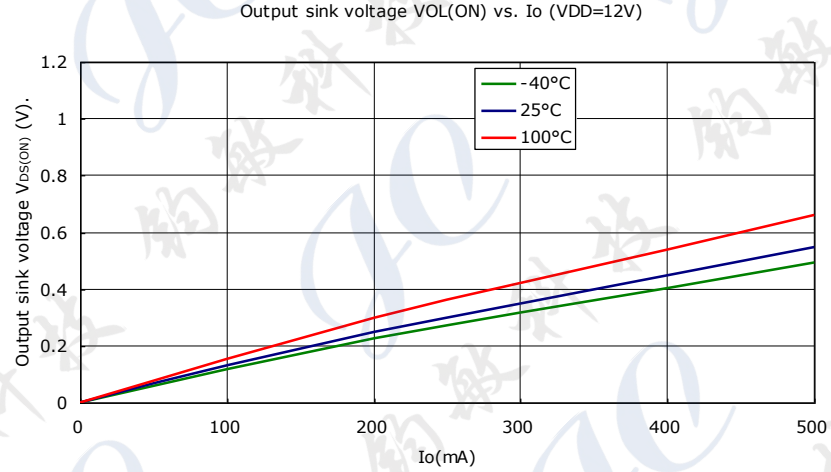
Lock Time T_{RS}/T_{SD}



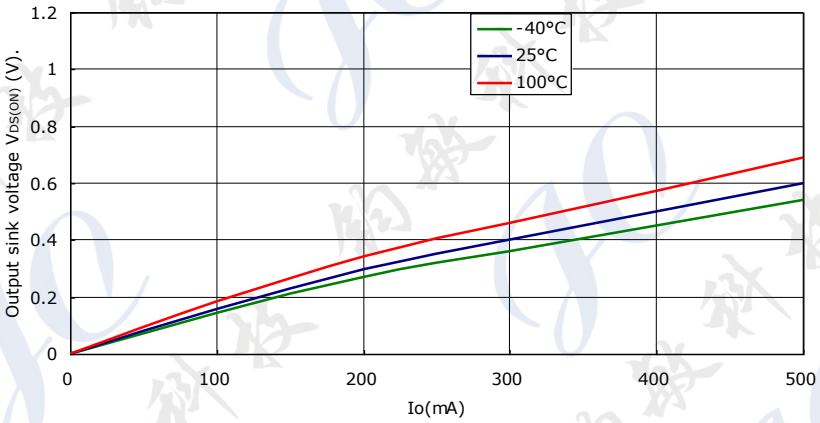
Performance curve



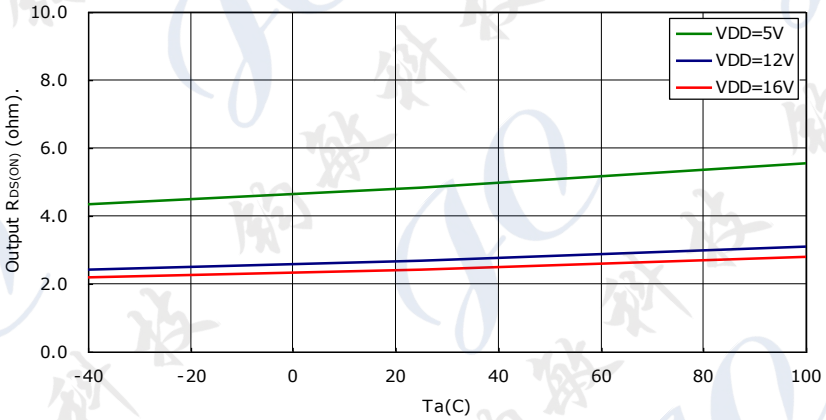




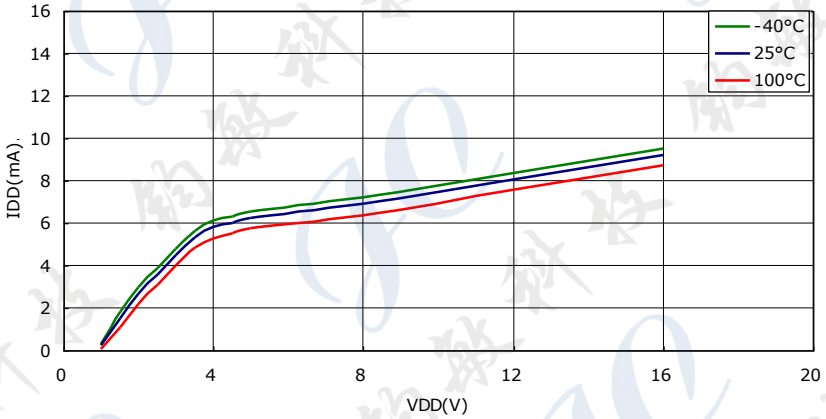
Output sink voltage VOH(ON) vs. Io (VDD=12V)



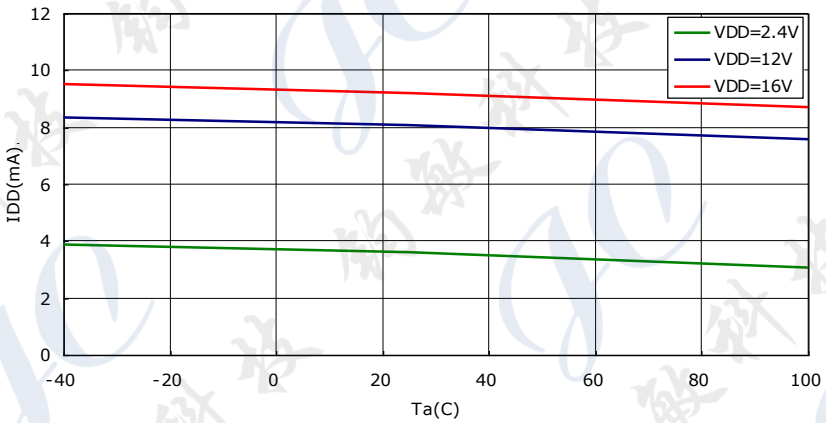
$R_{DS(ON)}$ vs.Ta



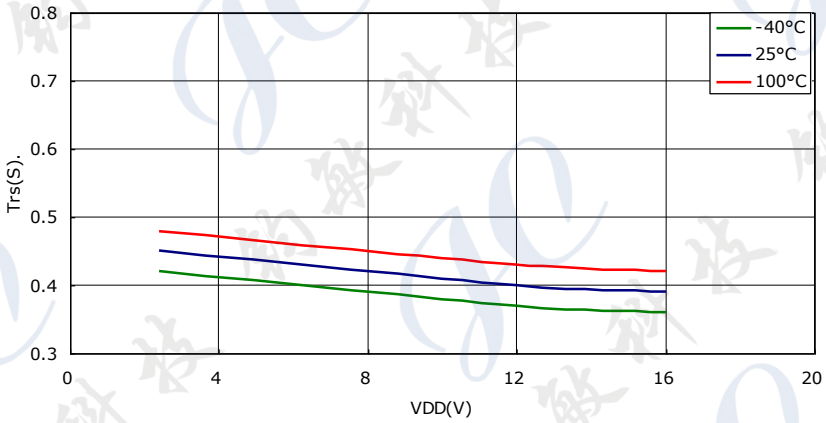
IDD vs. VDD



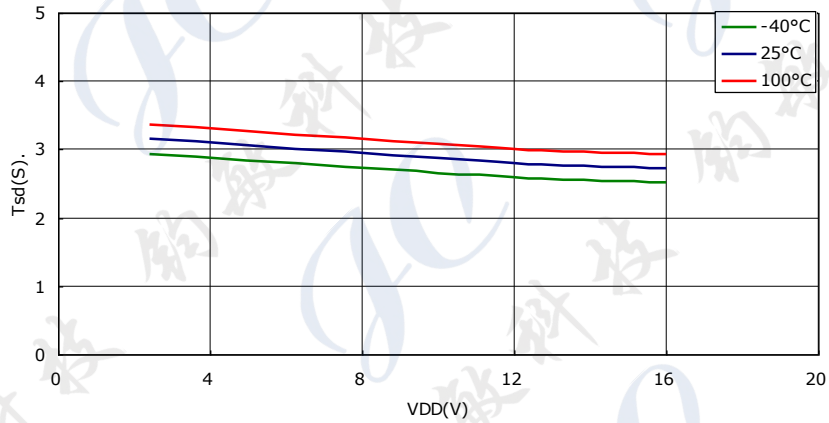
IDD vs. Ta



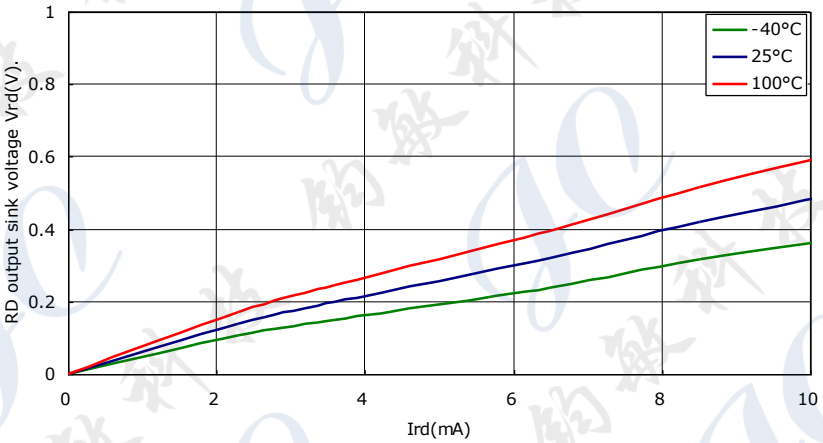
Lock Trs vs. VDD



Lock Tsd vs. VDD

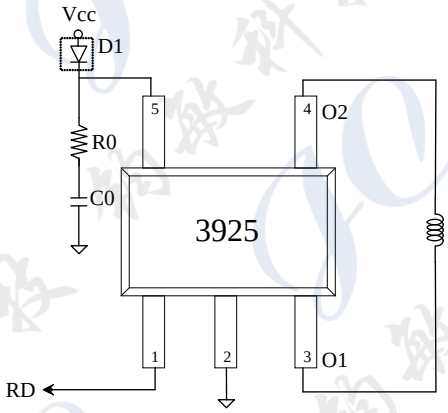


RD output sink voltage Vrd vs. Ird (VDD=12V)



Application circuits

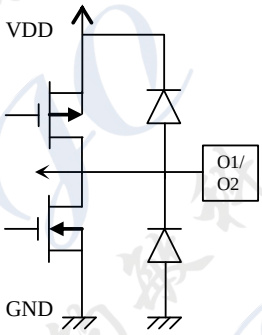
5V/12V application



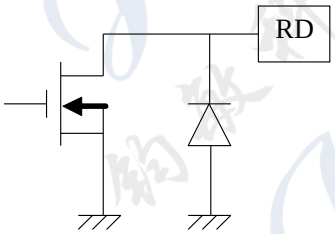
R0: Snubber circuit resistor 4.7ohm~10ohm for reducing surge voltage

C0: decoupling capacitor 0.1uF ~ 1uF

I/O Equivalent circuits



O1/O2 Output

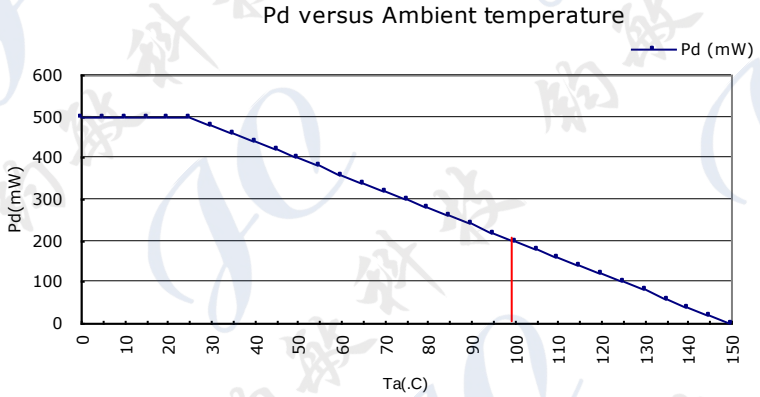


RD Output

Thermal resistance

Parameter	Symbol	Conditions	Rating	Units
Allowable power dissipation	P_d		500*1	mW
Junction to ambient thermal resistance	θ_{JA}		250	℃/W
Junction to case thermal resistance	θ_{JC}		80	℃/W
Maximum junction temperature	T_J		150	℃

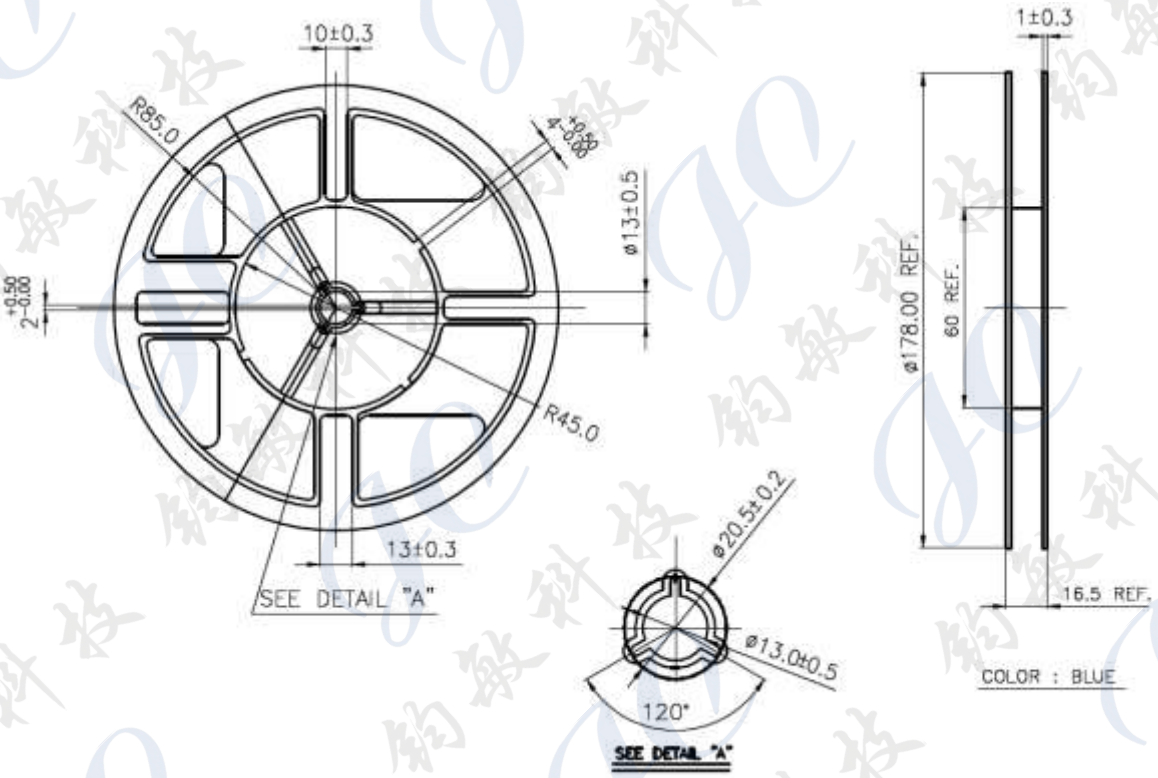
*1: Reduced by 4.54mW for each increase in Ta of 1°C over 25°C When mounted on 50mm x 50mm x 1.6mm glass epoxy board

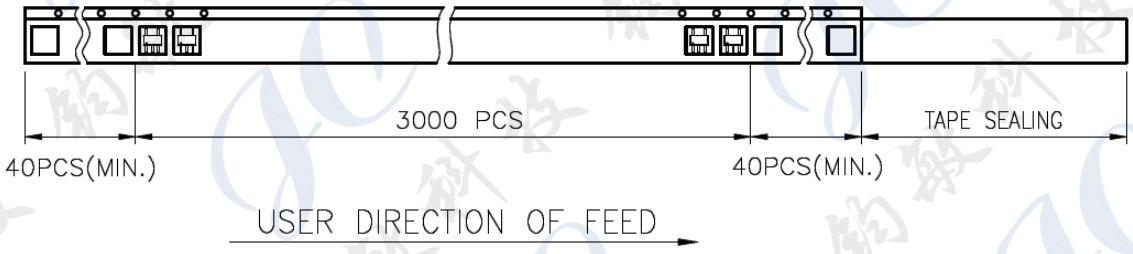


Soldering recommendations

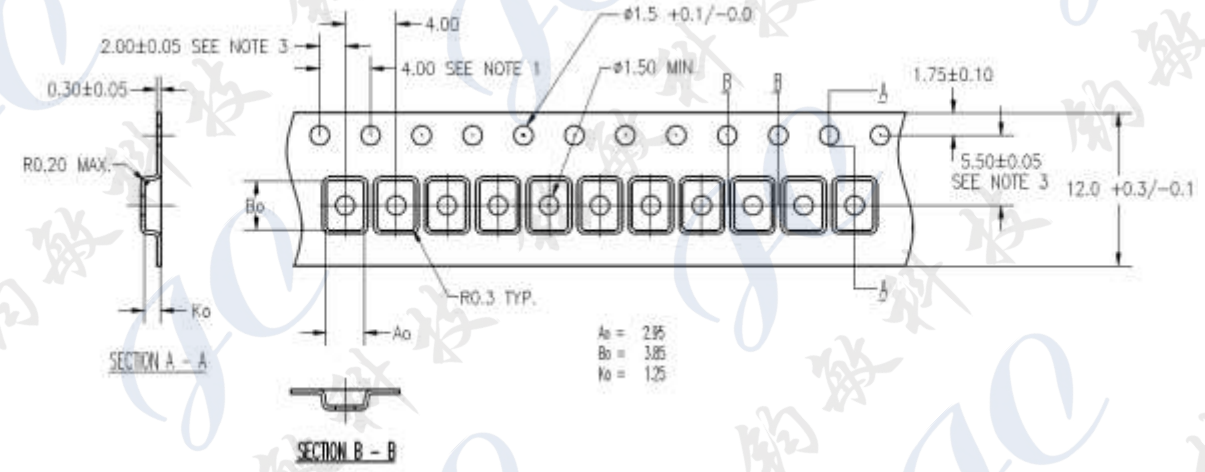
1. JEDEC J-STD-20
2. Iron Soldering
   Temperature and Time: 350°C, 3S
3. Reflow
   Temperature profile should conform to described in JEDEC-020 standard

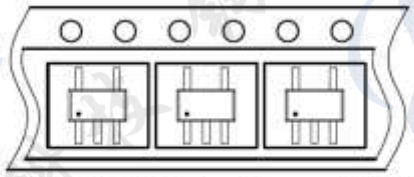
Carrier Tape & Reel specifications





USER DIRECTION OF FEED



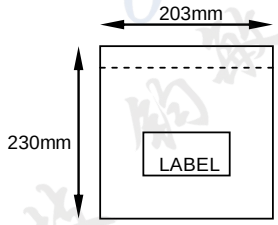


TSOT-25 (F/P : 2.2mm 平腳)

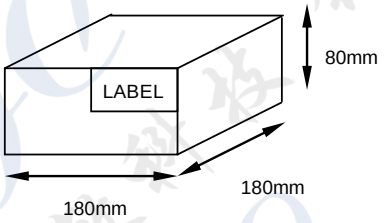
Package Method : 3000 EA / PER REEL

Packing specification

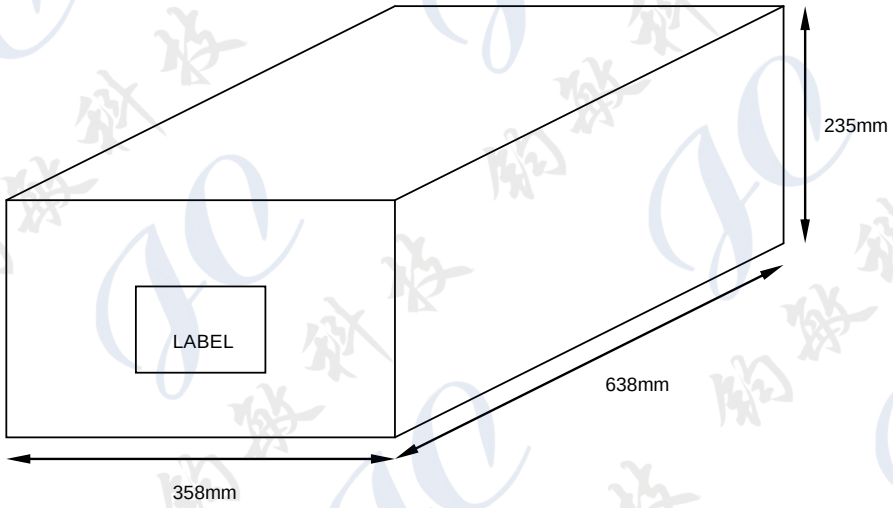
1. Reference document: PD-3-75-010
2. Dimension:



BAG



BOX



CARTON

3. Quantity:

   1REEL=3000EA

   1BOX=5 REELS

   1CARTON=14BOXES

Order information

Part Number	Temperature Range	Package Type	Delivery	MOQ
PT3925F1GCG7P1	-40°C~+100°C	TSOT25-5L	Reel	15K EA/BOX