

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

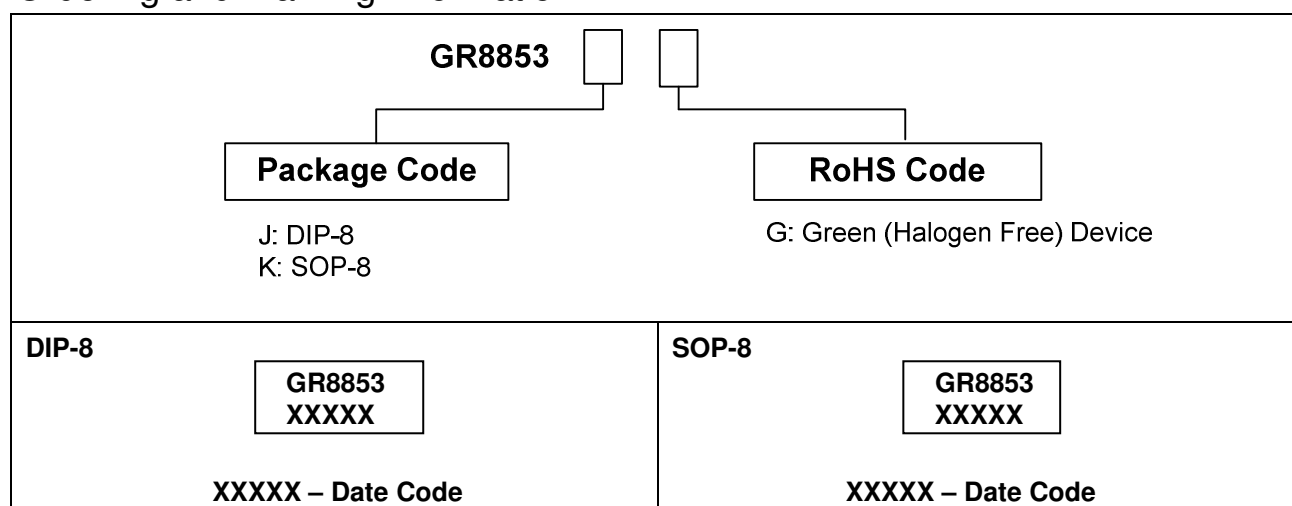
Applications

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

Description

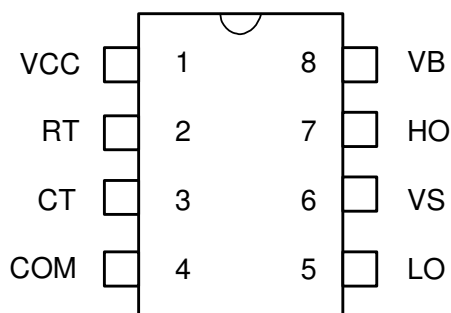
GR8853 is a high voltage, high speed, self-oscillating power MOSFET and IGBT driver with both high and low side referenced output channels. Proprietary HVIC and latch immune CMOS technologies enable ruggedized monolithic construction. The front end features a programmable oscillator which is similar 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

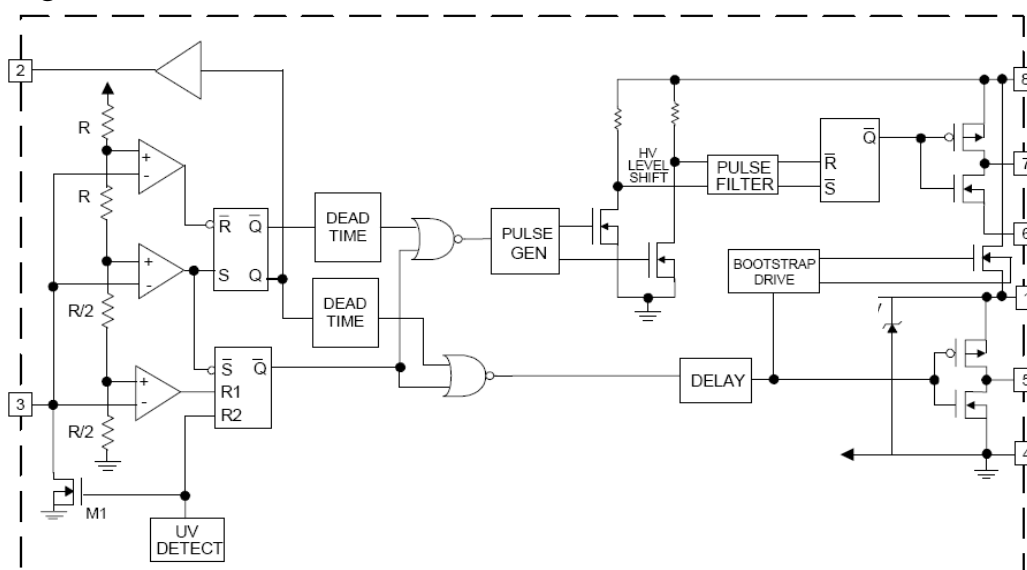


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TOP VIEW



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



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)	400 mW
Power Dissipation (DIP-8, at Ambient Temperature =85°C)	650mW
Lead Temperature (SOP-8 & DIP-8,Soldering, 10sec)	230°C
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 _{CCUV+}	8.1	9.0	9.9	V
Falling VCC under-voltage lockout threshold		V _{CCUV-}	7.2	8.0	8.8	V
VCC under-voltage lockout Hysteresis		V _{CCUVH}	0.5	1.0	1.5	V
Micropower startup VCC supply current	V _{CC} ≤ V _{CCUV}	I _{QCCUV}	—	50	100	μA
Quiescent VCC supply current		I _{QCC}	—	160	300	μA
VCC operating voltage		V _{op}	10	12	18	V

Floating Supply Characteristics

Micropower startup VBS supply current	V _{CC} ≤ V _{CCUV}	I _{QBSUV}	—	0	10	μA
Quiescent VBS supply current		I _{QBS}	—	30	50	μA
Offset supply leakage current	VB=VS=600V	I _{LK}	—	—	50	μA

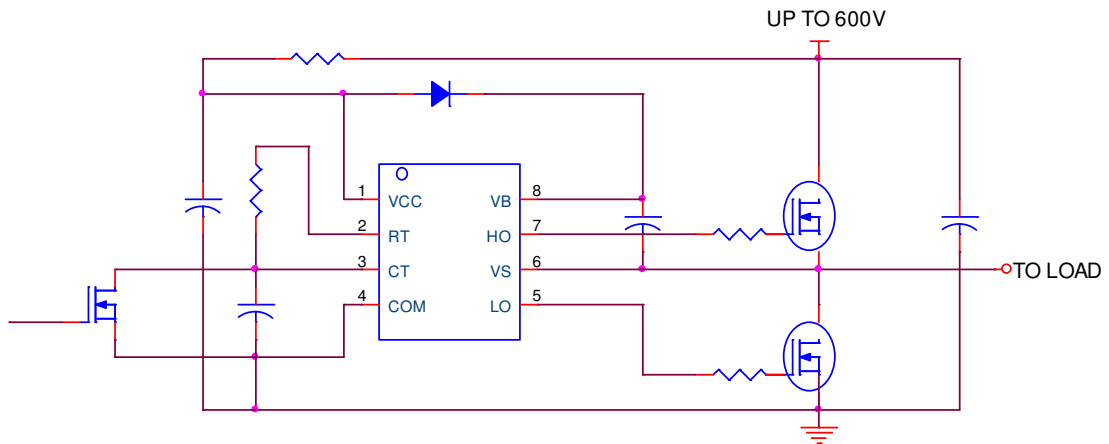
Oscillator I/O Characteristics

Oscillator frequency (CT=1nF)	RT = 36k	f _{osc}	19.4	20	20.6	kHz
	RT = 7.2k		94	100	106	kHz
RT pin duty cycle	f _{osc} < 100kHz	d	48	50	52	%
CT pin current		I _{CT}	—	0.001	1.0	uA
UV-mode CT pin pulldown current	V _{CC} = 7V	I _{CTUV}	0.25	0.30	0.5	mA
Upper CT ramp voltage threshold		V _{CT+}	—	8.0	—	V
Lower CT ramp voltage threshold		V _{CT-}	—	4.0	—	V
CT voltage shutdown threshold		V _{CTSD}	4.0	4.1	4.2	V
High-level RT output voltage, VCC - VRT	I _{RT} = 100uA	V _{RT+}	—	10	50	mV
	I _{RT} = 1mA		—	100	300	mV
Low-level RT output voltage	I _{RT} = 100uA	V _{RT-}	—	10	50	mV
	I _{RT} = 1mA		—	100	300	mV
UV-mode RT output voltage	V _{CC} ≤ V _{CCUV}	V _{RTUV}	—	0	100	mV
SD-Mode RT output voltage, VCC - VRT	I _{RT} = 100uA	V _{RTSD}	—	10	50	mV
	V _{CT} = 0V					mV
	I _{RT} = 1mA		—	10	300	mV
	V _{CT} = 0V					mV

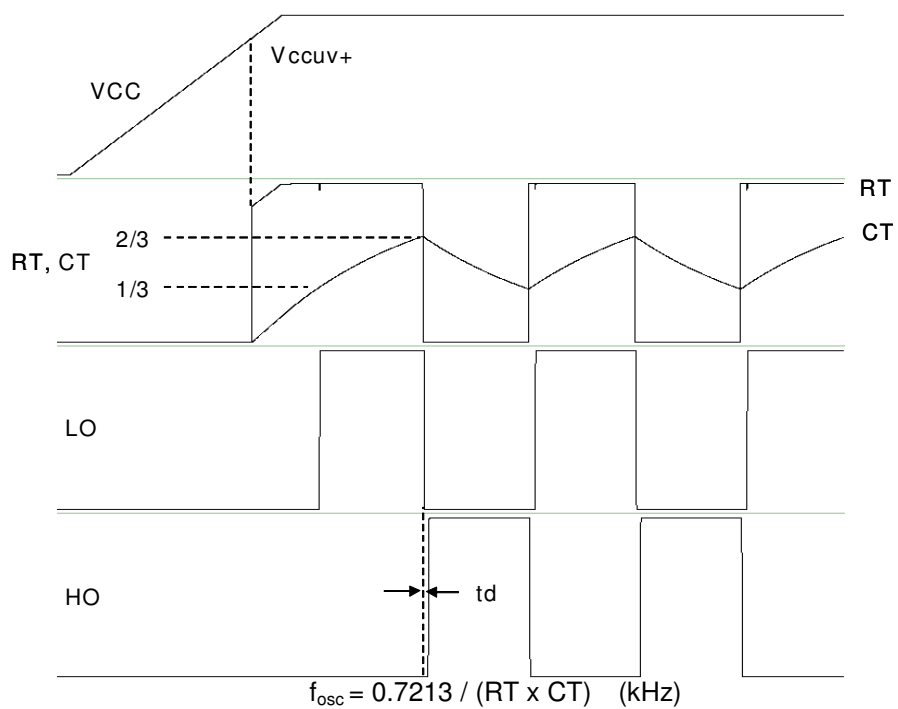
Gate Driver Output Characteristics

Output rise time (CL=1nF)	V _{CC} ≤ V _{CCUV}	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

Typical Application Circuit



Input/Output Timing Diagram



Typical Performance Characteristics

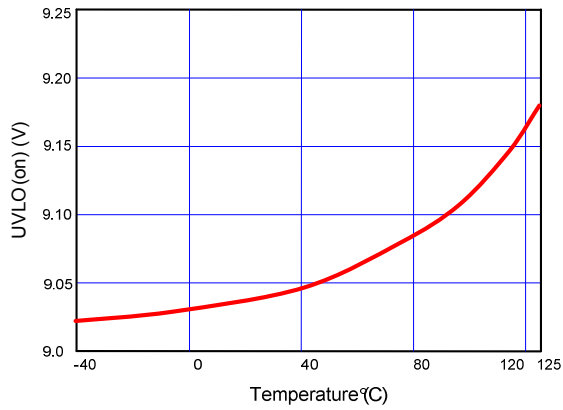


Fig. 1 UVLO(on) vs. Temperature

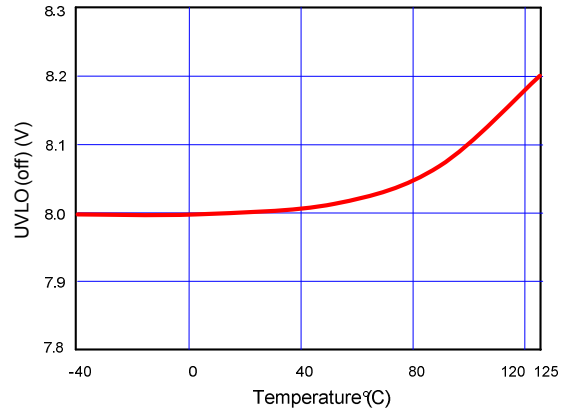


Fig. 2 UVLO(off) vs. Temperature

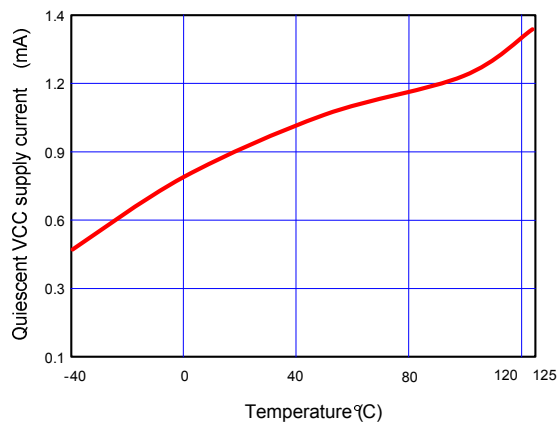


Fig. 3 Quiescent VCC supply current vs. Temperature

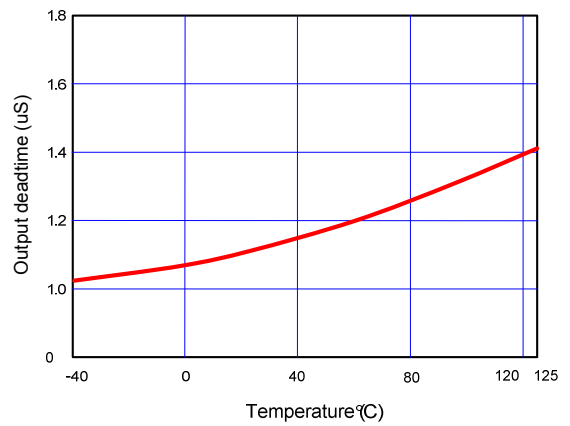


Fig. 4 Output deadtime vs. Temperature

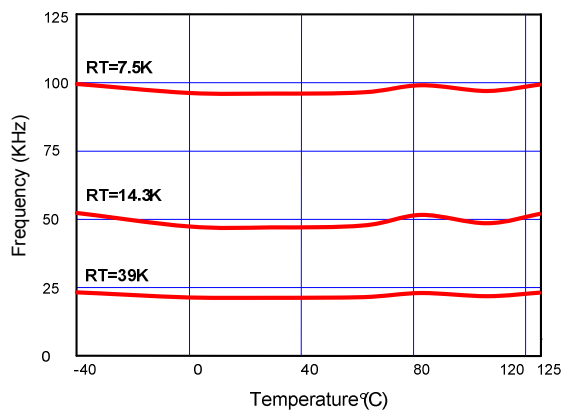
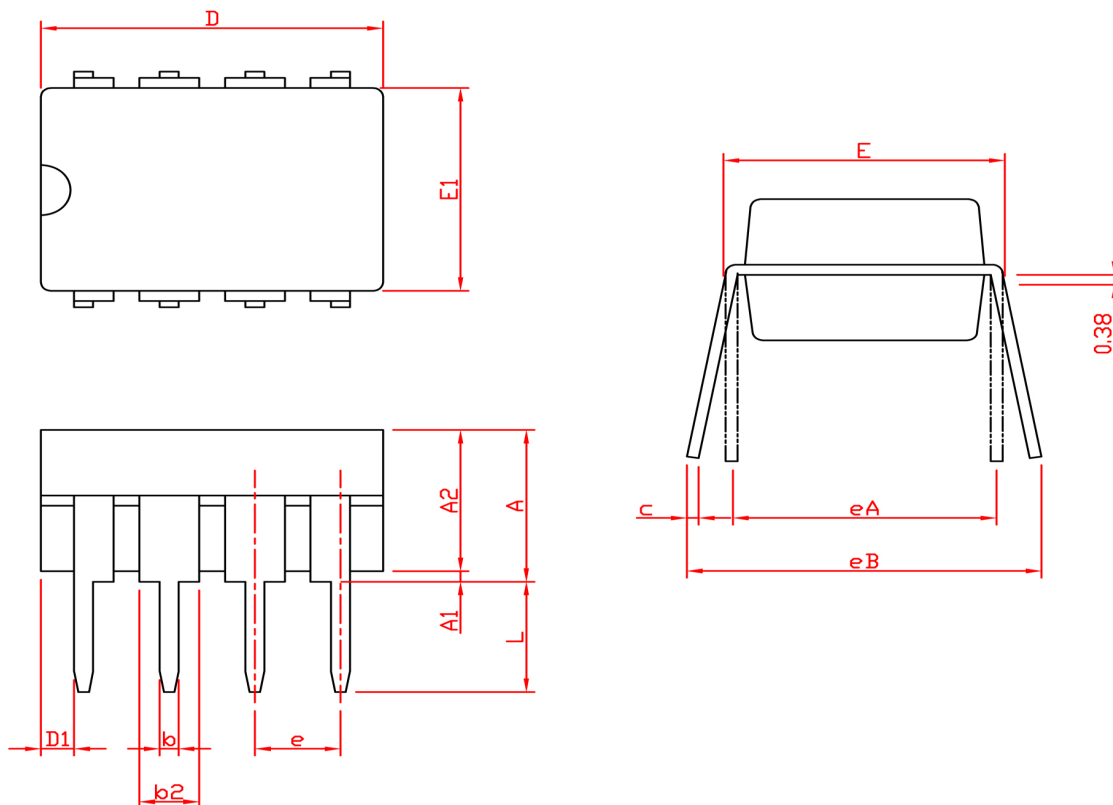


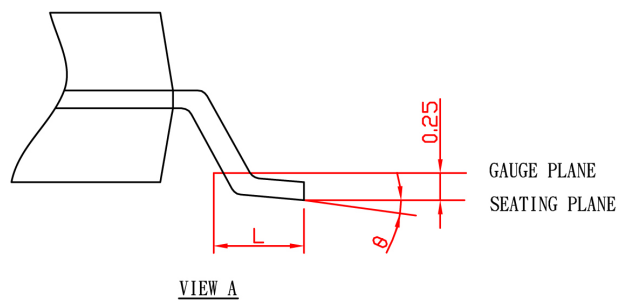
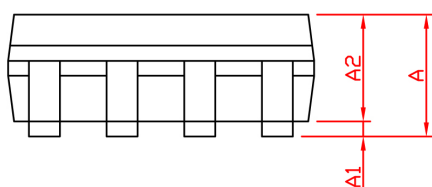
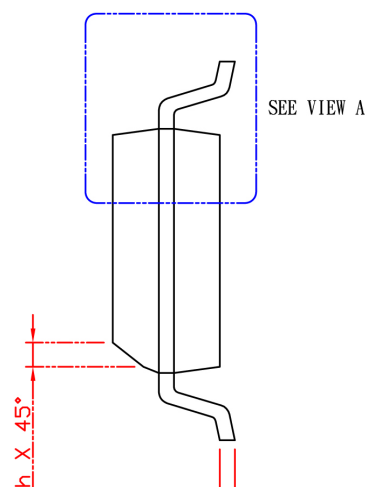
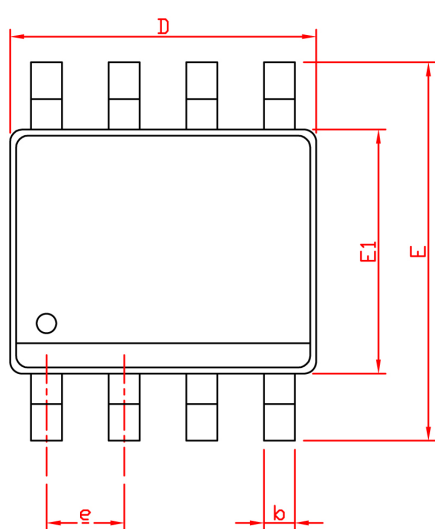
Fig. 5 Frequency vs. Temperature

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

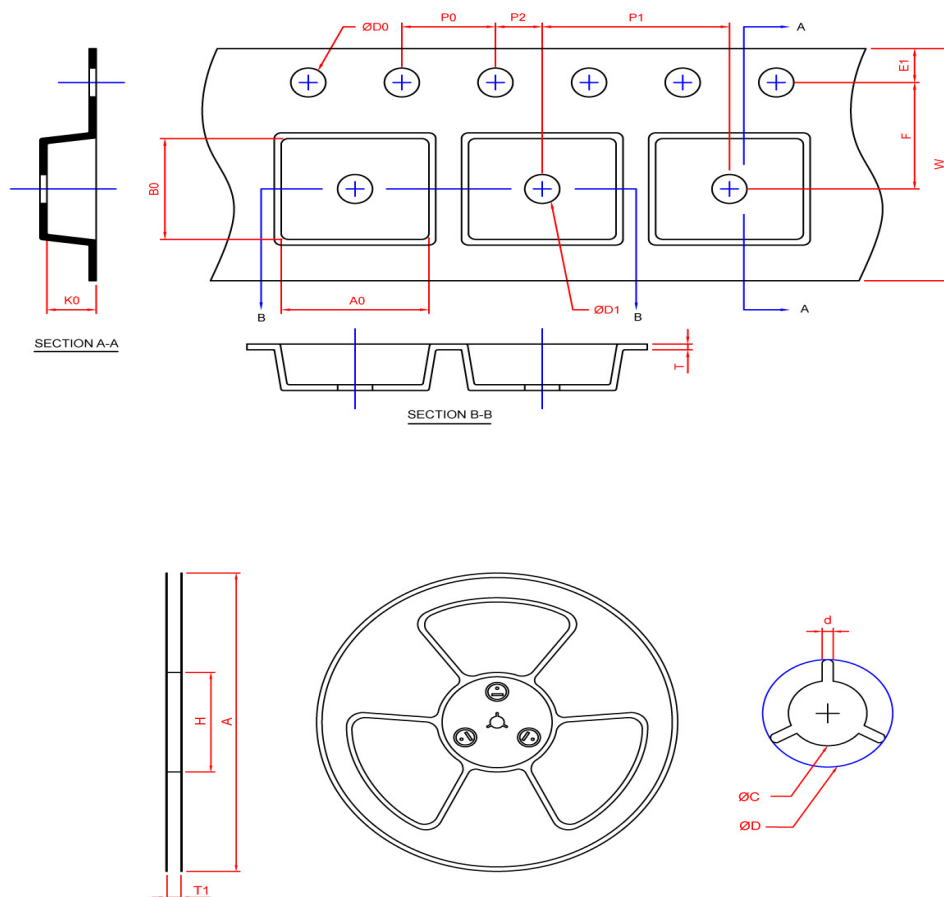
Package Information



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°

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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