

## Self-oscillating Half-bridge Driver

### Features

- Floating channel designed for bootstrap operation to +600V
- Noise immunity of transient voltage
- Under-voltage lockout
- Programmable oscillator frequency
- Matched propagation delay for both channels
- Ultra low startup current of 75uA
- Shutdown function turns off both channels
- Low side output in phase with  $R_T$

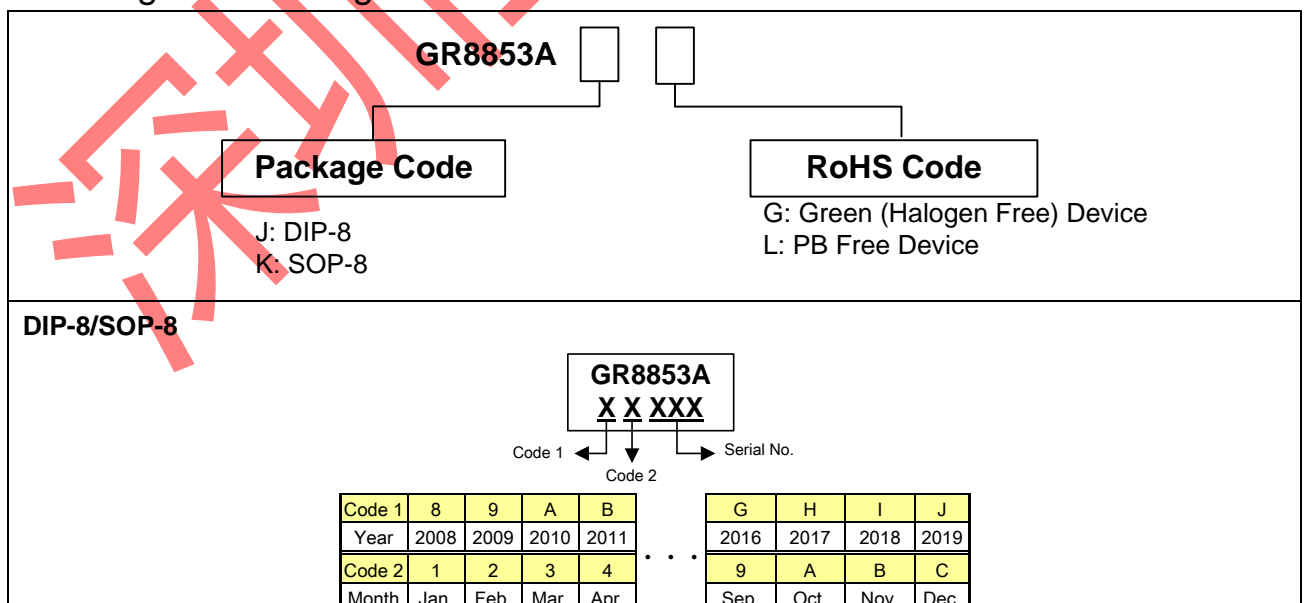
### Applications

- HID lamp ballast
- PDP sustain driver
- Motor driver
- SMPS

### Description

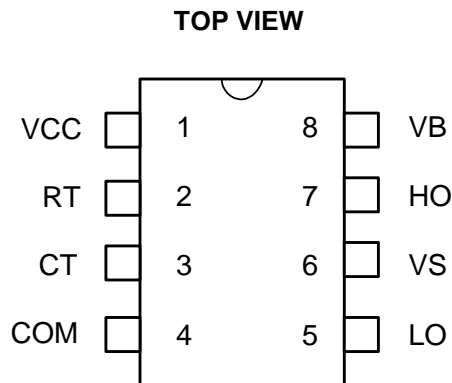
GR8853A is a high voltage, high speed, self-oscillating power MOSFET and IGBT driver with both high and low side referenced output channels. Proprietary HVIC and latch immune CMOS technologies enable ruggedized monolithic construction. The front end features a programmable oscillator which is similar to the 555 timer. The output drivers feature a high pulse current buffer stage and an internal dead time designed for minimum driver cross-conduction. Propagation delays for the two channels are matched to simplify use in 50% duty cycle applications. The floating channel can be used to drive an N-MOSFET or IGBT in the high side configuration that operates off a high voltage rail up to 600 volts.

### Ordering and Marking Information



Greenergy OPTO Inc. reserves the right to make changes to improve reliability or manufacture ability without notice, and advise customers to obtain the latest version of relevant information to verify before placing orders.

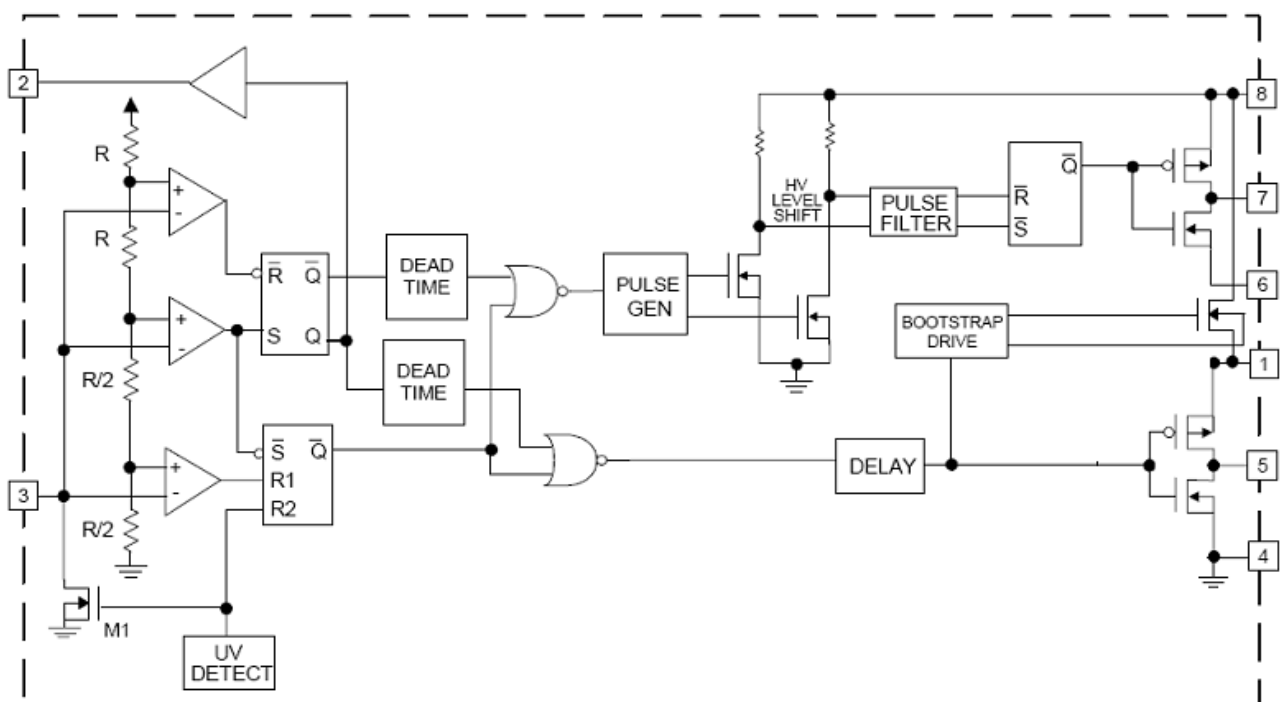
## Pin Configuration



## Pin Description

Pin No.	Name	Function
1	VCC	Low side and logic fixed supply
2	RT	Oscillator timing resistor input, in phase with HO for normal IC operation
3	CT	Oscillator timing capacitor input, the oscillator frequency according to the following equation: $f = 0.7213 / (RT \times CT)$
4	COM	Low side return
5	LO	Low side gate drive output
6	VS	High side floating supply return
7	HO	High side gate drive output
8	VB	High side floating supply

## Block Diagram



## Absolute Maximum Ratings

Supply voltage VCC	-----	19V		
VB	-----	- 0.3V ~ 625V		
VS	-----	VB-25V ~ VB+0.3V		
HO	-----	VS-0.3V ~ VB+0.3V		
LO, RT, CT	-----	- 0.3V ~ VCC+0.3V		
Junction temperature	-----	150°C		
Operating ambient temperature	-----	- 20°C ~ 85°C		
Storage temperature range	-----	- 65°C ~ 150°C		
SOP-8 package thermal resistance	-----	160°C/W		
DIP-8 package thermal resistance	-----	100°C/W		
Power dissipation (SOP-8, at ambient temperature = 85°C)	-----	400mW		
Power dissipation (DIP-8, at ambient temperature = 85°C)	-----	-----		
6	5	0	m	W
Lead temperature (All Pb free packages, soldering, 10sec)	-----	260°C		
ESD voltage protection, human body model	-----	3KV		
ESD voltage protection, machine model	-----	200V		

## Recommended Operating Conditions

Item	Min.	Max.	Unit
Supply voltage VCC	10	18	V
Supply voltage VBS	VCC-0.7	18	V

## Electrical Characteristics

VBIAS (VCC, VBS) = 12V, CL = 1000 pF, CT = 1 nF and TA = 25°C unless otherwise specified. The VIN, VTH and IIN parameters are referenced to COM. The VO and IO parameters are referenced to COM and are applicable to the respective output leads: HO or LO.

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
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### Low Voltage Supply Characteristics

Rising VCC under-voltage lockout threshold		V <sub>CCUV+</sub>	8.1	9.0	9.9	V
Falling VCC under-voltage lockout threshold		V <sub>CCUV-</sub>	7.2	8.0	8.8	V
VCC under-voltage lockout Hysteresis		V <sub>CCUVH</sub>	0.5	1.0	1.5	V
Micropower startup VCC supply current	V <sub>CC</sub> ≤ V <sub>CCUV</sub>	I <sub>QCCUV</sub>	—	50	100	μA
Quiescent VCC supply current		I <sub>QCC</sub>	—	160	300	μA
VCC operating voltage		V <sub>op</sub>	10	12	18	V

### Floating Supply Characteristics

Micropower startup VBS supply current	V <sub>CC</sub> ≤ V <sub>CCUV</sub>	I <sub>QBSUV</sub>	—	0	10	μA
Quiescent VBS supply current		I <sub>QBS</sub>	—	30	50	μA
Offset supply leakage current	V <sub>B</sub> =V <sub>S</sub> =600V	I <sub>LK</sub>	—	—	50	μA

### Oscillator I/O Characteristics

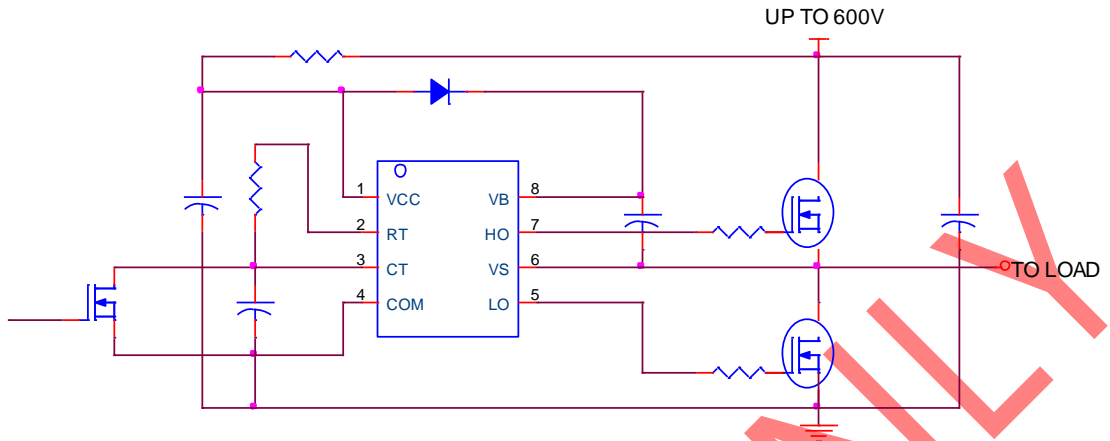
Oscillator frequency (CT=1008pF)	RT = 14.71k	f <sub>osc</sub>	47.2	48.2	49.2	kHz
RT pin duty cycle	f <sub>osc</sub> < 100kHz	d	48	50	52	%
CT pin current		I <sub>CT</sub>	—	0.001	1.0	μA
UV-mode CT pin pulldown current	V <sub>CC</sub> = 7V	I <sub>CTUV</sub>	0.25	0.30	0.5	mA
Upper CT ramp voltage threshold		V <sub>CT+</sub>	—	8.0	—	V
Lower CT ramp voltage threshold		V <sub>CT-</sub>	—	4.0	—	V
CT voltage shutdown threshold		V <sub>CTSD</sub>	3.8	4.1	4.2	V
High-level RT output voltage, VCC - VRT	I <sub>RT</sub> = 100μA	V <sub>RT+</sub>	—	10	50	mV
	I <sub>RT</sub> = 1mA		—	100	300	mV
Low-level RT output voltage	I <sub>RT</sub> = 100μA	V <sub>RT-</sub>	—	10	50	mV
	I <sub>RT</sub> = 1mA		—	100	300	mV
UV-mode RT output voltage	V <sub>CC</sub> ≤ V <sub>CCUV</sub>	V <sub>RTUV</sub>	—	0	100	mV
SD-Mode RT output voltage, VCC - VRT	I <sub>RT</sub> = 100μA	V <sub>RTSD</sub>	—	10	50	mV
	V <sub>CT</sub> = 0V		—	10	50	mV
	I <sub>RT</sub> = 1mA		—	100	300	mV
	V <sub>CT</sub> = 0V		—	100	300	mV

### Gate Driver Output Characteristics

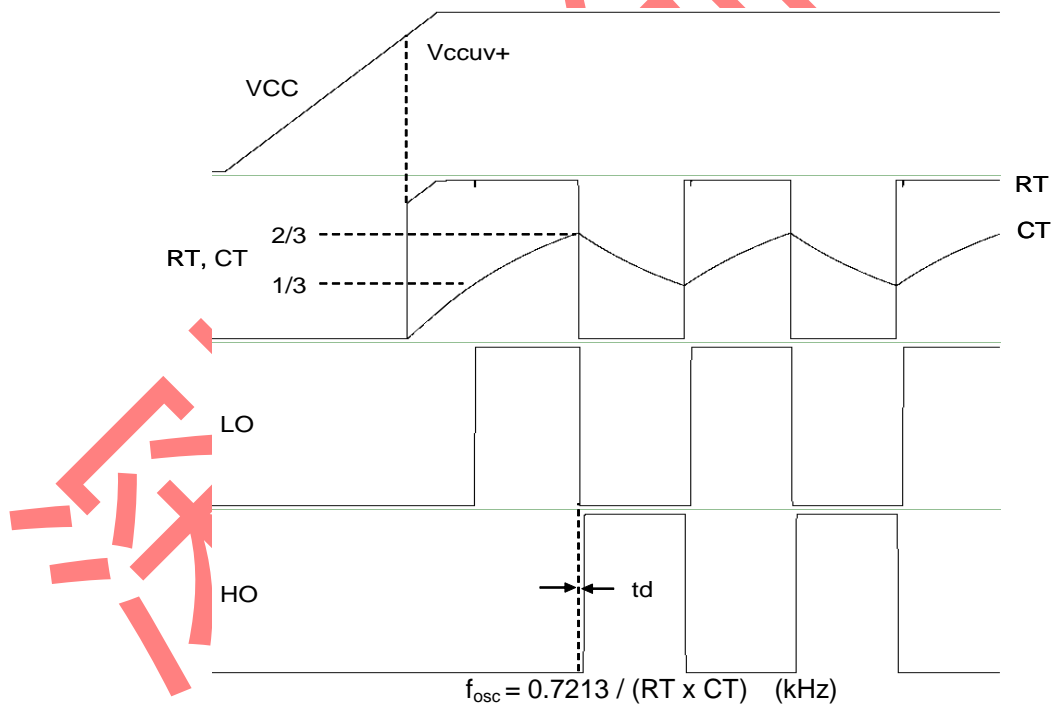
Output rise time (CL=1nF)	V <sub>CC</sub> ≤ V <sub>CCUV</sub>	tr	—	80	150	nsec
Output fall time (CL=1nF)		tf	—	30	100	nsec
Shutdown propagation delay		tsd	—	660	—	nsec

Output deadtime (HO or LO)		td	—	1.1	—	μs
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### Typical Application Circuit



### Input/Output Timing Diagram



## Typical Performance Characteristics

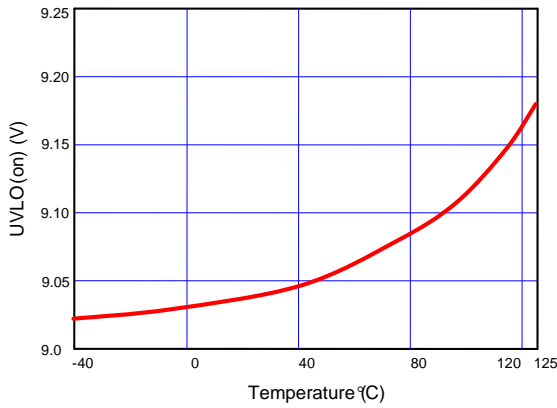


Fig. 1 UVLO(on) vs. Temperature

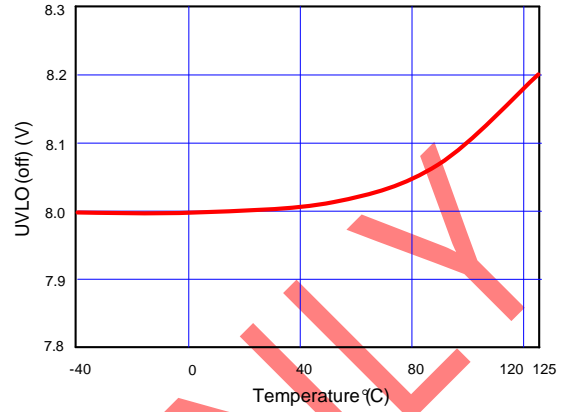


Fig. 2 UVLO(off) vs. Temperature

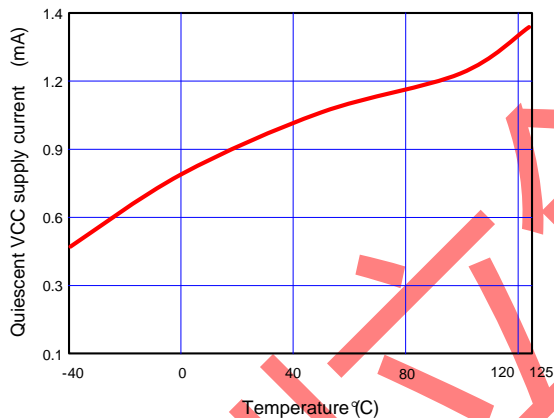


Fig. 3 Quiescent VCC supply current vs. Temperature

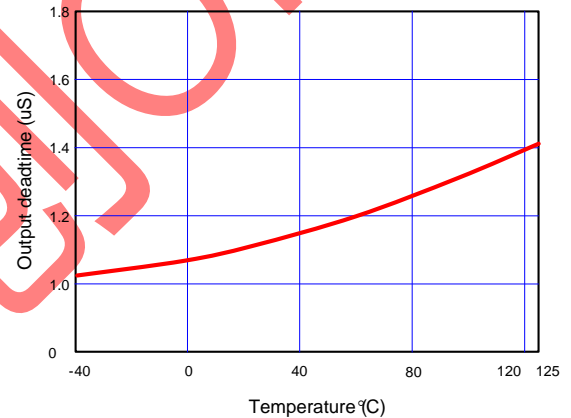


Fig. 4 Output deadtime vs. Temperature

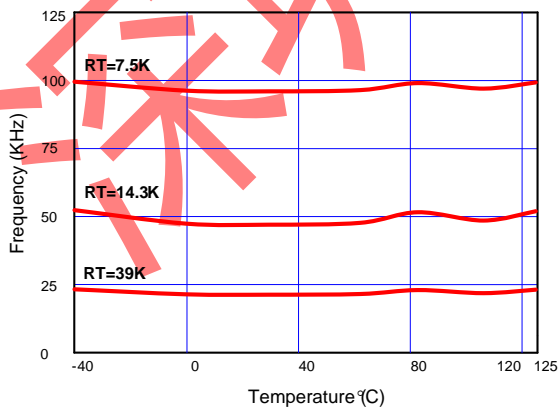
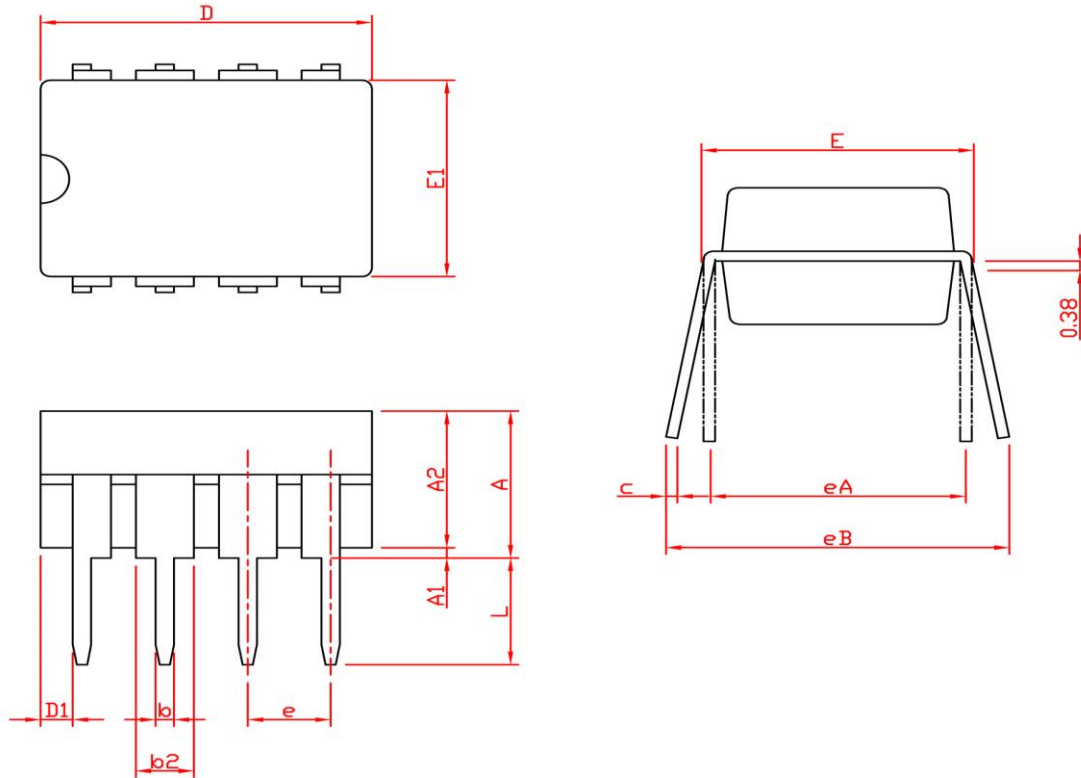


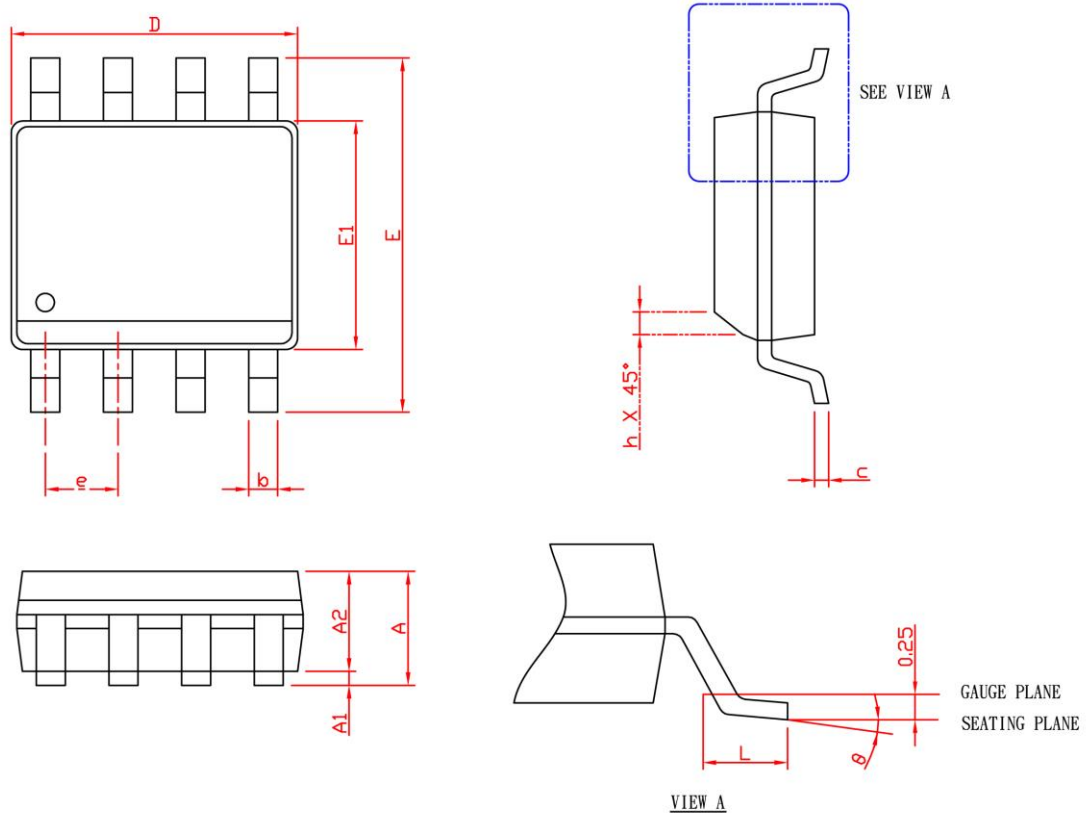
Fig. 5 Frequency vs. Temperature

**Package Information**


SYMBOL	DIP-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A		5.33		0.210
A1	0.38		0.015	
A2	2.92	4.95	0.115	0.195
b	0.36	0.56	0.014	0.022
b2	1.14	1.78	0.045	0.070
c	0.20	0.35	0.008	0.014
D	9.01	10.16	0.355	0.400
D1	0.13		0.005	
E	7.62	8.26	0.300	0.325
E1	6.10	7.11	0.240	0.280
e	2.54 BSC		0.100 BSC	
eA	7.62 BSC		0.300 BSC	
eB		10.92		0.430
L	2.92	3.81	0.115	0.150

Note: 1. Followed from JEDEC MS-001 BA.

2. Dimension D, D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 10 mil.

**Package Information**


SYMBOL	SOP-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A		1.75		0.069
A1	0.10	0.25	0.004	0.010
A2	1.25		0.049	
b	0.31	0.51	0.012	0.020
c	0.17	0.25	0.007	0.010
D	4.80	5.00	0.189	0.197
E	5.80	6.20	0.228	0.244
E1	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
h	0.25	0.50	0.010	0.020
L	0.40	1.27	0.016	0.050
θ	0°	8°	0°	8°

Note: 1. Followed from JEDEC MS-012 AA.

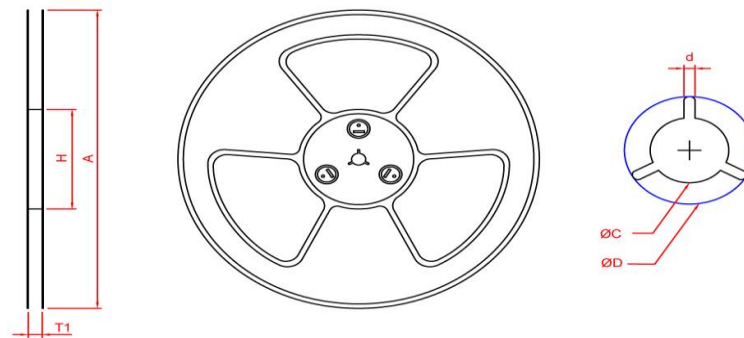
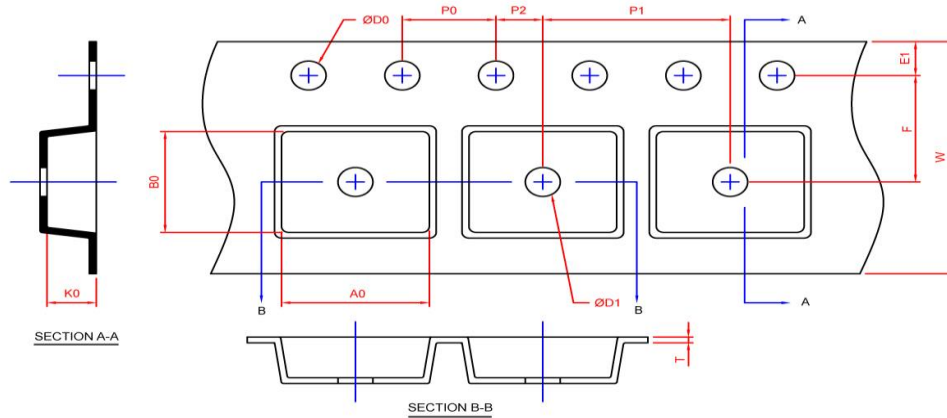
2. Dimension "D" does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 6 mil per side.

3. Dimension "E1" does not include inter-lead flash or protrusions. Inter-lead flash and protrusions shall not exceed 10 mil per side.



## Carrier Tape & Reel Dimensions

### SOP-8



Application	A	H	T1	C	d	D	W	E1	F
SOP-8	330.0±2.0	50 MIN.	12.4+2.00 -0.00	13.0+0.50 -0.20	1.5 MIN.	20.2 MIN.	12.0±0.30	1.75±0.10	5.5±0.05
	P0	P1	P2	D0	D1	T	A0	B0	K0
	4.0±0.10	8.0±0.10	2.0±0.05	1.5+0.10 -0.00	1.5 MIN.	0.6+0.00 -0.40	6.40±0.20	5.20±0.20	2.10±0.20

(mm)

### Devices Per Unit

Application	Carrier Width	Cover Tape Width	Devices Per Reel
SOP-8	12	-	2500

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