



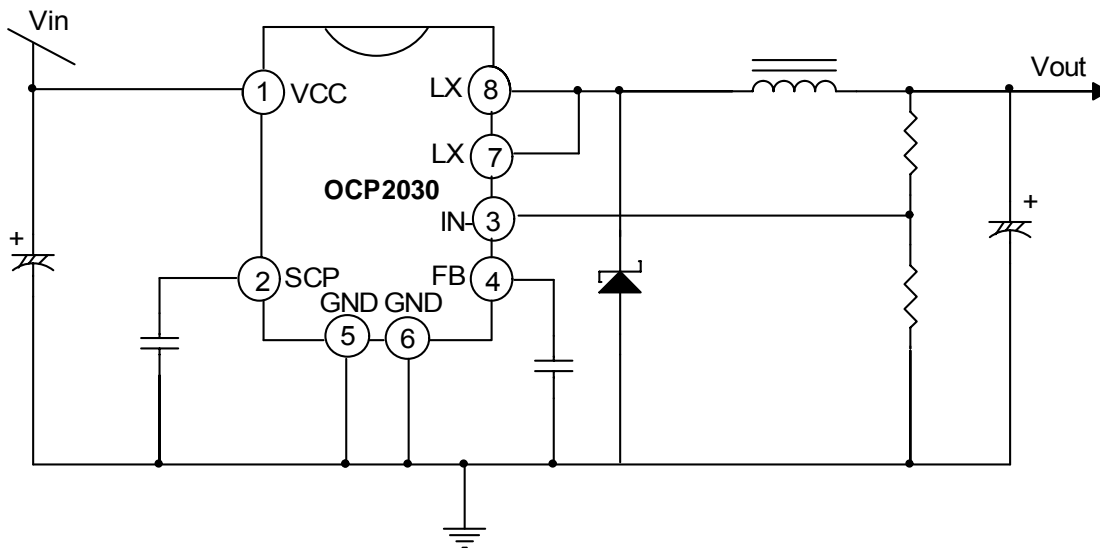
### ■ General Description

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

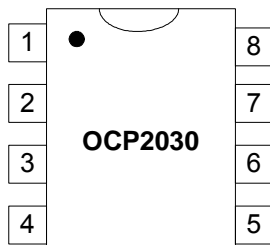
- Precision feedback reference voltage: 0.5V (2%)
- Wide supply voltage operating range: 3.0 to 20V
- Low current consumption: 5.5mA
- Internal fixed oscillator frequency: Typ. 500KHz
- Programmable Soft-Start function (SS)
- Short Circuit Shutdown and Auto Re-start function(ARSCP)
- Built-in P-MOSFET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

### ■ Typical Application Circuit

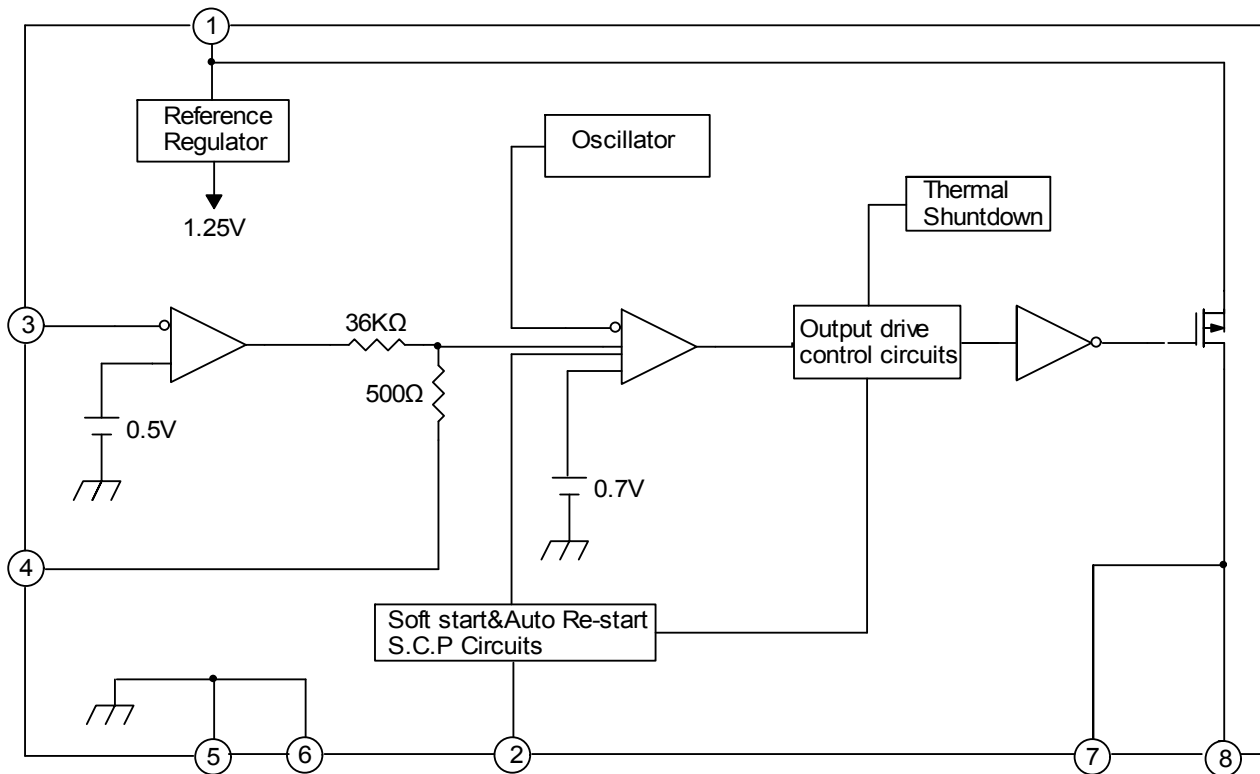


### ■ Pin Configuration

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	$\Delta V_{REF}$	$V_{CC}=3.0V$ 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	$\mu A$
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	$\mu A$
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	$\mu A$
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	$\mu A$
Output sink current	$I_{SINK}$		30	45	-	$\mu A$

### 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 $\Omega$
		$V_{CC}=10V, V_{IN-}=0V$		42	65	
Output leakage current	$I_L$	SCP active		5	-	$\mu A$

### Total device

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



■ Typical Characteristics

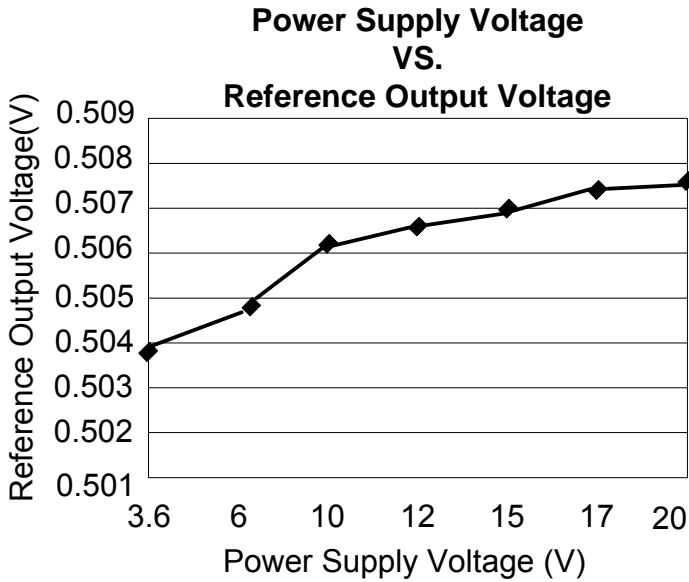


Figure 1

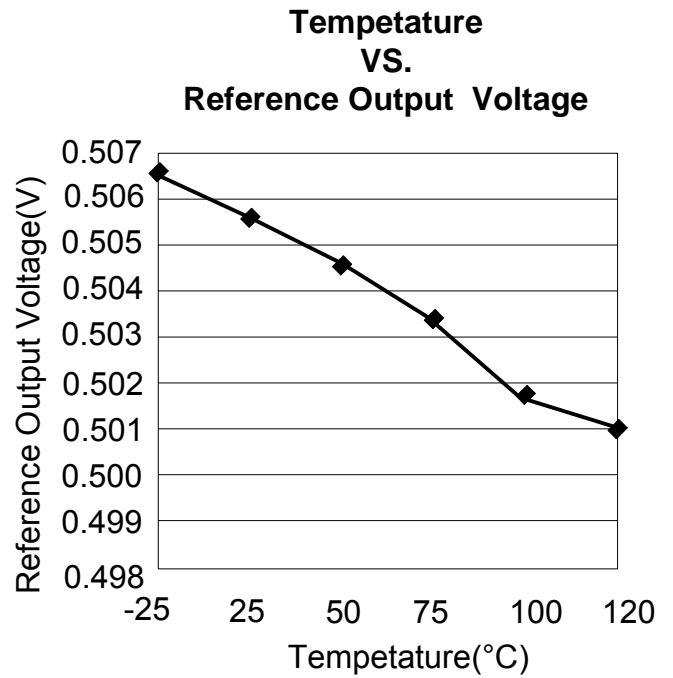


Figure 2

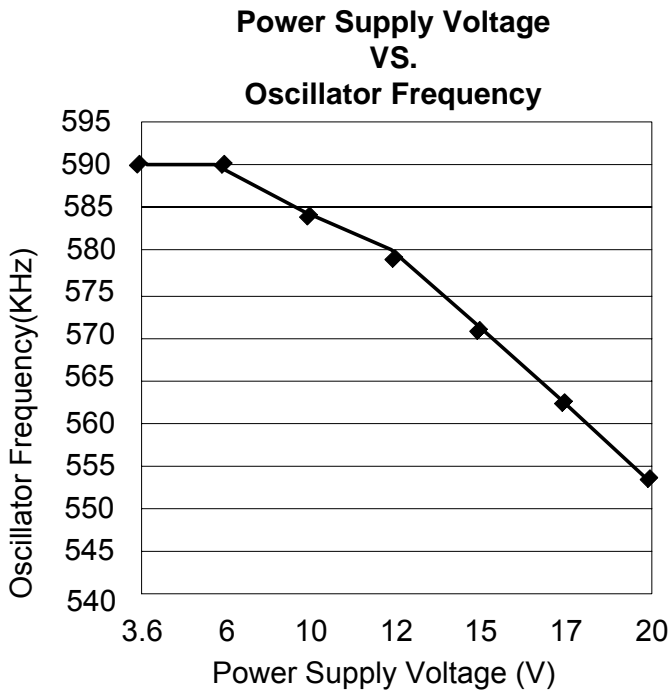


Figure 3

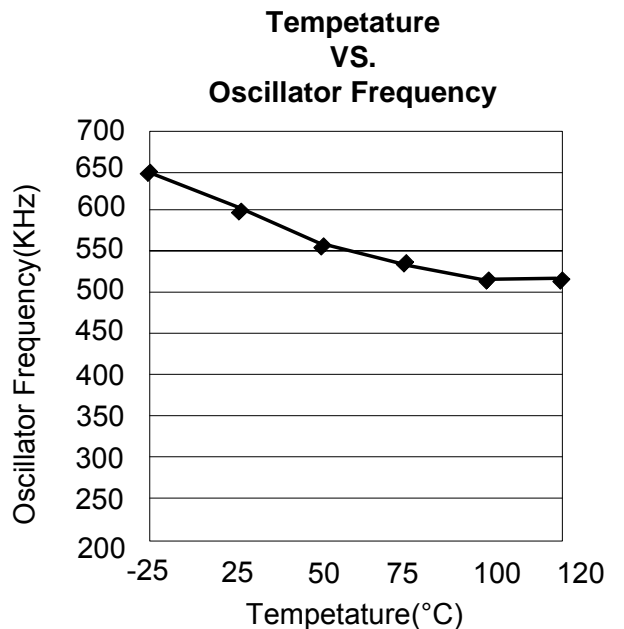


Figure 4



■ Typical Characteristics(Continues)

Output Current  
VS.  
Efficiency

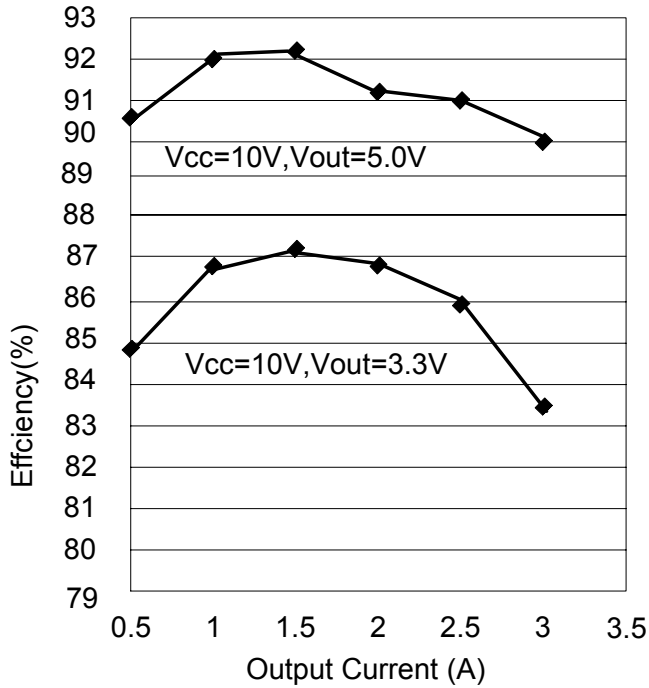


Figure 5

Output Load Regulation

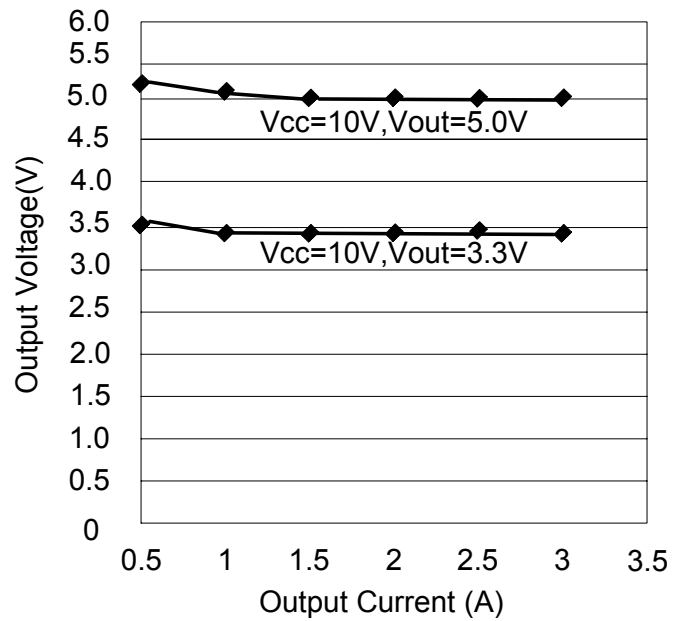


Figure 6

■ Timing Waveform

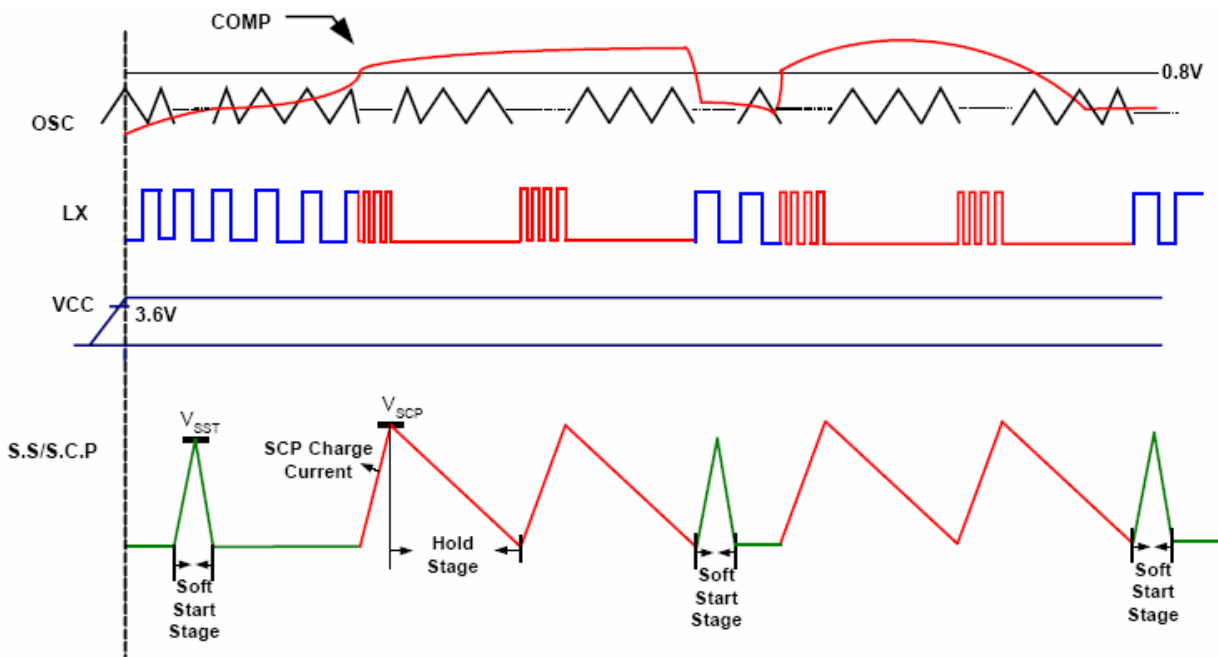
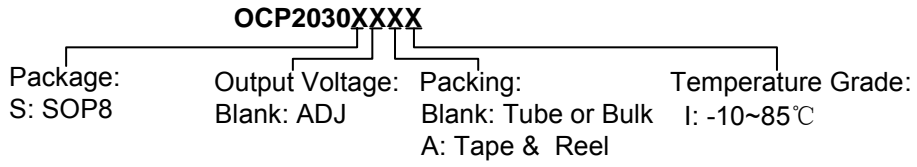


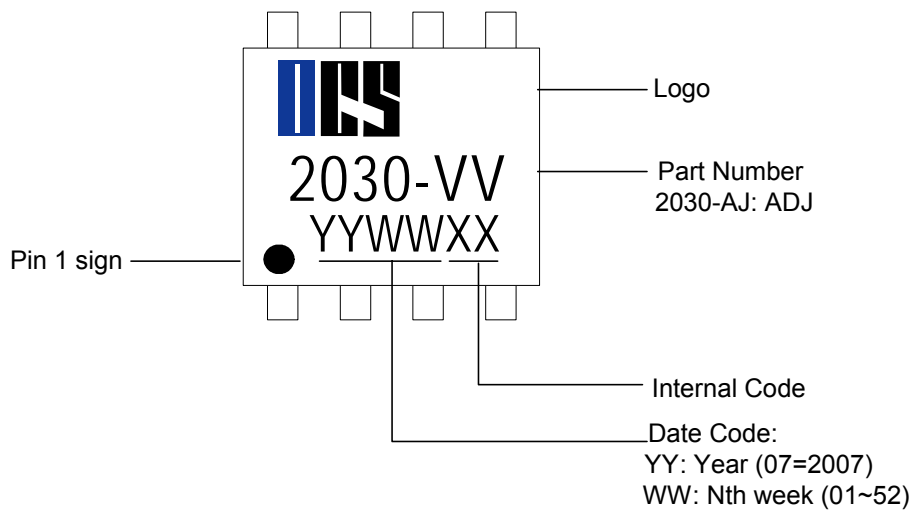
Figure 7 PWM Timing Diagram



■ Ordering Information

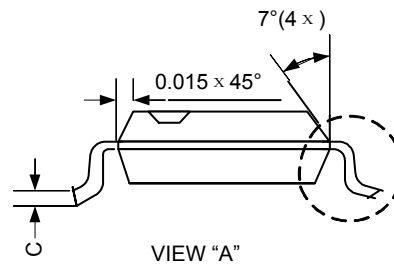
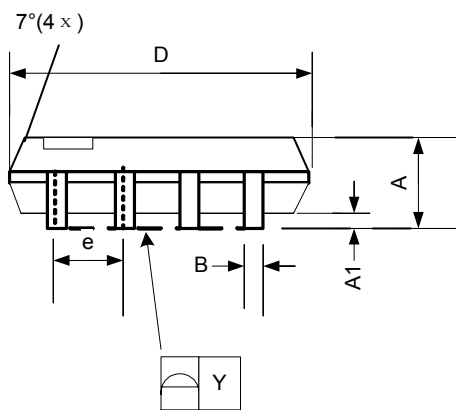
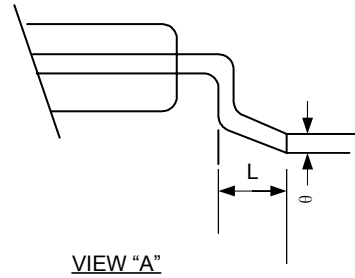
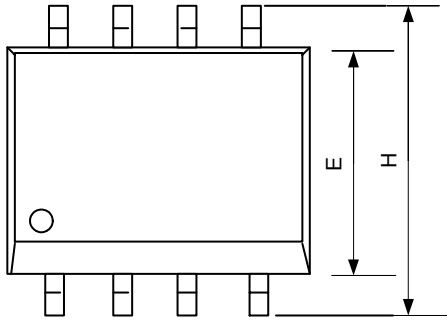


■ Marking Information





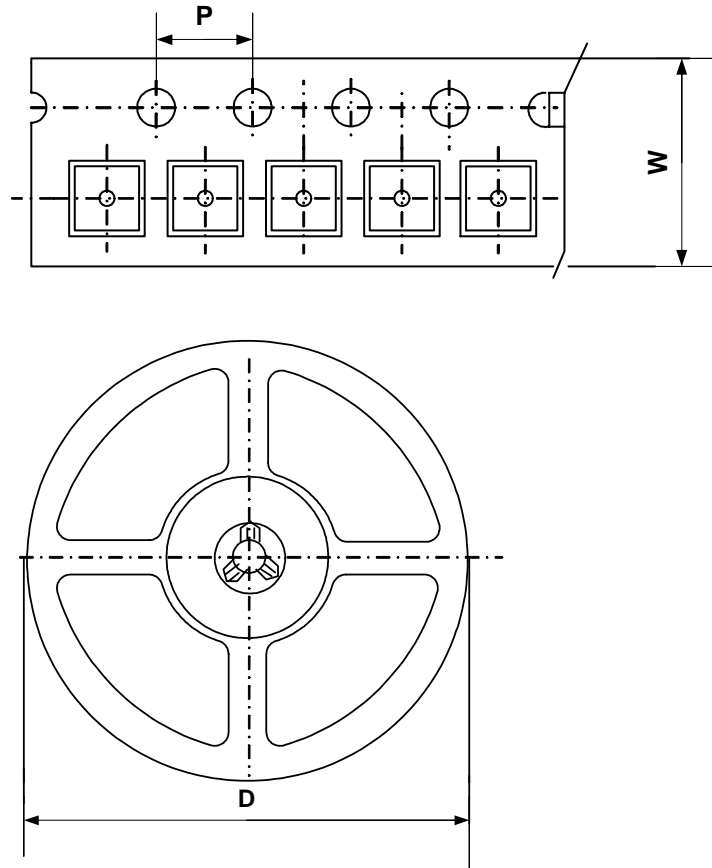
■ Package Information



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