SKI34063B

DC-DC Conversion Control Circuit

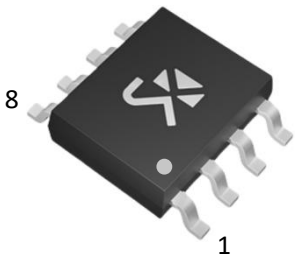
Description

SKI34063B is a monolithic DC-DC conversion integrated circuit, incorporating a temperature compensated reference voltage source (1.25V), a comparator, an oscillator capable of effectively limiting current and controlling duty cycle, a driver, and a high-current output switch. With a few external components, it can form boost, buck, and voltage-inverting converters. SKI34063B is available in SOP-8 and DIP-8 packages.

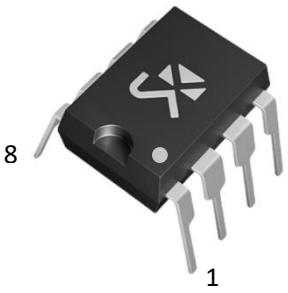
Features

- Wide operating voltage range: 3V~36V
- Low quiescent current
- Output current limiting and protection functions
- Maximum output switch current up to 1.2A
- Adjustable output voltage
- Operating frequency up to 100kHz
- Internal reference voltage accuracy of 2%

Package Outline Drawing



SOP-8

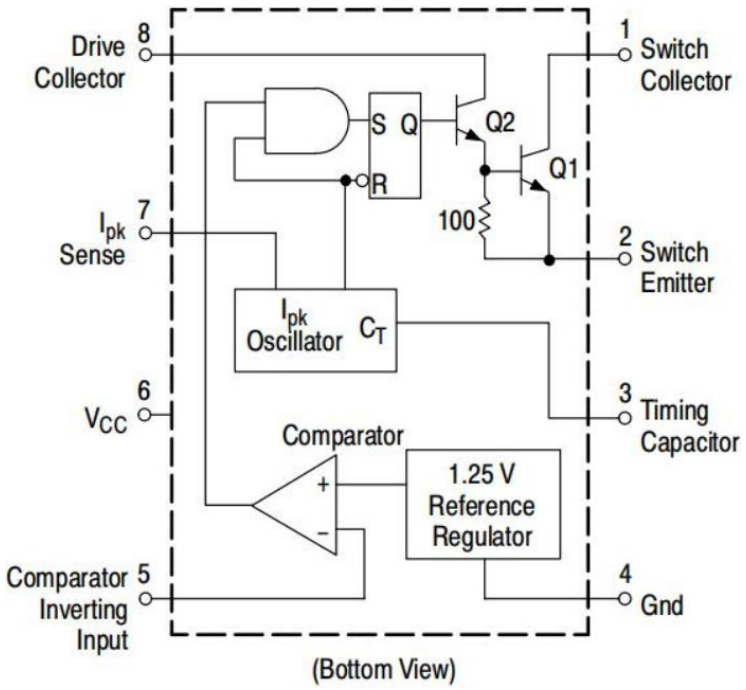


DIP-8

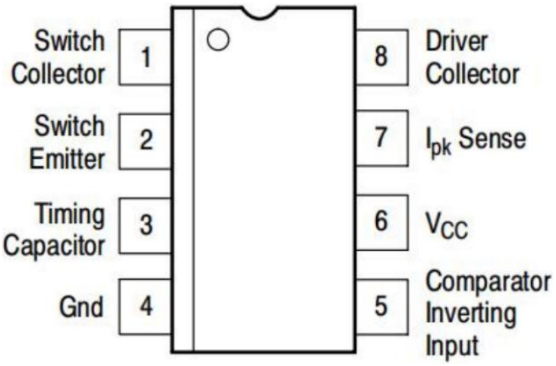
Ordering Information

Type	Marking	Package
SKI34063B-D8	3525	DIP-8
SKI34063B-P8	3525	SOP-8

Function Block Diagram



Pin Description

Pin Number	Pin Name	I/O	Description	Pin Configuration Diagram
1	SC	I	Switch Collector	
2	SE	O	Switch Emitter	
3	CT	I	Timing Capacitor	
4	GND	P	Ground	
5	FB	I	Comparator Inverting Input	
6	V_{CC}	P	Power Supply	
7	I_{PK}	P	Sense	
8	DC	I	Driver Collector	

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Supply Voltage	V_{CC}	36	V
Comparator Input Voltage Range	V_{IR}	-0.3~36	V
Output Transistor Collector Voltage	V_C(switch)	36	V
Output Transistor Emitter Voltage(Vpin1=32V)	Ve(switch)	36	V
Output Transistor Collector-Emitter Voltage	Vce(switch)	36	V
Driver Transistor Collector Voltage	V_C(driver)	36	V
Driver Transistor Collector Current	I_C(Driver)	100	mA
Output Current	I_{SW}	1.2	A
Junction Temperature	T_J	150	℃
Operating Temperature	T_A	-20~+85	℃
Storage Temperature	T_S	-65~+150	℃
Lead Temperature	T_W	260	℃

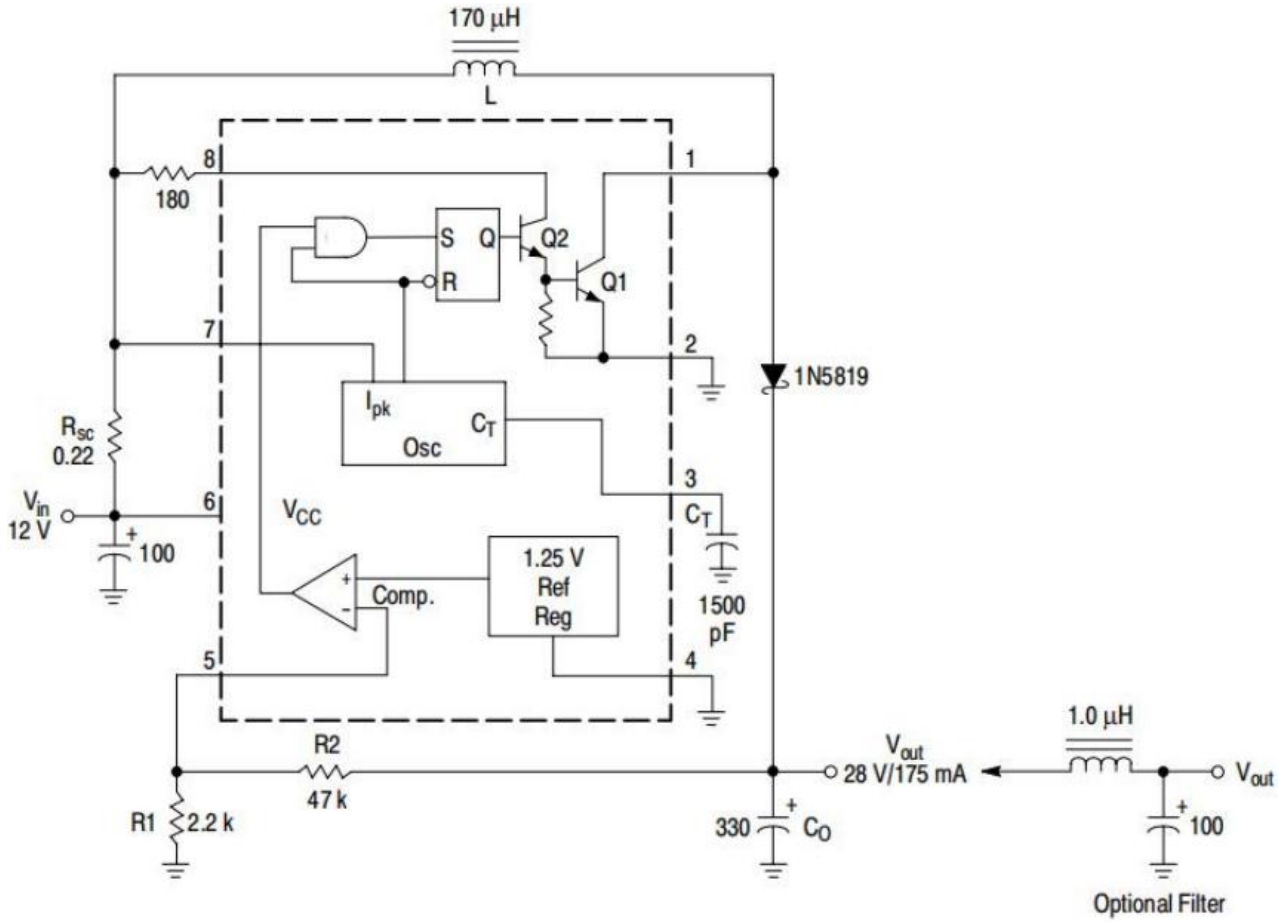
Note: Exceeding the above limit values may cause permanent damage to the chip.

Electrical Characteristics(T_A=25°C, V_{CC}=5V unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Oscillator Section						
Oscillator Frequency	F_{OSC}	V_{PIN5}=0V,C_T=1μF	24	33	42	KHz
Charging Current	I_{CHG}	V_{CC}=5V~32V	24	33	42	μA
Discharging Current	I_{DISCHG}	V_{CC}=5V~32V	140	200	260	μA
Discharging to Charging Current Ratio	I_{DISCHG}/ I_{CHG}	V_{PIN7}=V_{CC}	5.2	6.2	7.5	
Current Limiter Voltage Sensitivity	V_{IPK}	I_{CHG}=I_{DISCHG}	250	300	350	mV
Output Section						
Saturation Voltage Drop	$V_{CE(sat)}$	I_{SW}=1A,PIN1 and 8 connected		1.0	1.3	V
Saturation Voltage Drop	$V_{CE(sat)}$	I_{SW}=1A,R_{PIN8}=82Ω to V_{CC}		0.45	0.7	V
DC Current Gain	hFE	I_{SW}=1A,V_{CE}=5V	50	120		
Collector Leakage Current	$I_{C(off)}$	V_{CE}=30V		0.01	100	μA
Comparator Section						
Threshold Voltage	V_{TH}	T_A=25°C	1.23	1.25	1.27	V
		T_A=-20~+85°C	1.21		1.29	
Input Bias Current	I_{IB}	V_{IN}=0V		-40	-400	nA
Threshold Voltage Line Regulation	Regline	V_{CC}=3~30V		1.4	5.0	mV
Overall Section						
Supply Current	I_{CC}	V_{CC}=5V~30V,C_T=1.0nF, V_{PIN7}=VCC,V_{PIN5}>VTH, V_{PIN2}=GND,others floating		2.5	4.0	mA

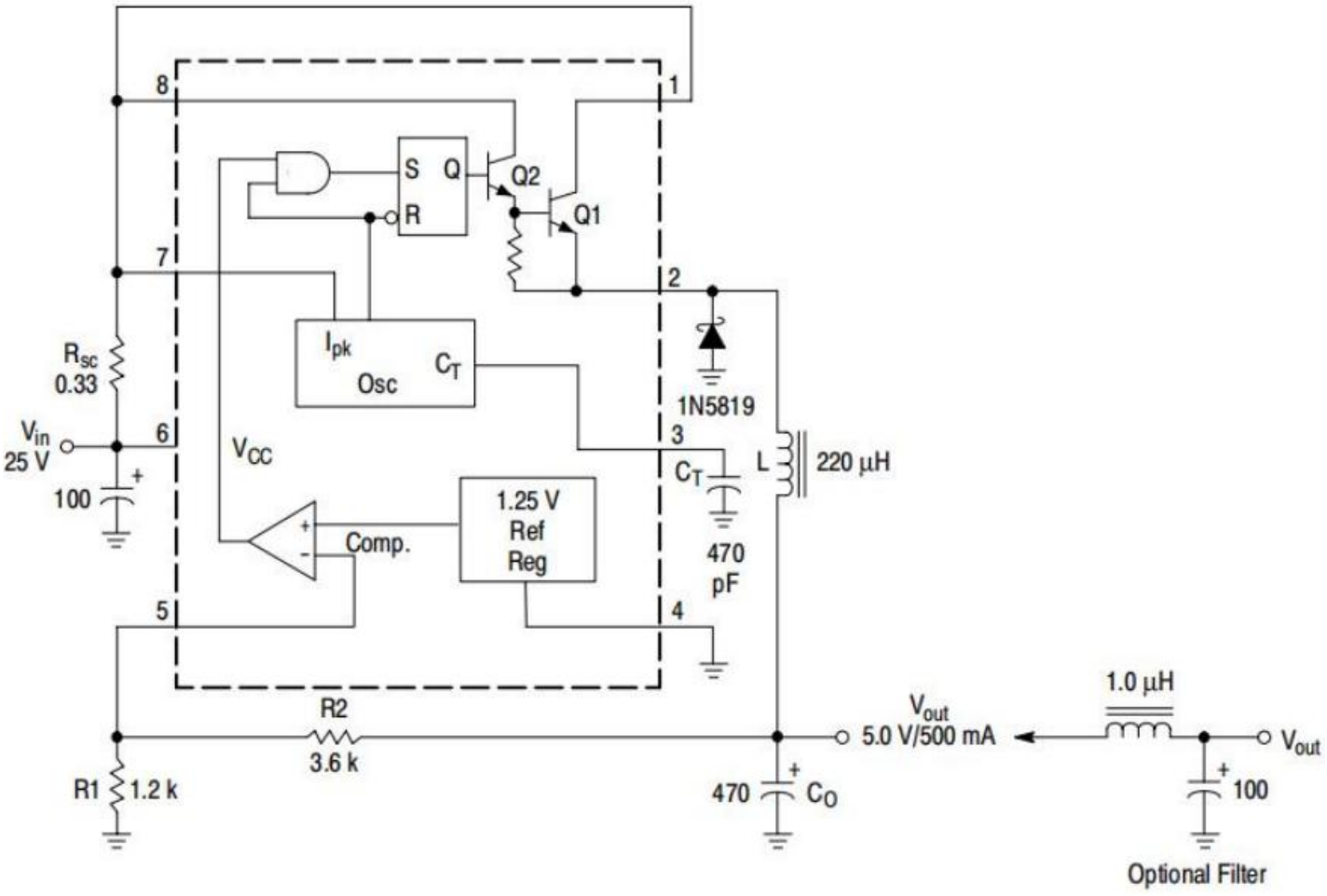
Application Circuits

1.Boost Converter



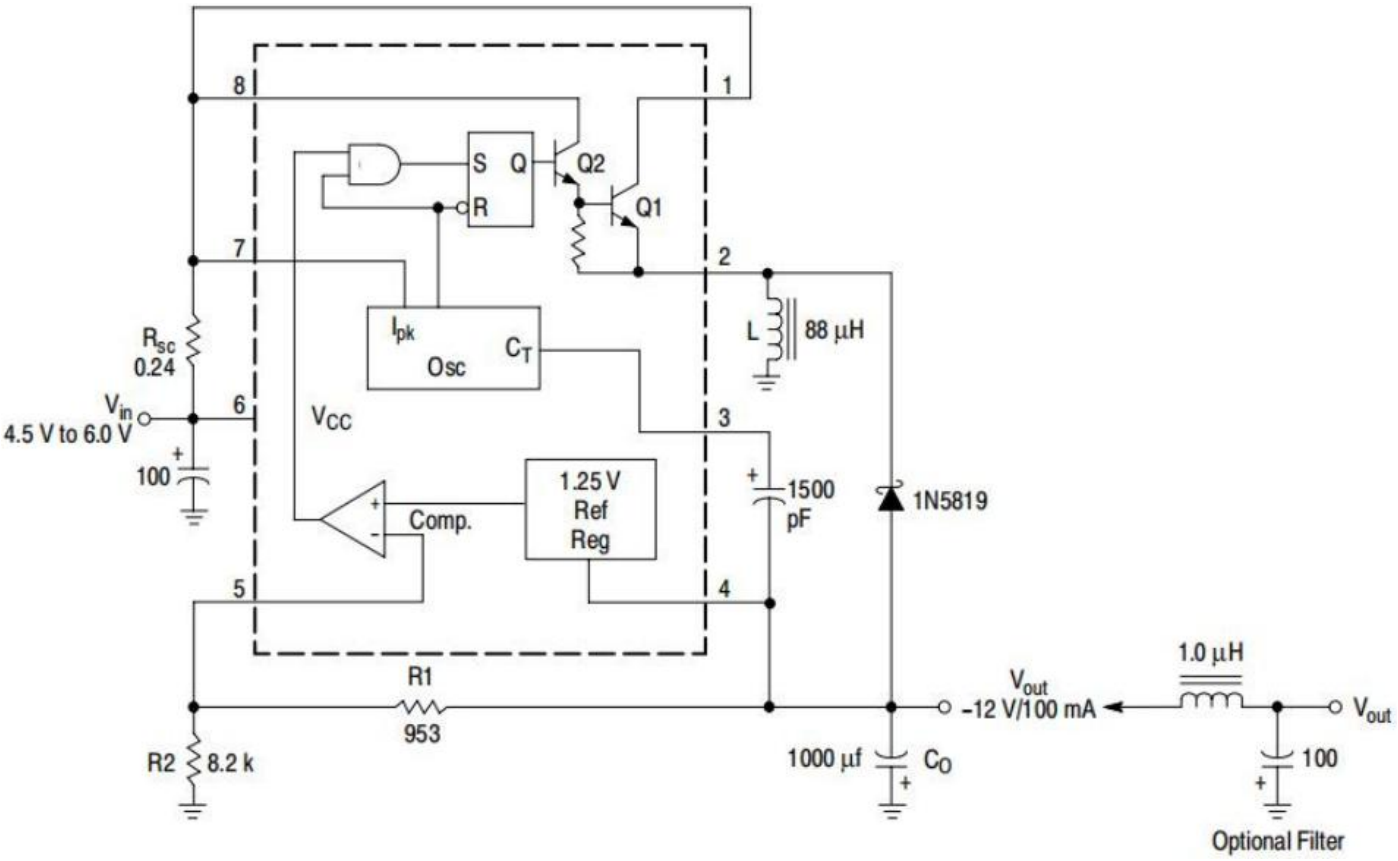
Test Item	Test Conditions	Result
Line Regulation	V_{IN}=8.0~16V,I_O=175mA	30mV = ± 0.05%
Load Regulation	V_{IN}=12V,I_O=75~175mA	10mV = + 0.017%
Output Ripple	V_{IN}=12V,I_O=175mA	400m Vpp
Efficiency	V_{IN}=12V,I_O=175mA	87.7%
Output Ripple(With External Filter)	V_{IN}=12V,I_O=175mA	40m Vpp

2.Buck Converter



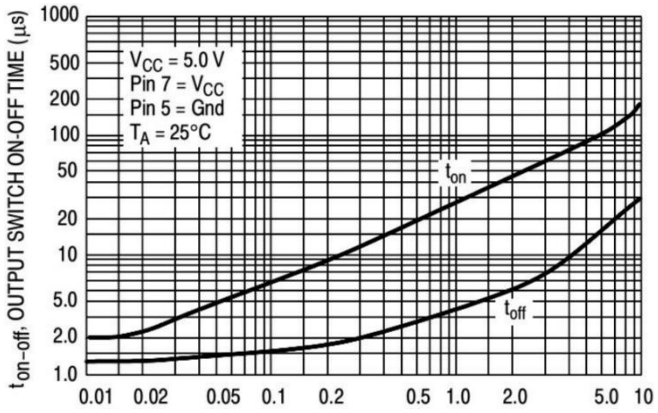
Test Item	Test Conditions	Result
Line Regulation	V_{IN}=15~25V,I_O=500mA	12mV = ± 0.12%
Load Regulation	V_{IN}=25V,I_O=50~500mA	3.0mV = + 0.03%
Output Ripple	V_{IN}=25V,I_O=500mA	120m Vpp
Short-Circuit Current	V_{IN}=25V,R_L=0.1Ω	1.1A
Efficiency	V_{IN}=25V,I_O=500mA	83.7%
Output Ripple(With External Filter)	V_{IN}=25V,I_O=500mA	40m Vpp

3.Voltage-Inverting Converter

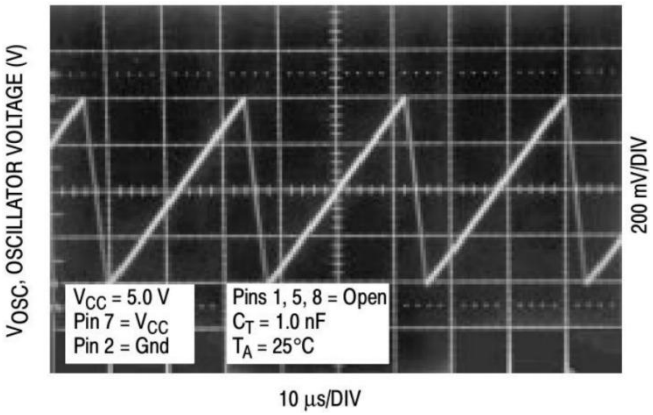


Test Item	Test Conditions	Result
Line Regulation	V_{IN}=4.5~6.0V,I_O=100mA	3.0mV = ± 0.012%
Load Regulation	V_{IN}=5.0V,I_O=10~100mA	0.022V = + 0.09%
Output Ripple	V_{IN}=5.0V,I_O=100mA	500m Vpp
Short-Circuit Current	V_{IN}=5.0V,R_L=0.1Ω	910mA
Efficiency	V_{IN}=5.0V,I_O=100mA	62.2%
Output Ripple(With External Filter)	V_{IN}=5.0V,I_O=100mA	70m Vpp

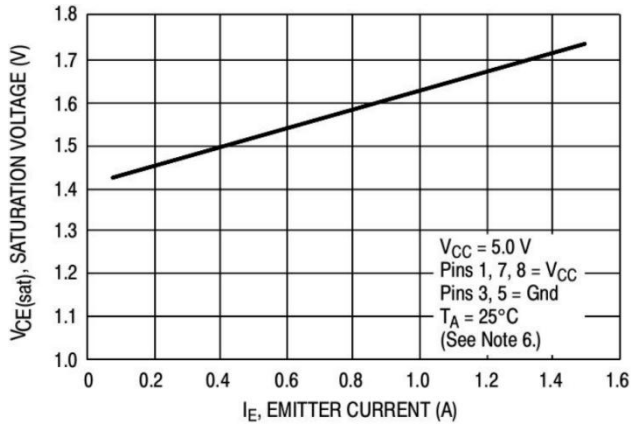
Typical Characteristics



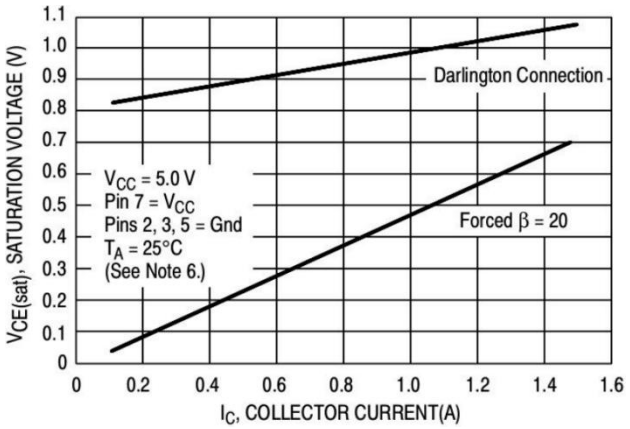
Oscillator Timing Capacitor Switching Characteristic Curve



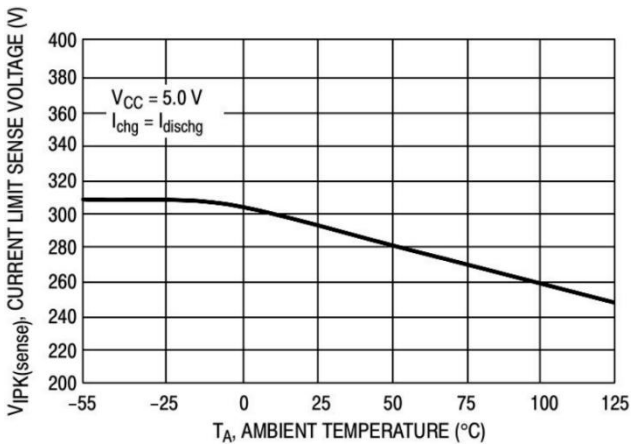
Oscillator Timing Capacitor Waveform



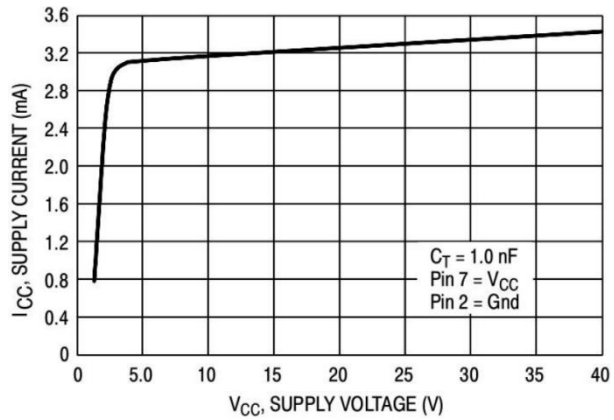
Emitter Output Saturation Voltage Drop vs. Emitter Current Characteristic Curve



Common-Emitter Switch Output Saturation Voltage Drop vs. Collector Current Characteristic Curve



Current Limiter Voltage Sensitivity vs. Temperature Characteristic Curve

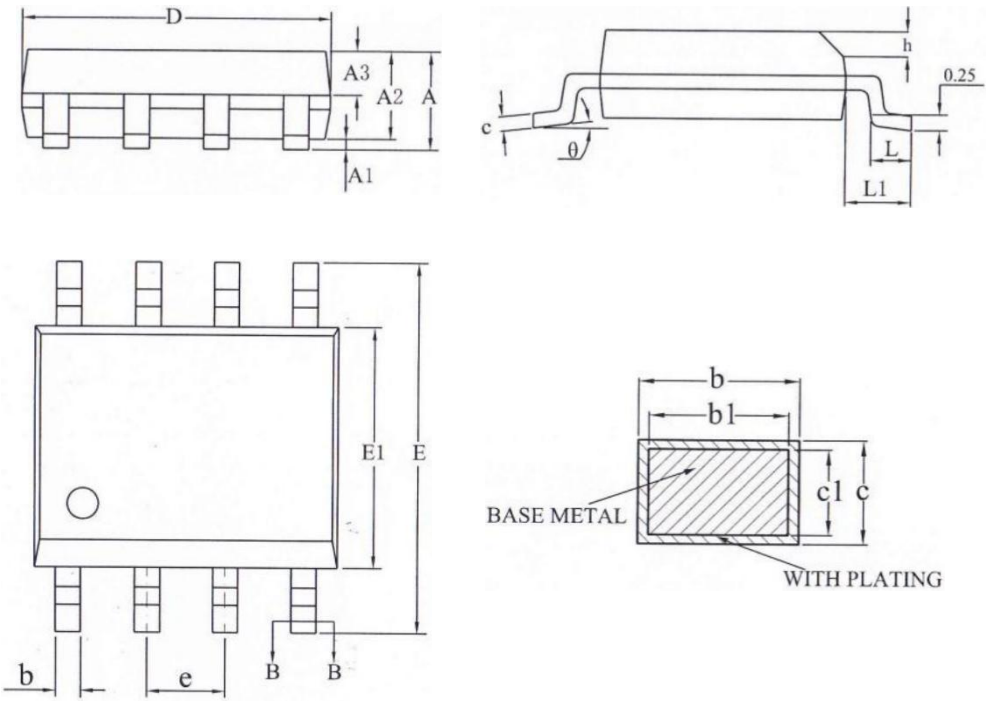


Quiescent Current vs. Operating Voltage Characteristic Curve

Package Information

SOP-8

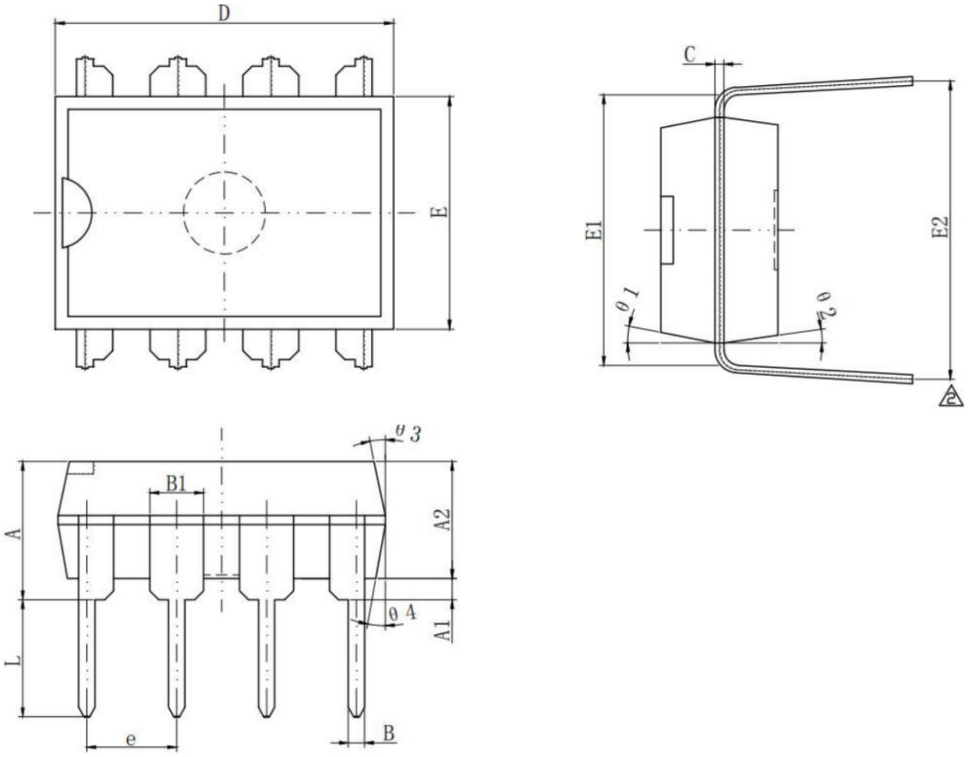
Dimensions in mm



Symbol	Dimensions In Millimeters			Symbol	Dimensions In Millimeters		
	Min	Nom	Max		Min	Nom	Max
A	-	-	1.75	D	4.80	4.90	5.00
A1	0.10	-	0.225	E	5.80	6.00	6.20
A2	1.30	1.40	1.50	E1	3.80	3.90	4.00
A3	0.60	0.65	0.70	e	1.27 BSC		
b	0.39	-	0.47	h	0.25	-	0.50
b1	0.38	0.41	0.44	L	0.50	-	0.80
c	0.20	-	0.24	L1	1.05 REF		
c1	0.19	0.20	0.21	θ	0°	-	8°

DIP-8

Dimensions in mm



Symbol	Dimensions In Millimeters			Symbol	Dimensions In Millimeters		
	Min	Nom	Max		Min	Nom	Max
A	3.75	3.90	4.15	E1	7.35	7.62	7.85
A1	0.60	-	-	E2	8.00	8.40	8.80
A2	3.15	3.30	3.40	e	2.54 BSC		
B	0.38	0.46	0.56	L	3.00	3.30	3.60
B1	1.52 BSC			θ1	10°	-	14°
C	0.20	0.25	0.34	θ2	8°	-	12°
D	9.00	9.25	9.40	θ3	10°	-	14°
E	6.20	6.35	6.50	θ4	8°	-	12°

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