

General Description

The OCH29897 is an integrated Hall sensor with H-Bridged output driver designed for brushless DC motor applications . The device is using high voltage BCD process includes an on-chip Hall sensor for magnetic sensing, an amplifier that amplifies the Hall voltage, a comparator to provide switching hysteresis for noise rejection, a bi-directional drivers for sinking and driving large current load.

OCH29897 built-in power supply reverse connection protection circuit enables the OCH29897 do no need for external reverse diode in application, can reducing the fan cost.

OCH29897 is available in SOT23-6F package and is rated over the -40°C to 125°C.

Features

- 24V One-chip Solution
- Built-in VDD to GND Reverse Voltage Protection
- RD/FG Signal Output Select By SET Pin
- Input Voltage Range:3.5V ~ 30V
- Lock-shutdown Protection & Auto-Restart Function
- High Sensitivity Hall Sensor
BOP (20GS), BRP (-20GS)
- $R_{DS(ON)}$:1.4 Ω
- Thermal Shutdown Protection
- RoHS Compliant
- Available in SOT23-6F package

Applications

- 24V Single Coil DC Brushless Fan
- 24V Single Coil DC Brushless Motor

Pin Configuration



Figure 1, Pin Assignments Of OCH29897

Pin Name	Pin Number	Pin Function
RD/FG	1	FG Or RD Signal Output
GND	2	IC Ground
DOB	3	Output 2
DO	4	Output 1
VDD	5	Power Supply
SET	6	SET Pin (when SET Pin connected to the GND, the PIN 1 output is FG signal , and when SET Pin NC, the PIN 1 output is RD signal)

■ Typical Application Circuit

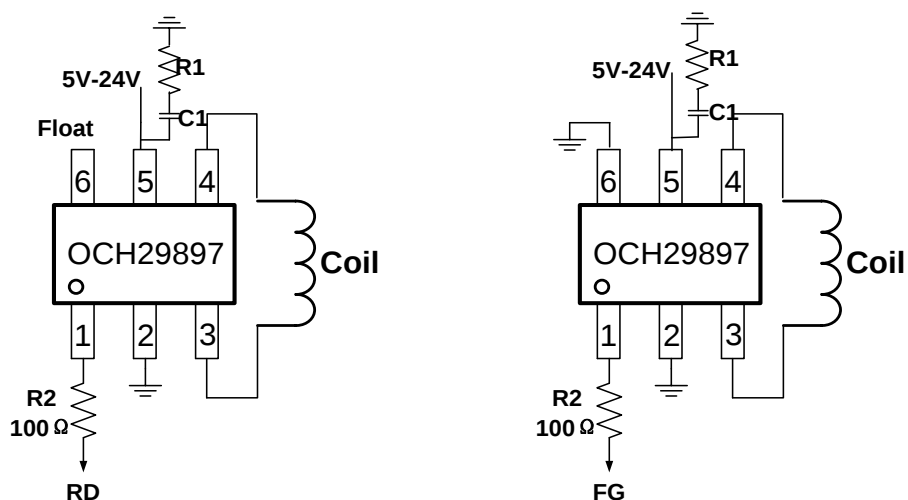


Figure 2, Typical Application Circuit Of OCH29897

Note1: When the power pulse is relatively large, must use least $C1=1\sim 2.2\mu\text{F}$ ceramic capacitor and $R1=2\Omega$ (Typ.) for the decoupling between VDD and GND and place the capacitor as close to the IC as possible.

Note2: The R2 is used to prevent FG/RD pin, typical value is $50\sim 100\Omega$.

■ Ordering Information

Part Number	Package Type	Packing Qty.	B _{OP} (Gauss)	B _{RP} (Gauss)	Temperature	Eco Plan	Lead
OCH29897TOAE	SOT23-6F	3000pcs /Reel	20(Typ.)	-20(Typ.)	-40 ~ 125°C	ROHS	Cu



■ Block Diagram

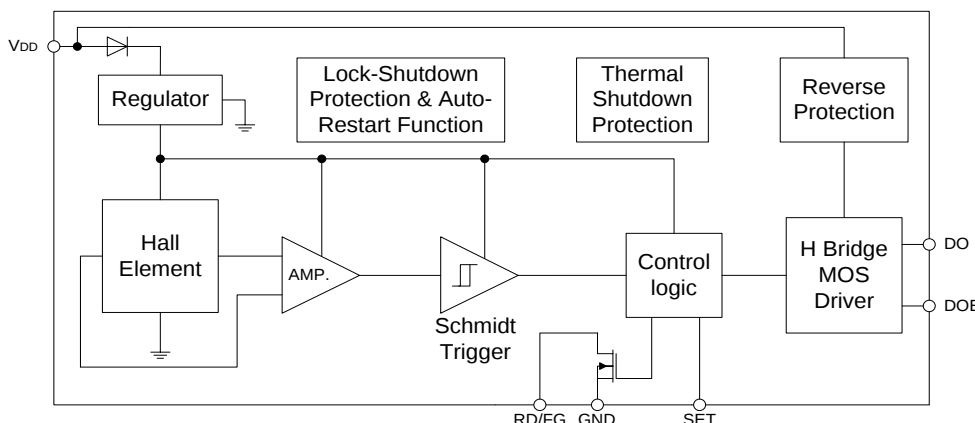
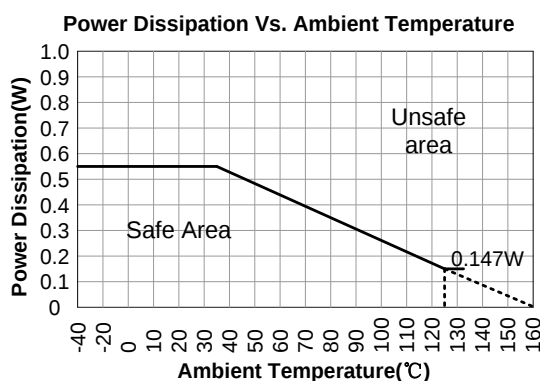


Figure 3, Block Diagram Of OCH29897

■ Absolute Maximum Ratings (T_A=25°C, unless otherwise noted)

Parameter	Symbol	Rating	Unit
VDD Pin to GND	V _{DD}	-29(VCC to GND NO Filter element) ~ + 32	V
DO/DOB Pin to GND	V _{DO/DOB}	-0.3 ~ + 32	V
FG/RD Pin to GND	V _{FG/RD}	-0.3 ~ + 18	V
SET Pin to GND	V _{SET}	-0.3 ~ + 6	V
Continuous Output Current	I _{O(CONT)}	0.3	A
Peak Output Current	I _{O(PEAK)}	0.75	A
Maximum Power Dissipation	P _D	525	mW
Thermal Resistance	θ _{JA}	240	°C /W
Junction temperature	T _J	150	°C
Storage Temperature Range	T _S	-55 ~ + 150	°C
Maximum Soldering Temperature (at leads,10 sec)	T _{LEAD}	260	°C

Note3: The maximum dissipation power P_D allowed at any ambient temperature point is calculated: $P_D (max) = (T_J - T_A) / \theta_{JA}$, T_J=160°C. When applied, do not exceed the maximum rating to prevent chip damage, and work for a long time at maximum rating may affect chip reliability.



■ Recommended Operating Conditions

Parameter	Symbol	Rating	Unit
VDD Pin to GND	V _{DD}	3.5 ~ 30	V
Operating Temperature Range	T _{OP}	-40 ~ + 125	°C

Note4 : In practical application, the effect of fan coil heating on the chip must take into account, with the actual over temperature protection point of actual test of high temperature fan for reference. On the basis of pre leave relatively safe temperature allowance, avoid chip in the critical limit (maximum ratings) for a long time and affects the reliability.



Electrical Characteristics

Typical values are at $T_A=+25^{\circ}\text{C}$, $V_{DD}=24\text{V}$, unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Supply						
V_{DD}	Input Voltage	-	3.5	-	30	V
I_{DD}	Supply Current	No load	-	2.5	4	mA
Output						
$R_{DS(ON)}$	Output On-Resistance	$I_O=0.3\text{A}$	-	1.4	-	Ω
RD/FG						
$R_{FG/RD(ON)}$	Output On-Resistance	$I_O=5\text{mA}$	-	45	-	Ω
$I_{FG/RD-Leakage}$	FG/RD leakage current	-	-1	-	1	μA
Protection						
T_{ON}	Locked Protection On Time	-	-	0.4	-	Sec
T_{OFF}	Locked Protection Off Time	-	-	2.4	-	Sec
R_{Duty}	Locked Protection Duty Ratio	T_{OFF}/T_{ON}	-	6	-	-
T_{SD}	Thermal Shutdown Temperature	-	150	165	-	$^{\circ}\text{C}$
T_{SH}	Thermal Shutdown Hysteresis	-	-	30	-	$^{\circ}\text{C}$

Magnetic Characteristics

Typical values are at $T_A=+25^{\circ}\text{C}$, $V_{DD}=24\text{V}$, unless otherwise noted.

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating Point	B_{OP}	5	20	40	Gauss
Release Point	B_{RP}	-40	-20	-5	Gauss
Hysteresis	B_{HYS}	20	40	60	Gauss

Driver Output Vs. Magnetic Pole

Parameter	Test Conditions	DO	DOB
South Pole	$B > B_{OP}$	High	Low
North Pole	$B < B_{RP}$	Low	High

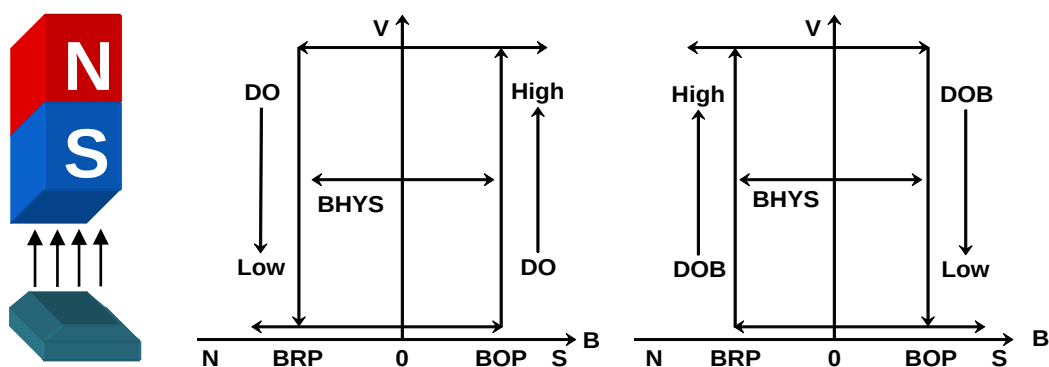


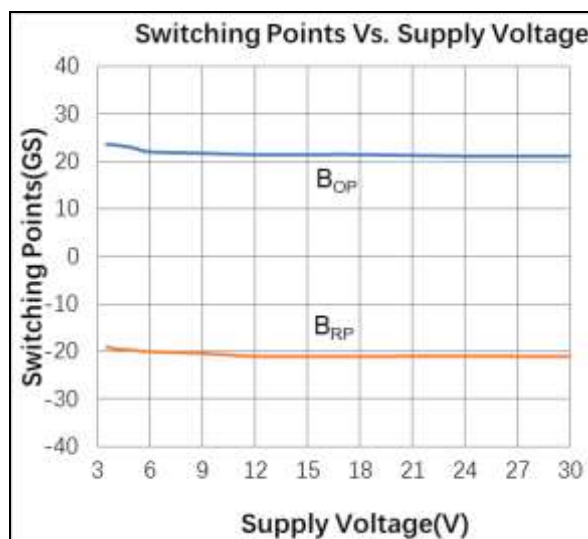
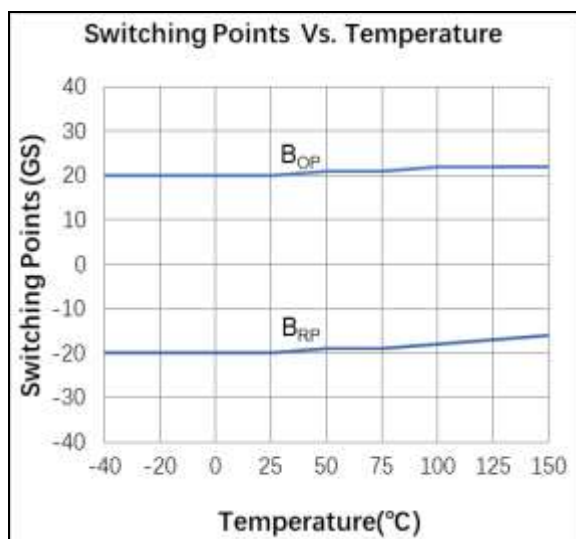
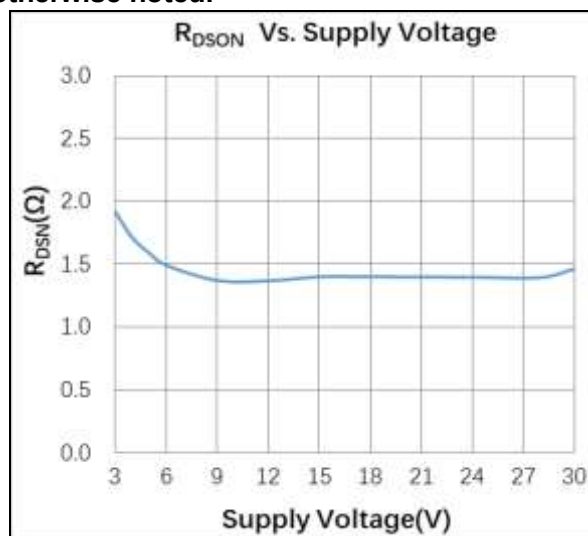
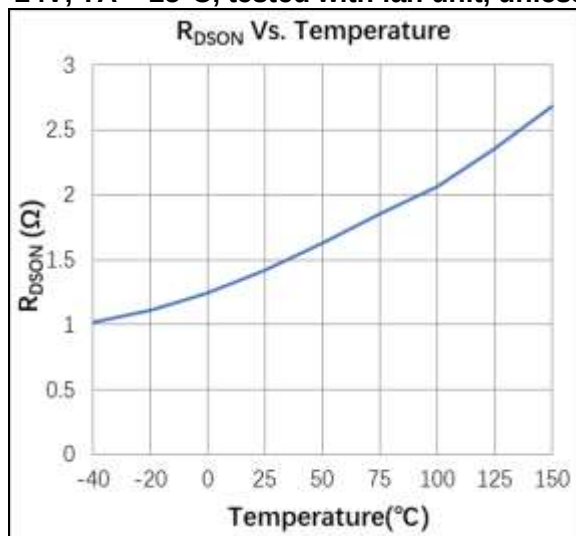
Figure 4 · Magnetic Hysteresis Characteristics Of OCH29897

Truth Table (SOT23-6F)

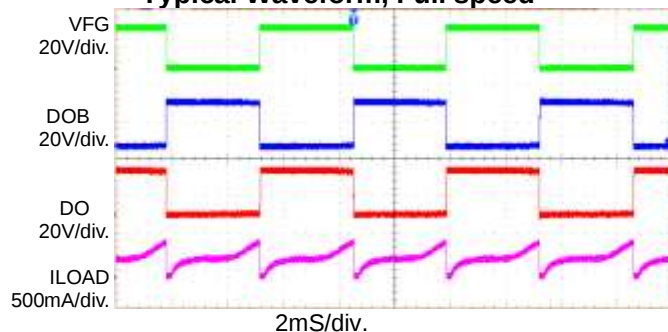
Input	Output				Mode
B	DO	DOB	FG	RD	
B_{OP}	H	L	OFF(H)	L	Operation Mode
B_{RP}	L	H	L	L	
B_{OP}	L	L	OFF(H)	OFF(H)	Lock Mode
B_{RP}	L	L	L	OFF(H)	

■ Typical Performance Characteristics

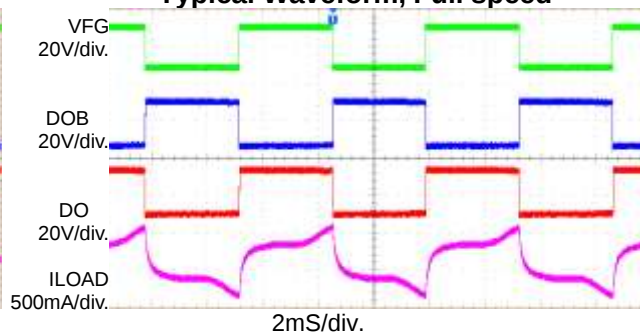
VCC = 24V, TA = 25°C, tested with fan unit, unless otherwise noted.



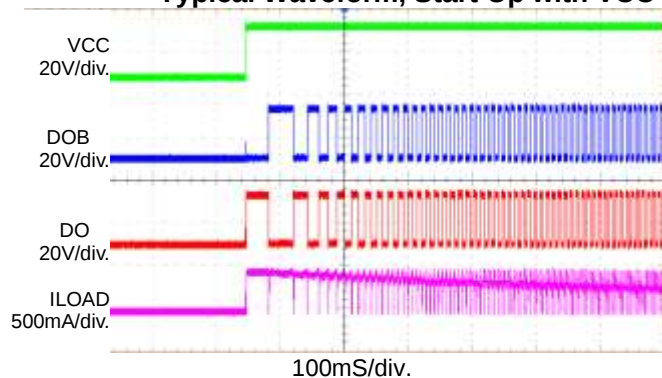
Typical Waveform, Full speed



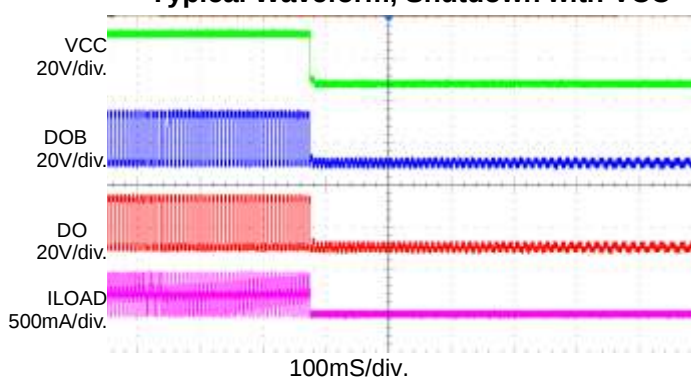
Typical Waveform, Full speed



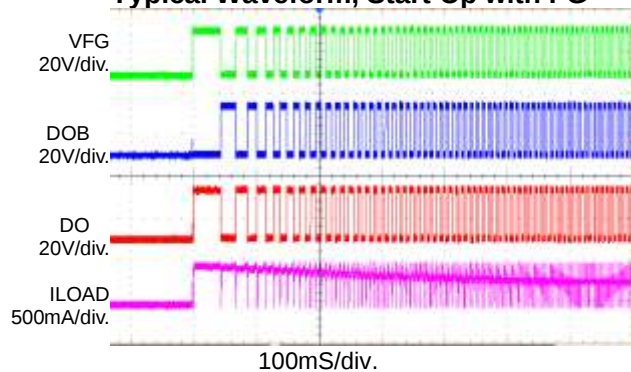
Typical Waveform, Start-Up with VCC



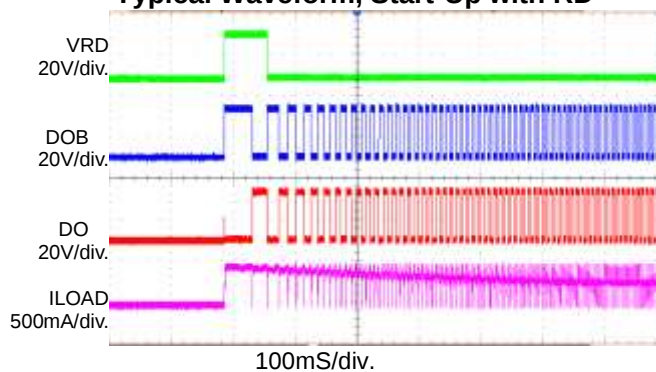
Typical Waveform, Shutdown with VCC



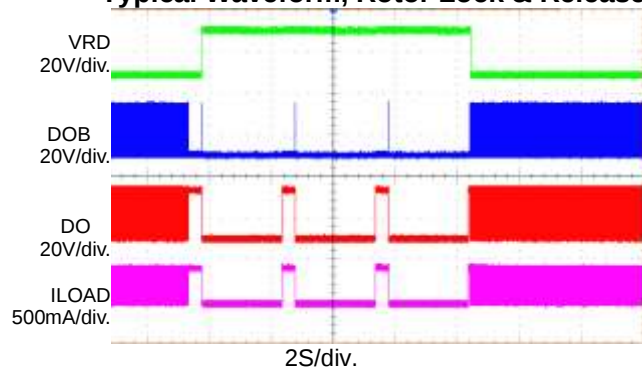
Typical Waveform, Start-Up with FG



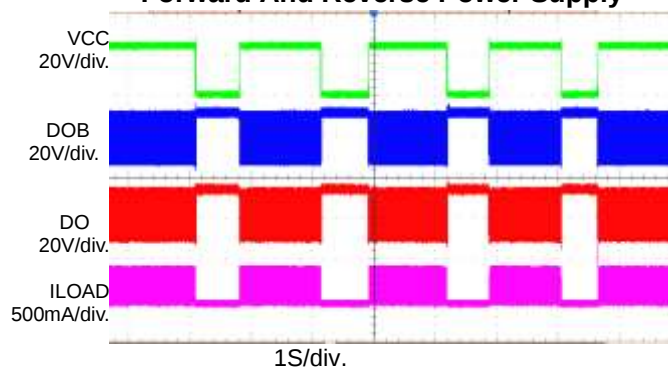
Typical Waveform, Start-Up with RD



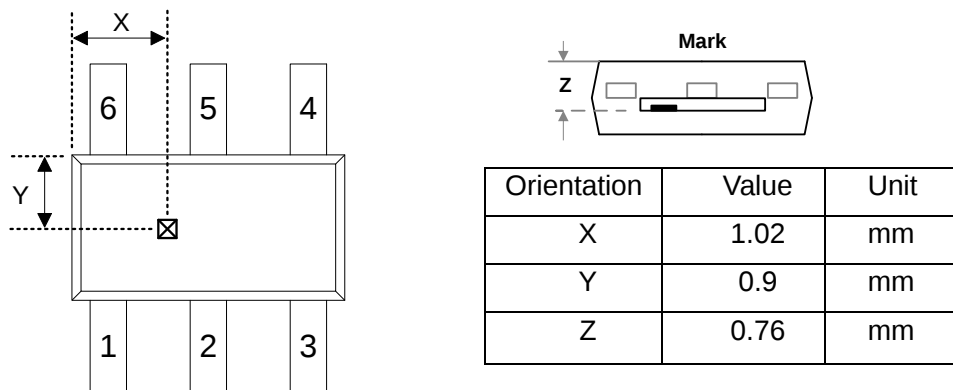
Typical Waveform, Rotor Lock & Release



Forward And Reverse Power Supply



■ Hall Sensor Location

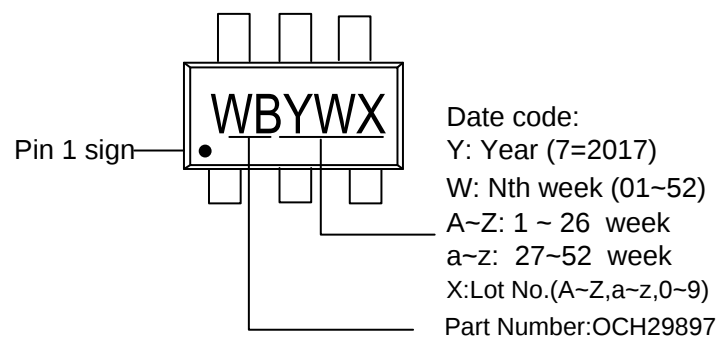


SOT23-6F

Figure 8, hall sensor location, where marks the IC number.

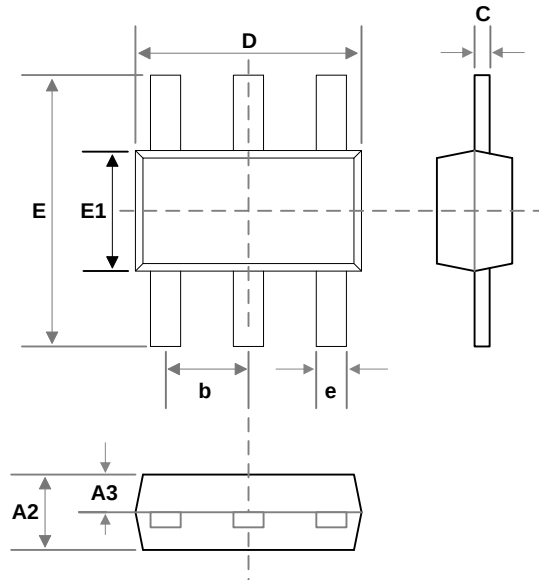
■ Marking Information

SOT23-6F



■ Package Information

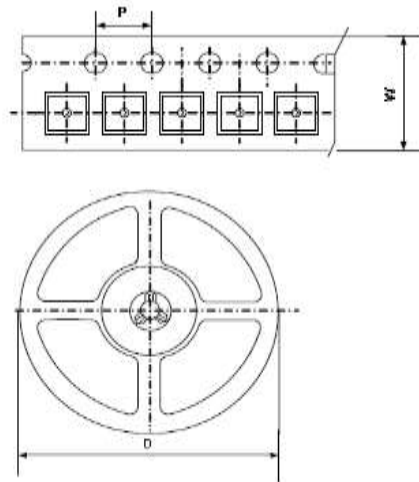
SOT23-6F



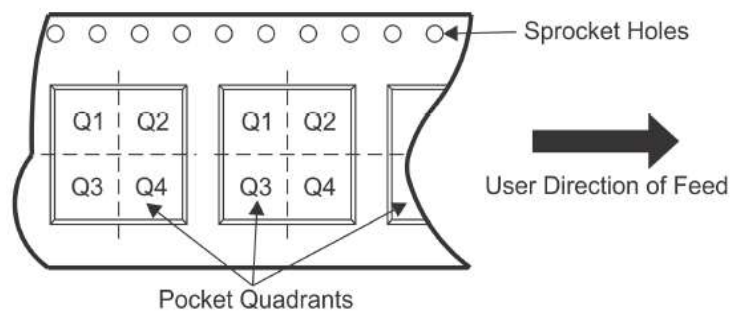
Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Norm.	Max.	Min.	Norm.	Max.
A2	1.00	1.10	1.20	0.03	0.04	0.04
A3	0.6	0.65	0.7	0.02	0.02	0.02
b	0.90	0.95	1.00	0.03	0.04	0.04
C	0.12	0.13	0.14	0.01	0.01	0.01
D	2.70	2.90	3.10	0.11	0.11	0.12
E	3.40	3.60	3.80	0.13	0.14	0.15
E1	1.50	1.60	1.70	0.06	0.06	0.07
e	-	0.35	-	-	0.01	-



■ **Packing Information**
SOT23-6F



QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



Package Type	Carrier Width (W)	Pitch (P)	Reel Size(D)	Packing Minimum	PIN1 Quadrant
SOT23-6F	8.0±0.1 mm	4.0±0.1 mm	180±1 mm	3000pcs	Q3

Note: Carrier Tape Dimension, Reel Size and Packing Minimum



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