

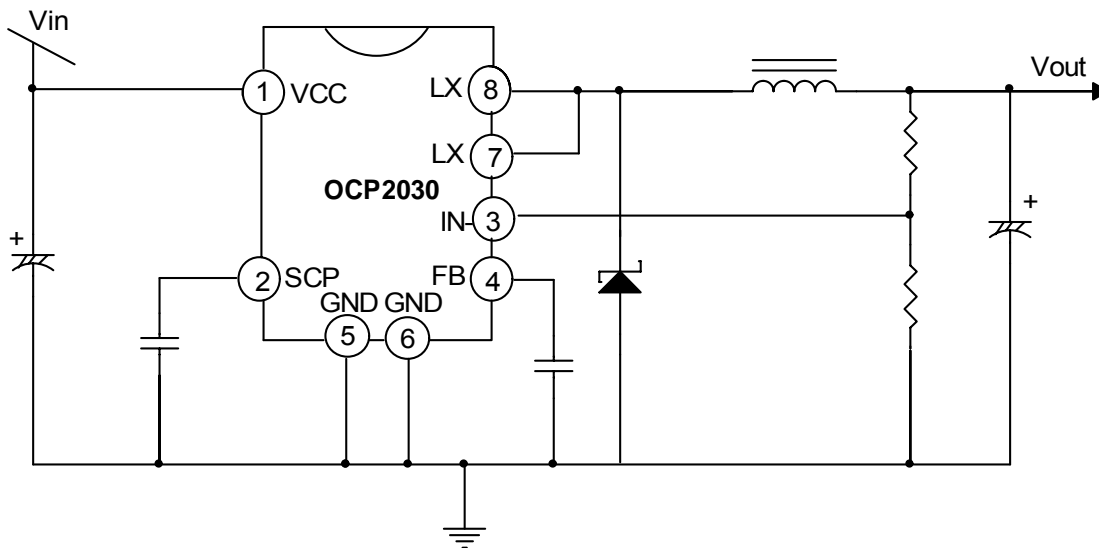
■ General Description

The OCP2030 is a buck topology of switching regulator for wide operating voltage applications field. The OCP2030 includes a high current P-MOSFET, high precision reference (0.5V) for comparing output voltage with feedback amplifier, an internal dead-time control and oscillator for controlling the maximum duty cycle and PWM frequency, and has power-on programmable soft start time and short circuit PMOS turn-off and auto re-start protection functions.

■ Features

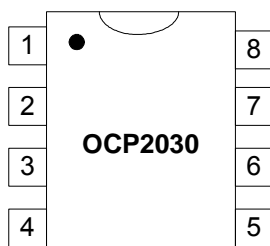
- Precision feedback reference voltage: 0.5V (2%)
- Wide supply voltage operating range: 3.0 to 20V
- Low current consumption: 5.5mA
- Internal fixed oscillator frequency: Typ. 500KHz
- Programmable Soft-Start function (SS)
- Short Circuit Shutdown and Auto Re-start function(ARSCP)
- Built-in P-MOSFET for 3A loading capability
- Package: SOP8

■ Typical Application Circuit

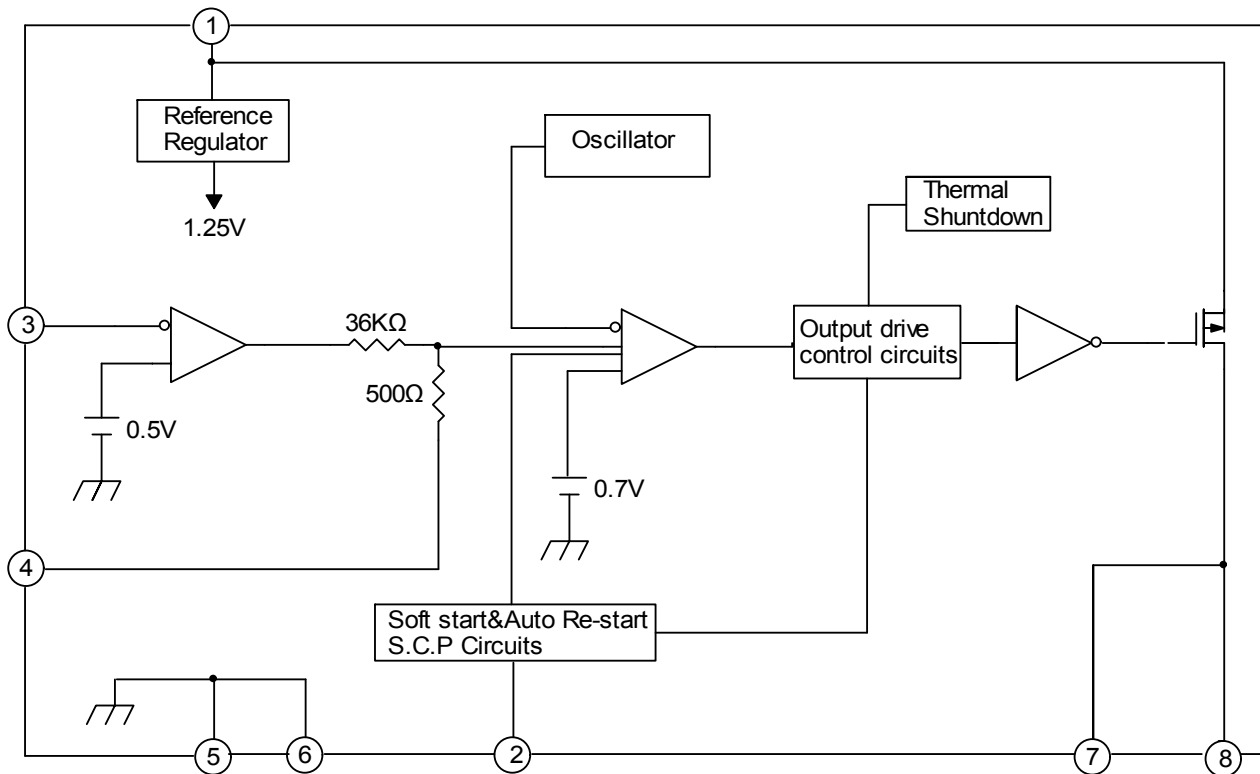


■ Pin Configuration

Top View



Name	No.	Status	Description
VCC	1	P	IC Power Supply (PMOS Source)
SS/SCP	2	I	Connecting with a Soft-start & ARSCP timing capacitor
IN-	3	I	Error Amplifier Inverting Input
FB	4	O	Error Amplifier Compensation Output
GND	5	P	IC Ground
	6		
LX	7	O	PMOS High Current Output
	8		

Block Diagram

Absolute Maximum Ratings

Power supply voltage		+20V
Output source current		+3A
Error amplifier inverting input		-0.3V~+1.2V
Allowable dissipation	SOP8 Ta ≦ +25°C	650mW
Operating temperature		-10°C~+85°C
Storage temperature		-55°C~+125°C
SOP8 Lead Temperature (soldering, 10 sec)		+260°C

DC Electrical Characteristics

Electrical characteristics over recommended operating free-air temperature range, $V_{CC}=6V$, (unless otherwise noted)

Reference

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output voltage	V_{REF}	COMP connected to FB	0.490	0.5	0.510	V
Input regulation	ΔV_{REF}	$V_{CC}=3.0V$ to 20V		2	12.5	mV
Output voltage change with temperature	$\Delta V_{REF}/V_{REF}$	$T_A=-10^\circ C$ to $25^\circ C$		1	2	%
		$T_A=25^\circ C$ to $85^\circ C$		1	2	

Soft Start (S.S.)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
S.S. Source current	I_{SS}	$V_{SS}=0V$	-15	-10	-7	μA
Soft start threshold voltage	V_{SST}	-	0.8	0.9	1.0	V



■ DC Electrical Characteristics (Continuous)

Short-circuit protection (S.C.P.)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
S.C.P source current	I_{SCP}	$V_{SCP}=0V$	-15	-10	-7	μA
SCP re-start/hold time	T_{RS}/T_{HOLD}	$V_{COMP}>0.8V$		1/20		-
S.C.P threshold voltage	V_{SCP}	$V_{FB}>450mV$	0.9	1.0	1.1	V
	V_{SB}	$V_{FB}<450mV$		0.1	0.15	

Oscillator

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Frequency	f		400	500	600	KHz
Frequency change with voltage	$\Delta f/\Delta V$	$V_{CC}=3.0V$ to 20V	-	5		%
Frequency change with temperature	$\Delta f/\Delta T$	$T_A=-10^\circ C$ to $85^\circ C$	-	5	-	%

Error amplifier

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Input threshold voltage	V_{IN-}	$V_{FB}=450mV$	490	500	510	mV
V_T change with voltage	$\Delta V_{IN-}/\Delta V$	$V_{CC}=3V$ to 20V	-	5	20	mV
V_T change with temperature	$\Delta V_{IN-}/\Delta T$	$T_A = -10^\circ C$ to $85^\circ C$	-	1	-	%
Input bias current	I_B	--	-1.0	-0.2	1.0	μA
Voltage Gain	A_V	--	-	100	-	V/V
Frequency bandwidth	BW	$A_V=0$ dB	-	6	-	MHz
Output voltage Swing	Positive	$V_{IN-}=0.3V$	0.78	0.87	-	V
	Negative	$V_{IN-}=0.7V$	-	0.05	0.2	
Output source current	I_{SOURCE}	$V_{FB}=450mV$	-	-45	-30	μA
Output sink current	I_{SINK}		30	45	-	μA

Idle Period Adjustment

Parameter	Symbol	Test Conditions	Min.	Typ,	Max.	Unit
Maximum duty cycle	T_{DUTY}	$V_{IN-}=0.2V$	-	80	-	%

Output

Parameter	Symbol	Test Conditions	Min.	Typ,	Max.	Unit
PMOS D-S voltage	V_{DSS}	$V_{FB}=0.1V$		-25	-	V
PMOS source current	I_D			-2		A
PMOS On resistance	$R_{DS(ON)}$	$V_{CC}=5.0V, V_{IN-}=0V$		70	90	m Ω
		$V_{CC}=10V, V_{IN-}=0V$		42	65	
Output leakage current	I_L	SCP active		5	-	μA

Total device

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Standby supply current	$I_{STANDBY}$		-	4.5	6	mA



■ Typical Characteristics

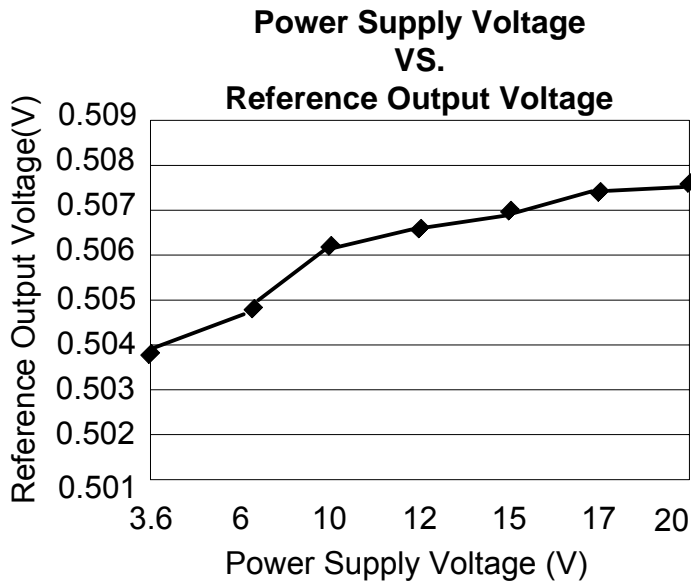


Figure 1

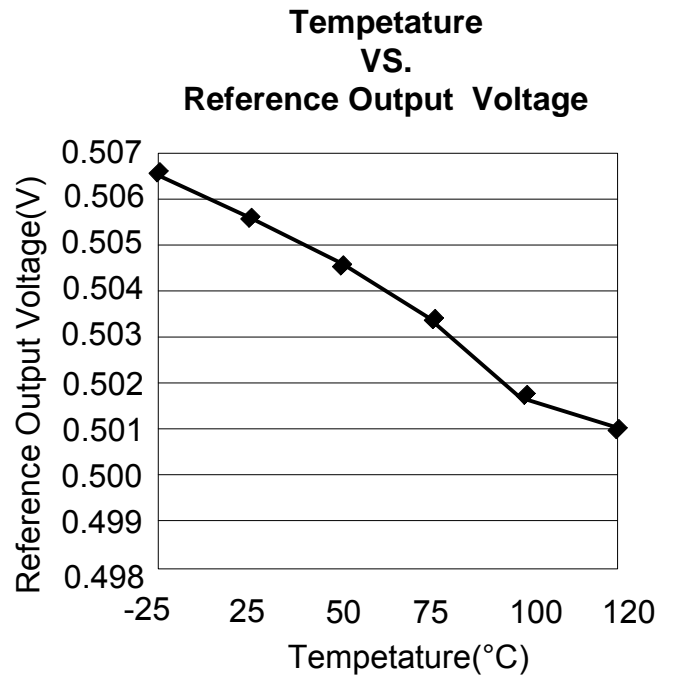


Figure 2

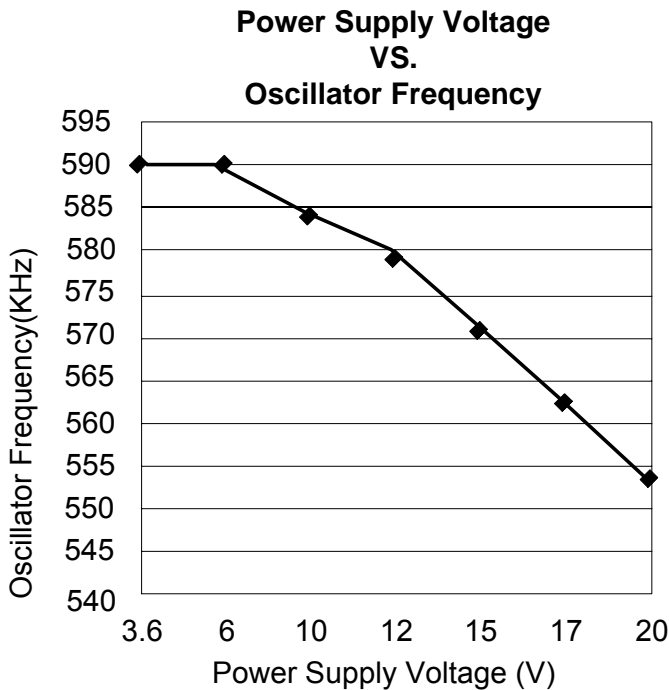


Figure 3

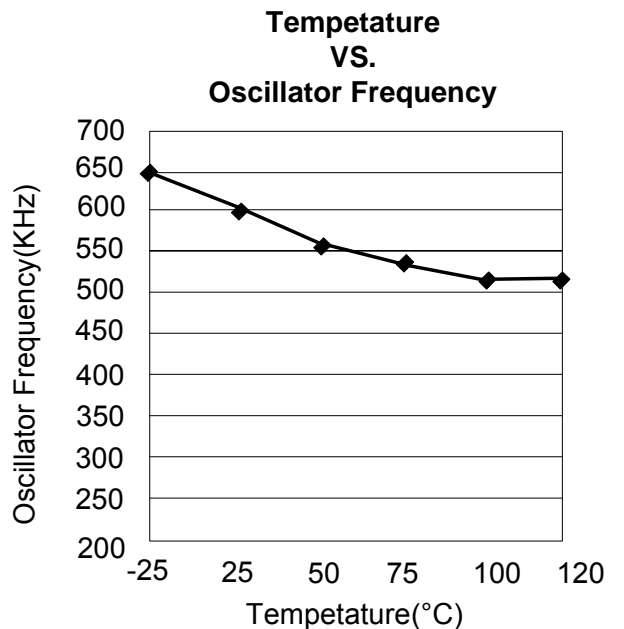


Figure 4



■ Typical Characteristics(Continues)

Output Current
VS.
Efficiency

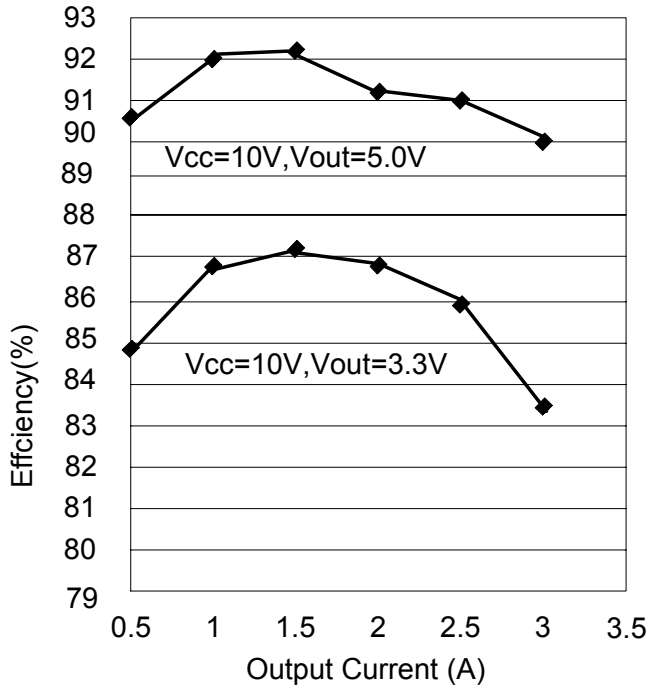


Figure 5

Output Load Regulation

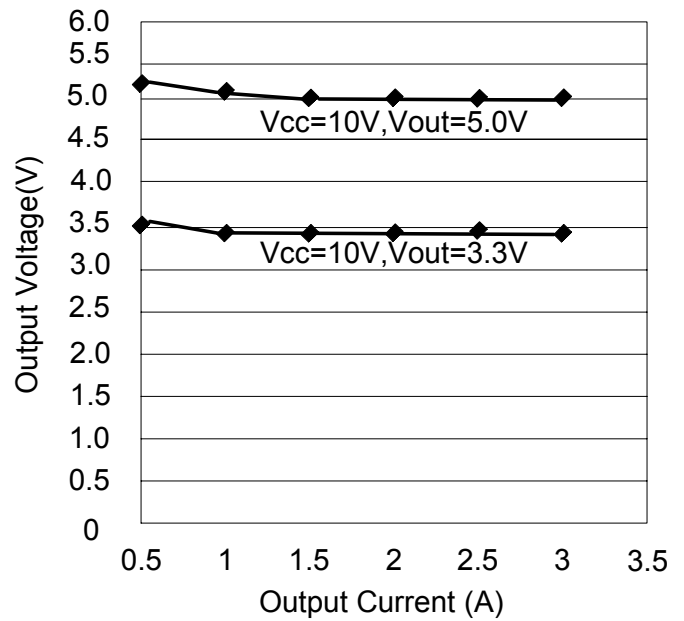


Figure 6

■ Timing Waveform

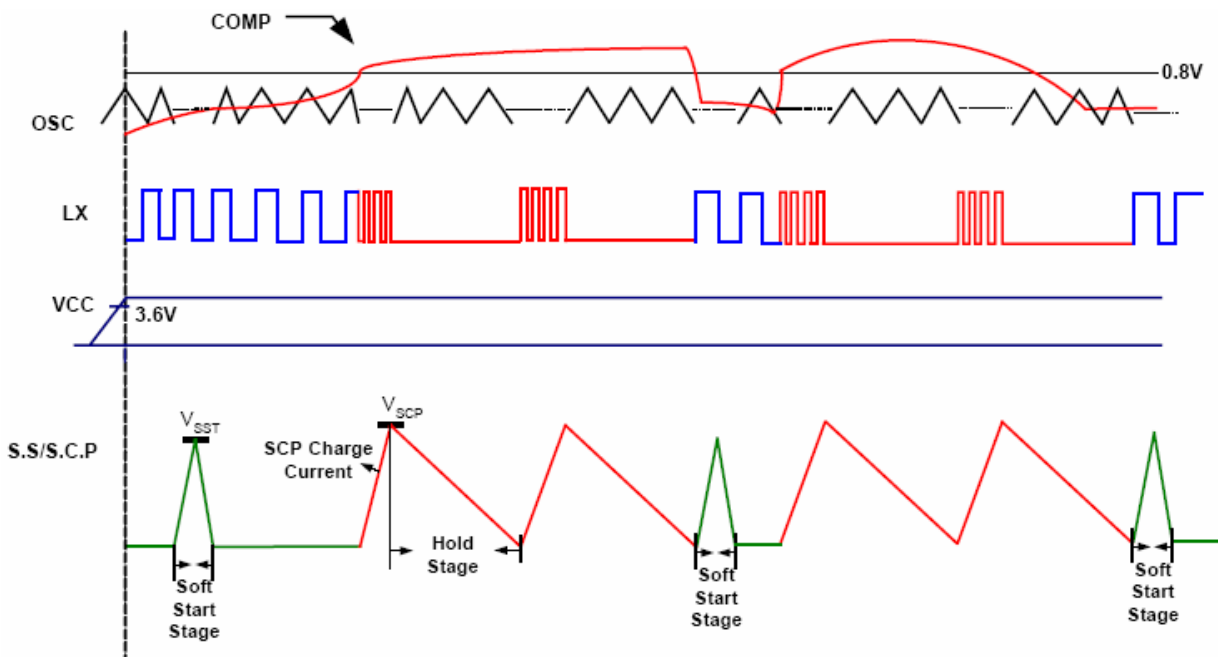
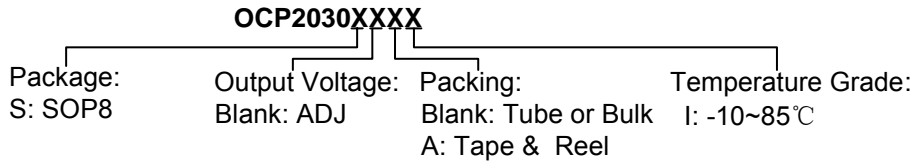


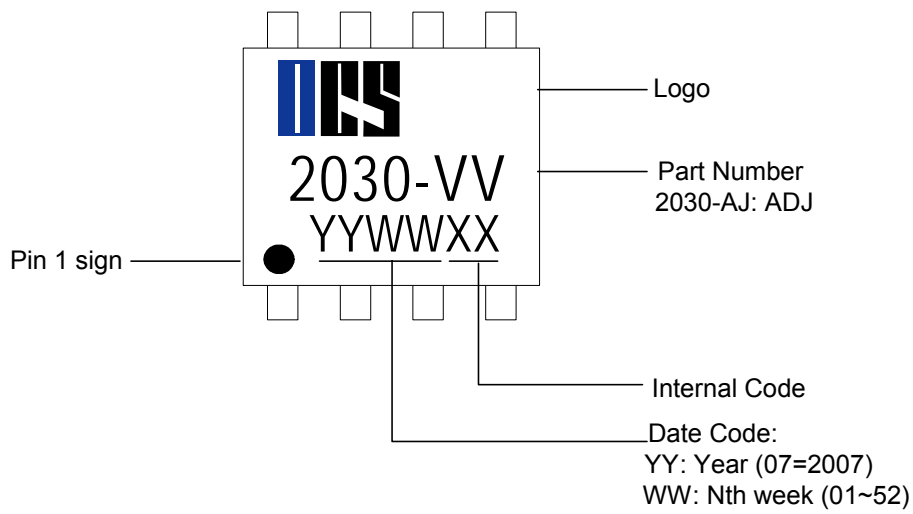
Figure 7 PWM Timing Diagram



■ Ordering Information

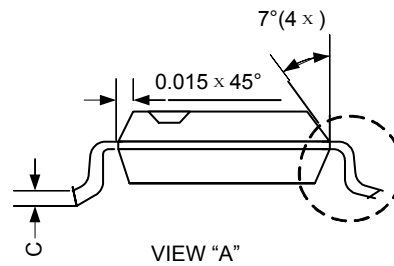
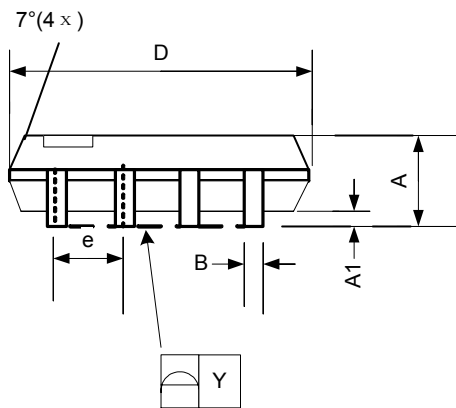
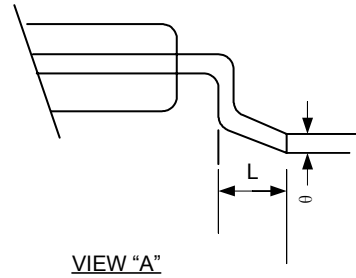
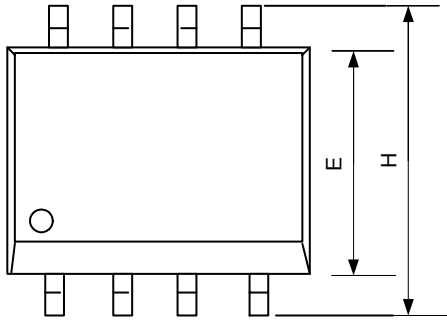


■ Marking Information





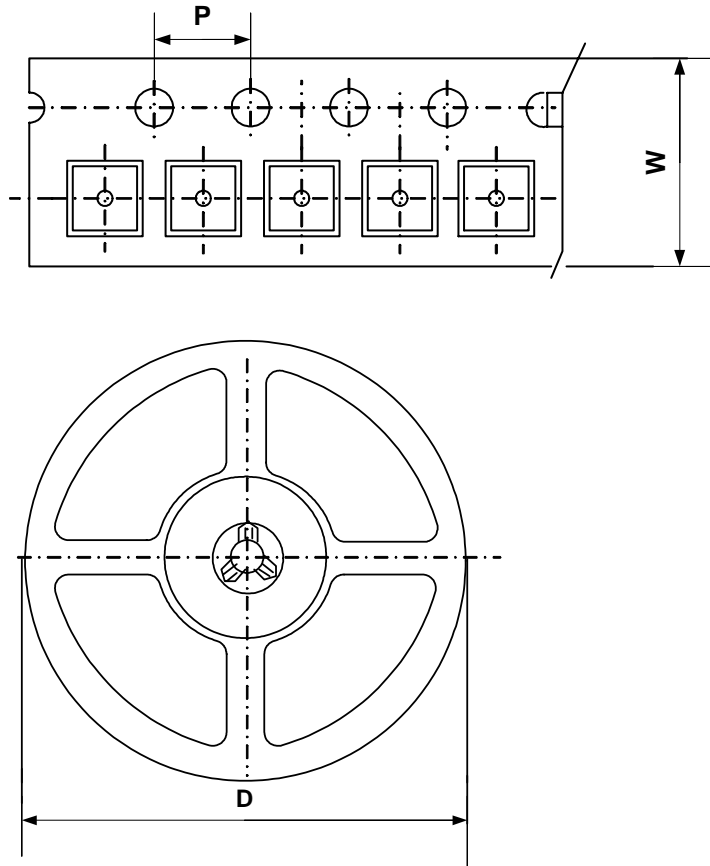
■ Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
B	0.33	0.51	0.013	0.020
C	0.19	0.25	0.007	0.010
D	4.80	4.98	0.189	0.196
E	3.81	3.99	0.150	0.157
e	1.27		0.050	
H	5.79	6.20	0.228	0.244
L	0.41	1.27	0.016	0.050
Y		0.10		0.004
θ	0°	8°	0°	8°



■ Packing information



Package Type	Carrier Width (W)	Pitch (P)	Reel Size(D)	Packing Minimum
SOP8	12.0± 0.3 mm	4.0±0.1 mm	330±1 mm	2500 pcs

Note: Carrier Tape Dimension, Reel Size and Packing Minimum