



# 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

### Specifications

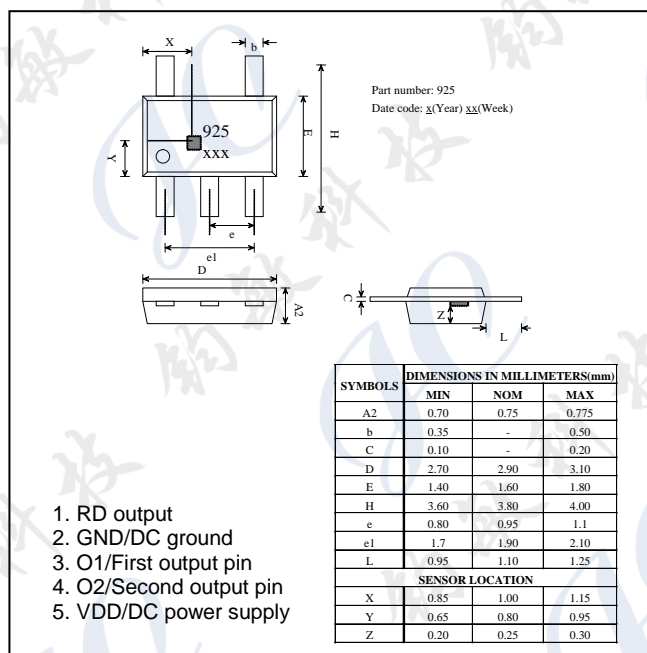
#### Absolute Maximum Ratings (Ta=25°C)

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

### Package: TSOT25F-5pin



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**PROLIFIC TECHNOLOGY INC.**

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**Electrical Characteristics ( $T_A=+25^{\circ}\text{C}$ ,  $V_{DD}=12\text{V}$ )**

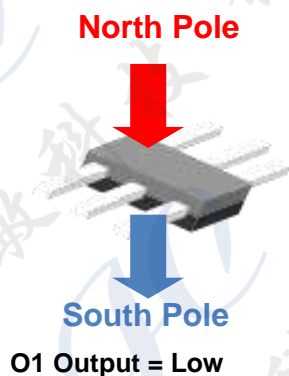
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Units
Supply Voltage	$V_{DD}$		2.4		16	V
Output High Voltage	$V_{OH(ON)}$	@ $I_{OUT}=200\text{mA}$	$V_{DD}-0.6$	$V_{DD}-0.3$		V
Output Low Voltage	$V_{OL(ON)}$	@ $I_{OUT}=200\text{mA}$		0.25	0.4	V
Output Voltage Clamp	$V_{BV}$		18			V
Supply Current	$I_{DD}$	Output open		8	10	mA
RD output voltage	$V_{RD}$				16	V
RD sink voltage	$V_{DSRD}$	$R_{RD}=4.7\text{K}$		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 ( $T_A=+25^{\circ}\text{C}$ ,  $V_{DD}=12\text{V}$ )**

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	$B > B_{op}$	H	L	During rotation
North Pole to Marking side	$B < B_{rp}$	L	H	



## 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.

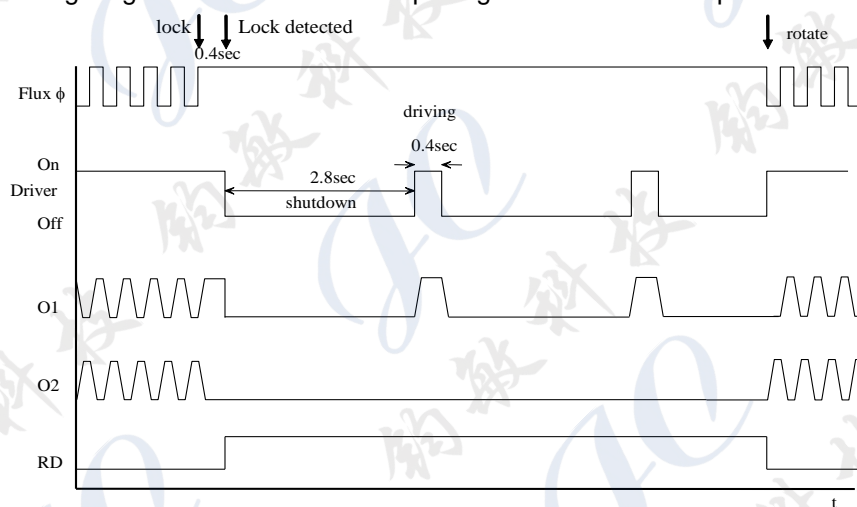


Fig 1. Lock Protection

## 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  $\pm 15$  Gauss.

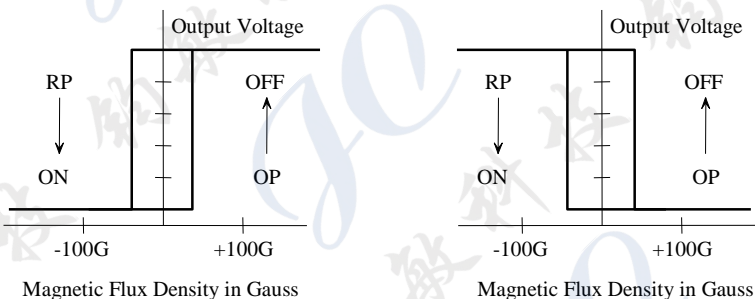


Fig 2. Magnetic Hysteresis Characteristics



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

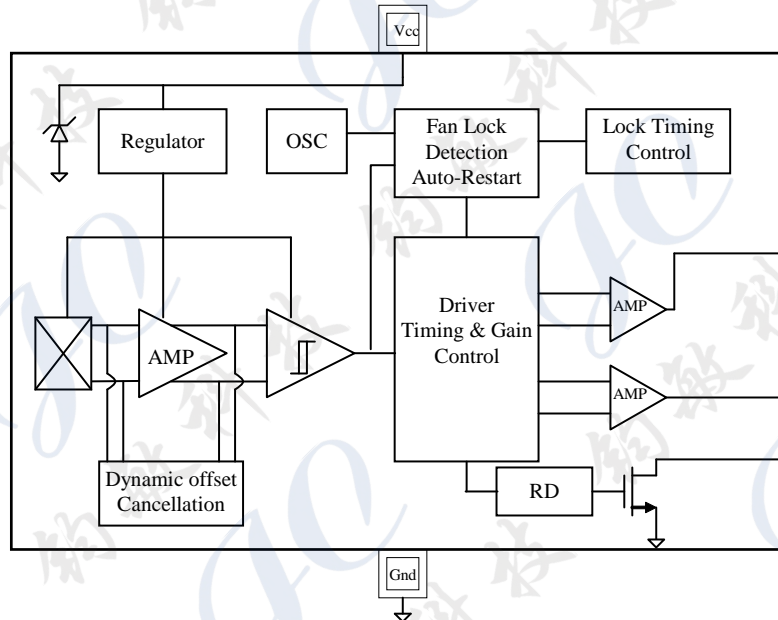
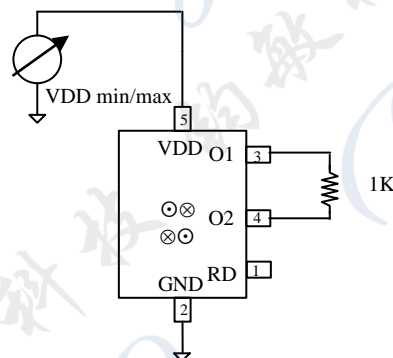


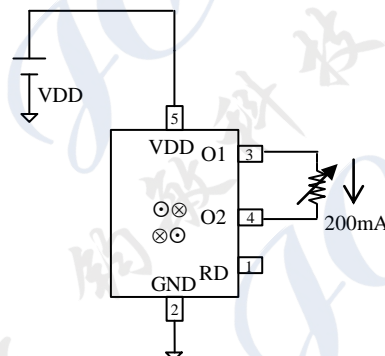
Fig. 3 Hall IC Architecture

### Test circuit

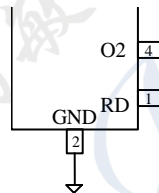
#### VDD Min./Max.



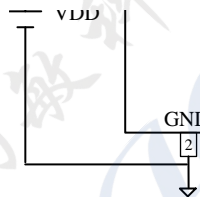
#### VOH(ON)/VOL(ON)



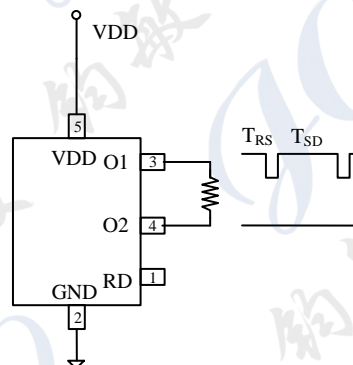
### Supply Current $I_{DD}$



### RD Sink Voltage $V_{DSRD}$

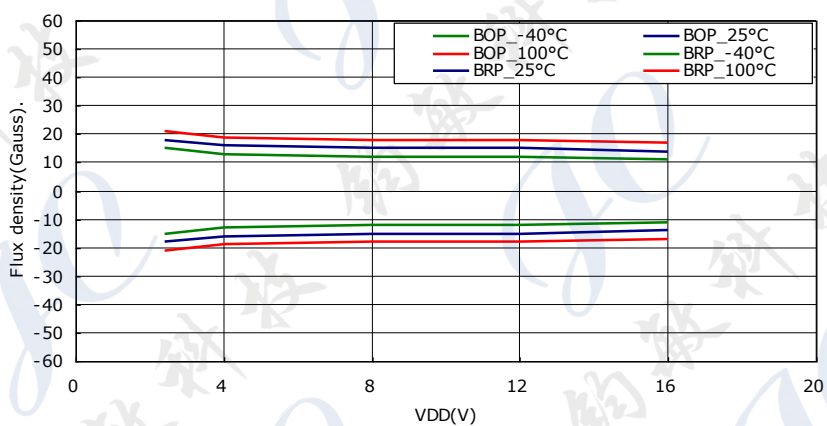


### Lock Time $T_{RS}/T_{SD}$

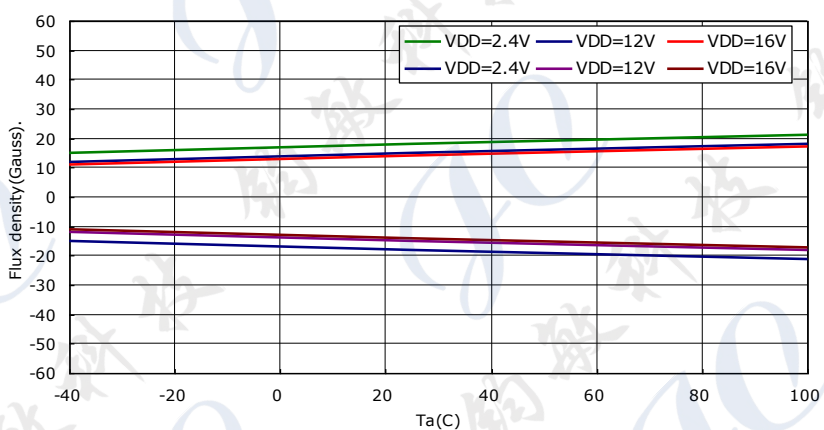


**Performance curve**

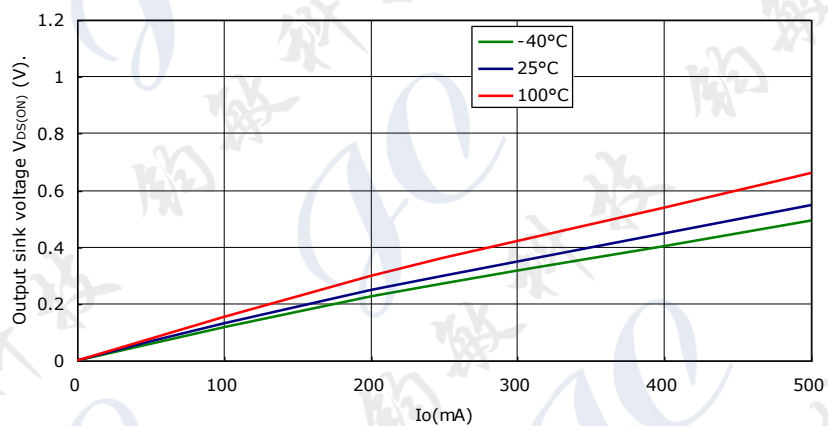
BOP\_BRP vs. VDD



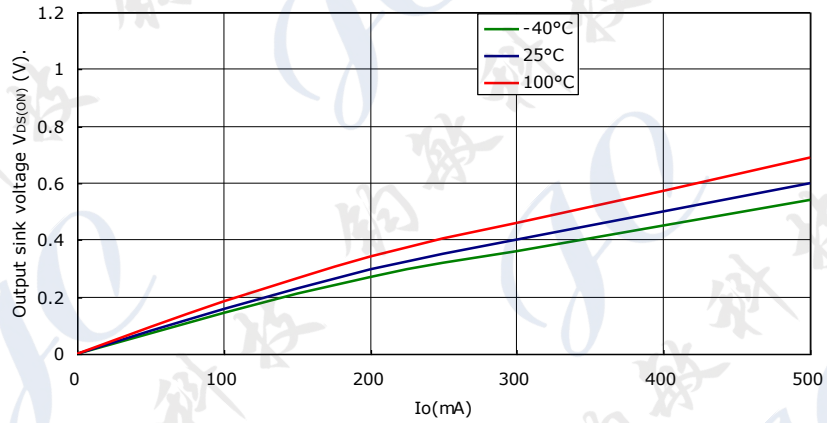
BOP\_BRP vs. Ta



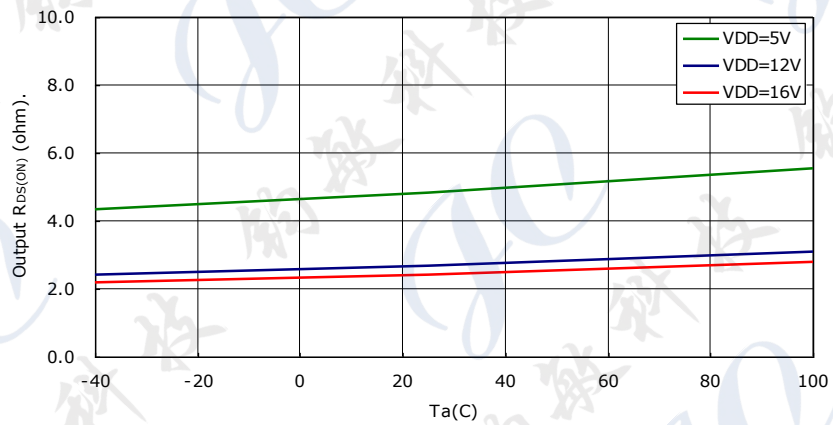
Output sink voltage VOL(ON) vs. Io (VDD=12V)



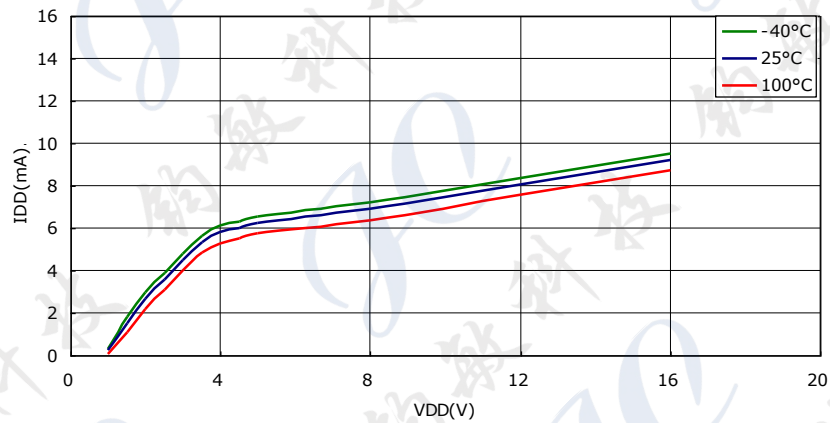
Output sink voltage  $V_{OH(ON)}$  vs.  $I_o$  ( $V_{DD}=12V$ )



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

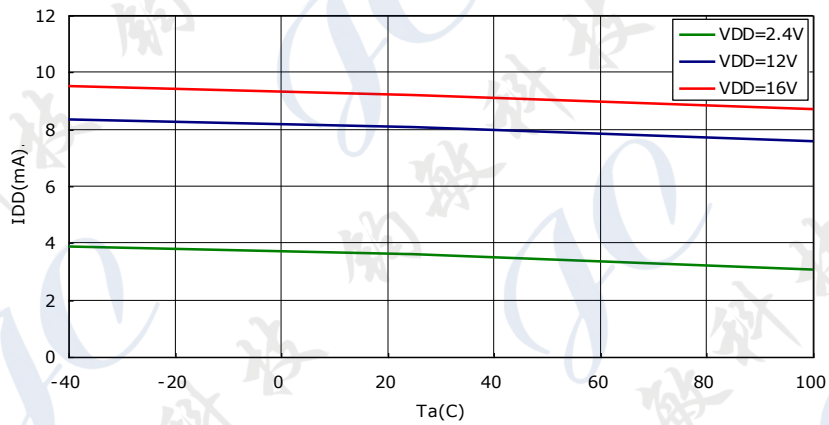


$I_{DD}$  vs.  $V_{DD}$

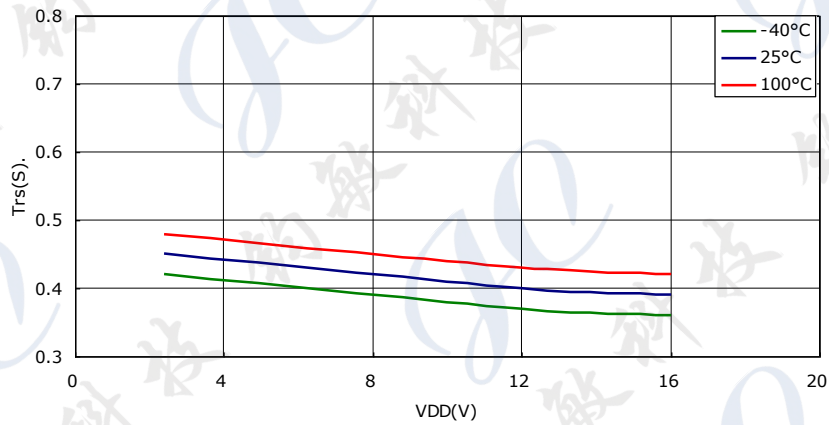




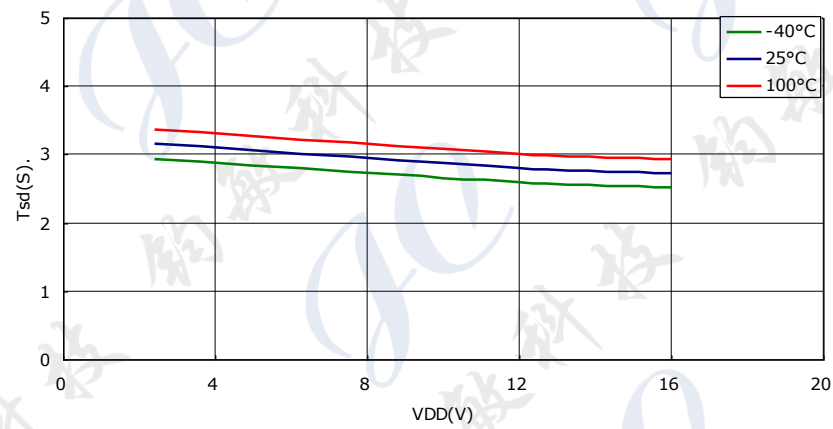
IDD vs. Ta



Lock Trs vs. VDD

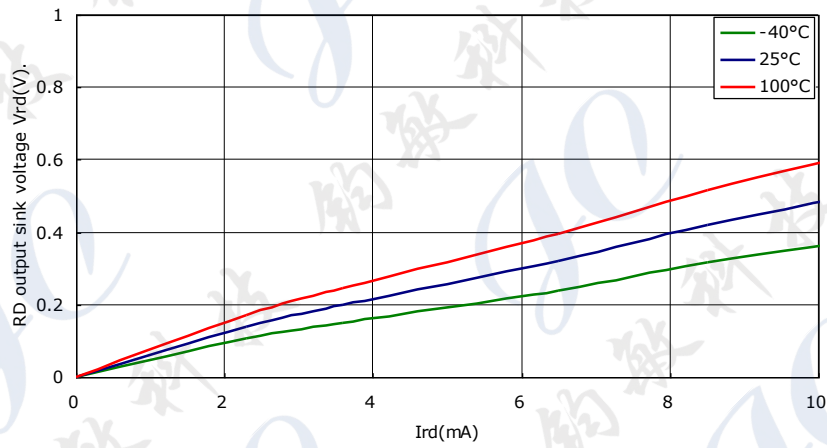


Lock Tsd vs. VDD



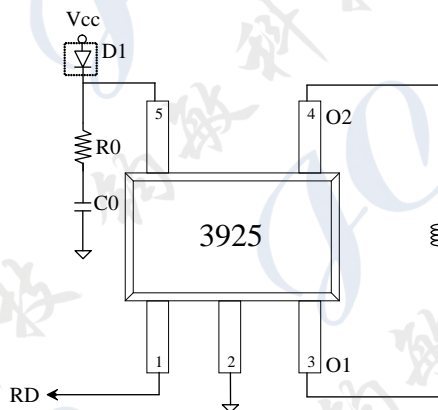


RD output sink voltage  $V_{rd}$  vs.  $I_{rd}$  ( $V_{DD}=12V$ )



## Application circuits

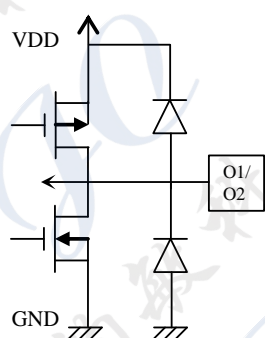
### 5V/12V application



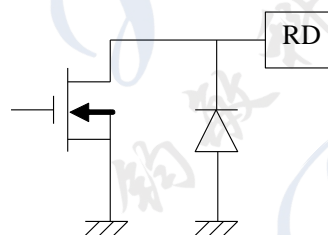
R0: Snubber circuit resistor 4.7ohm~10ohm for reducing surge voltage

C0: decoupling capacitor 0.1uF ~ 1uF

### I/O Equivalent circuits



O1/O2 Output

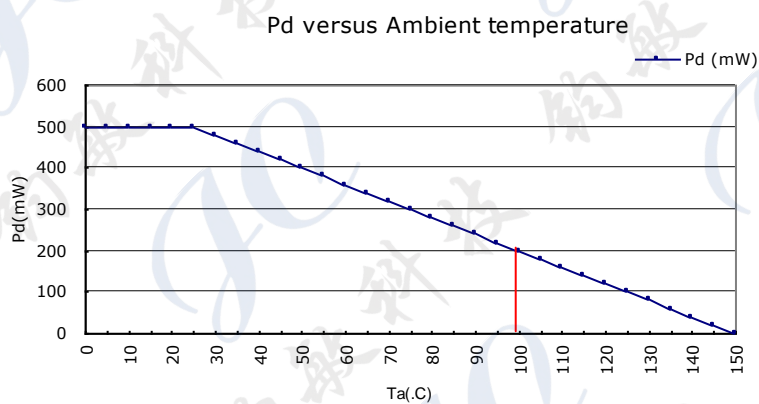


RD Output

## Thermal resistance

Parameter	Symbol	Conditions	Rating	Units
Allowable power dissipation	$P_d$		500 <sup>*1</sup>	mW
Junction to ambient thermal resistance	$\theta_{JA}$		250	°C/W
Junction to case thermal resistance	$\theta_{JC}$		80	°C/W
Maximum junction temperature	$T_J$		150	°C

\*1: Reduced by 4.54mW for each increase in  $T_a$  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

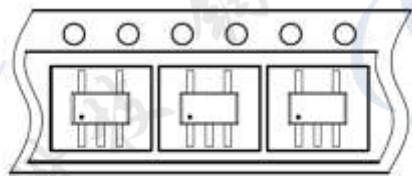
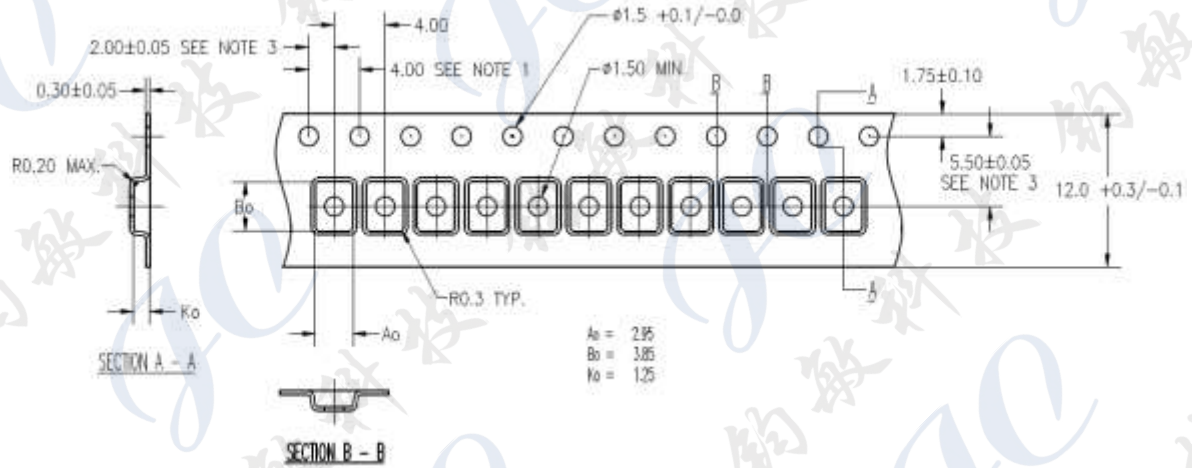
Temperature and Time: 350°C, 3S

3. Reflow

Temperature profile should conform to described in JEDEC-020 standard

## Date: Aug-2014





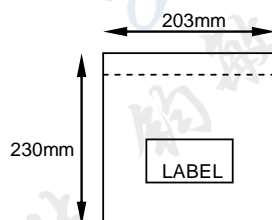
TSOT-25 (F/P : 2.2mm 平脚)

Package Method : 3000 EA / PER REEL

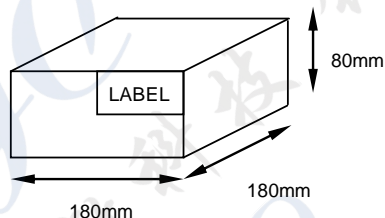
**Packing specification**

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

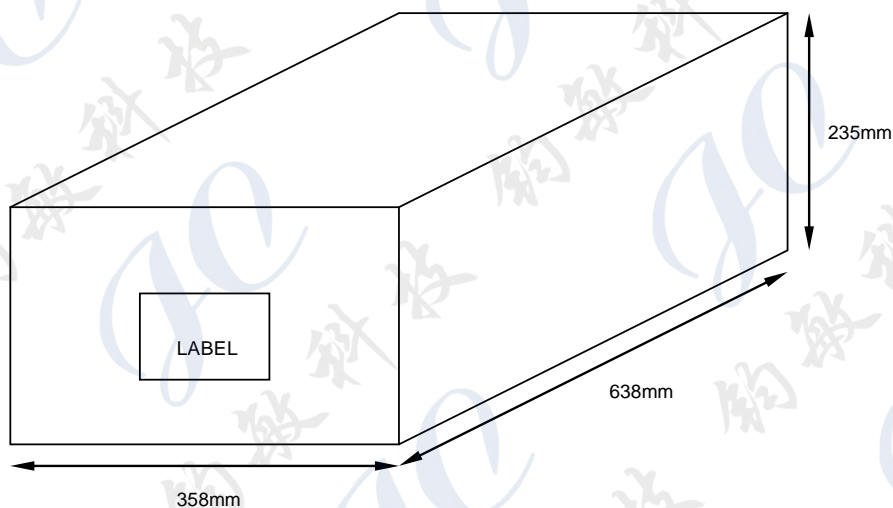
2. Dimension:



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

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