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

GR8853A □ □

Package Code
J: DIP-8
K: SOP-8

RoHS Code
G: Green (Halogen Free) Device
L: PB Free Device

DIP-8/SOP-8

GR8853A
X X XXX
Code 1 ← Code 2 → Serial No.

Code 1	8	9	A	B		G	H	I	J
Year	2008	2009	2010	2011	. . .	2016	2017	2018	2019
Code 2	1	2	3	4		9	A	B	C
Month	Jan.	Feb.	Mar.	Apr.		Sep.	Oct.	Nov.	Dec.

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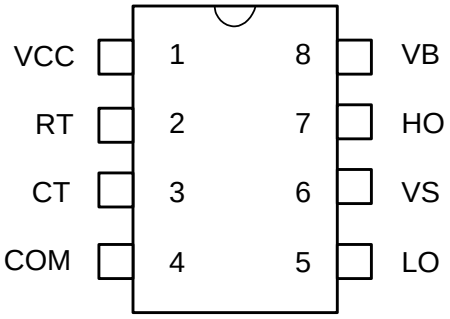
Pin Configuration

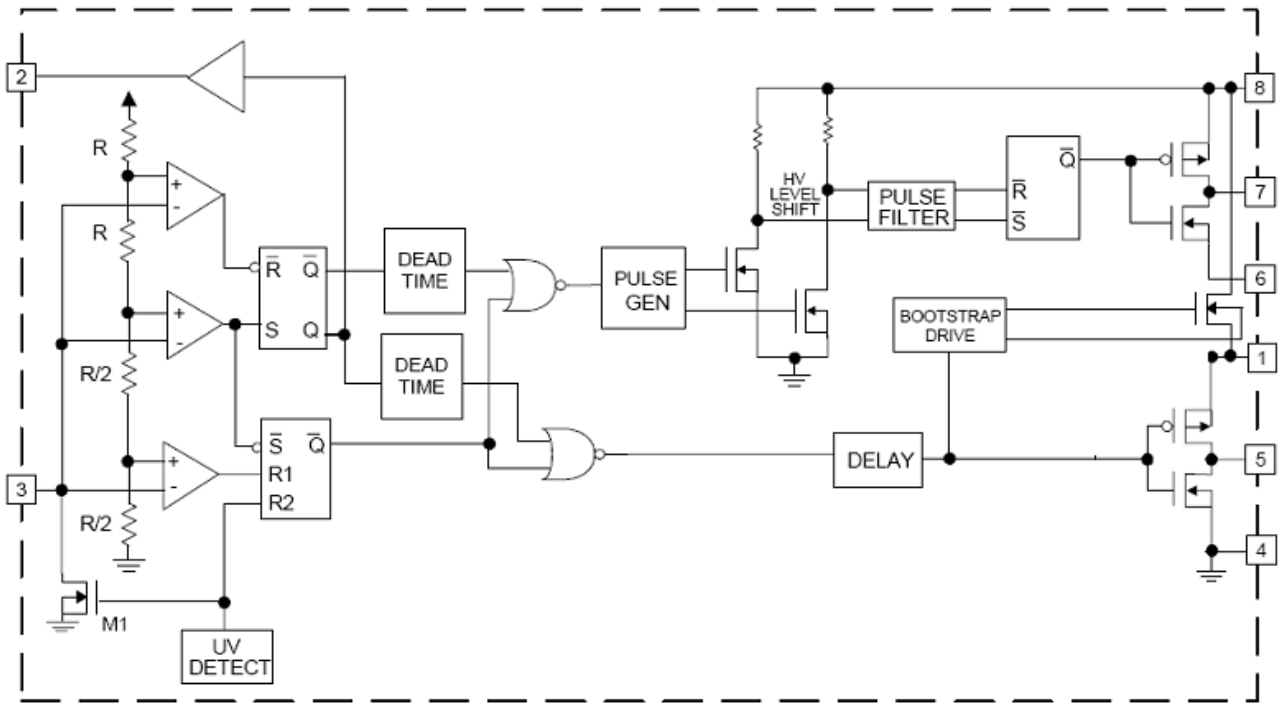
TOP VIEW



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 x 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℃

Operating ambient temperature ---------- - 20℃ ~ 85℃

Storage temperature range ---------- - 65℃ ~ 150℃

SOP-8 package thermal resistance ---------- 160℃/W

DIP-8 package thermal resistance ---------- 100℃/W

Power dissipation (SOP-8, at ambient temperature = 85℃) ---------- 400mW

Power dissipation (DIP-8, at ambient temperature = 85℃) ----------

6 5 0 m W

Lead temperature (All Pb free packages, soldering, 10sec) ---------- 260℃

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

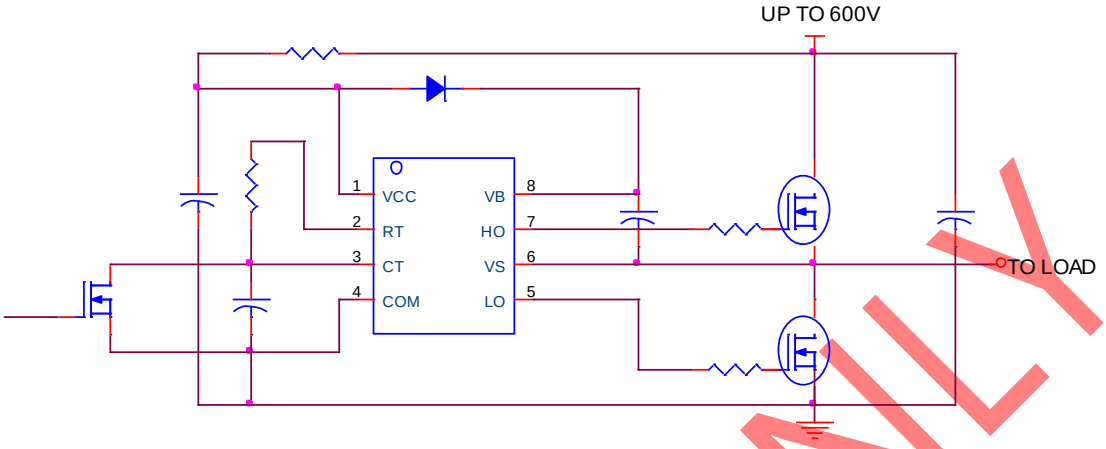
Electrical Characteristics

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.

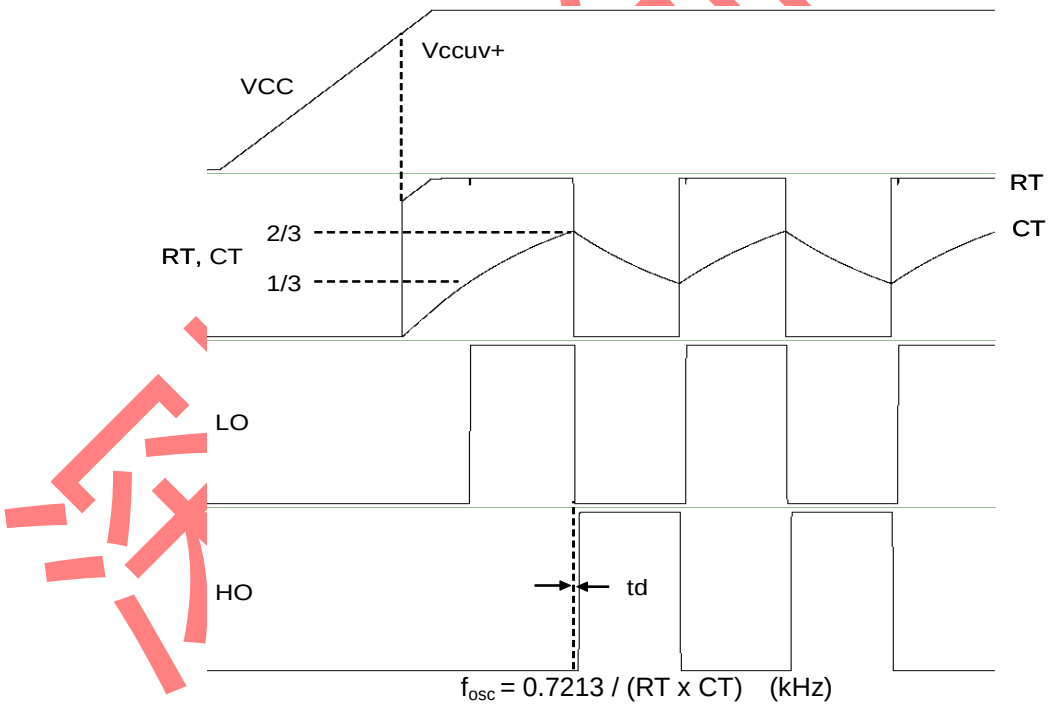
Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit
Low Voltage Supply Characteristics						
Rising VCC under-voltage lockout threshold		V_{CCUV+}	8.1	9.0	9.9	V
Falling VCC under-voltage lockout threshold		V_{CCUV-}	7.2	8.0	8.8	V
VCC under-voltage lockout Hysteresis		V_{CCUVH}	0.5	1.0	1.5	V
Micropower startup VCC supply current	$V_{CC} \leq V_{CCUV}$	I_{QCCUV}	—	50	100	μA
Quiescent VCC supply current		I_{QCC}	—	160	300	μA
VCC operating voltage		Vop	10	12	18	V
Floating Supply Characteristics						
Micropower startup VBS supply current	$V_{CC} \leq V_{CCUV}$	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=1008pF)	RT = 14.71k	f_{osc}	47.2	48.2	49.2	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}	3.8	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	$V_{CC} \leq V_{CCUV}$	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		—	100	300	mV
	V_{CT} = 0V					mV
Gate Driver Output Characteristics						
Output rise time (CL=1nF)	$V_{CC} \leq V_{CCUV}$	tr	—	80	150	nsec
Output fall time (CL=1nF)		tf	—	30	100	nsec
Shutdown propogation delay		tsd	—	660	—	nsec

Output deadtime (HO or LO)		td	—	1.1	—	μs

Typical Application Circuit



Input/Output Timing Diagram



Typical Performance Characteristics

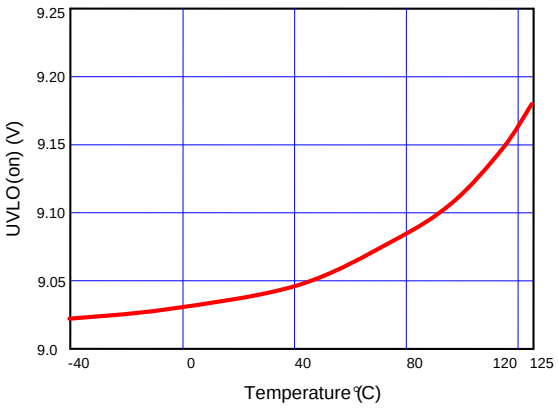


Fig. 1 UVLO(on) vs. Temperature

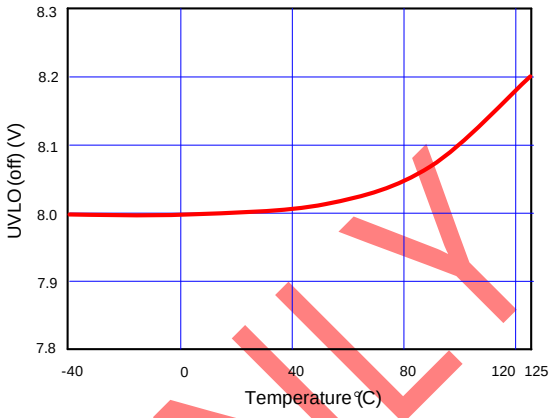


Fig. 2 UVLO(off) vs. Temperature

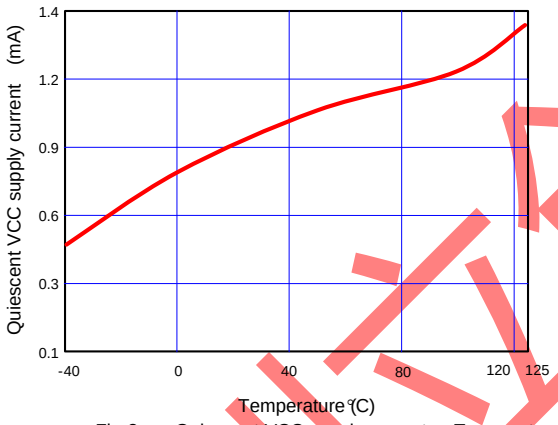


Fig.3 Quiescent VCC supply currentvs. Temperature

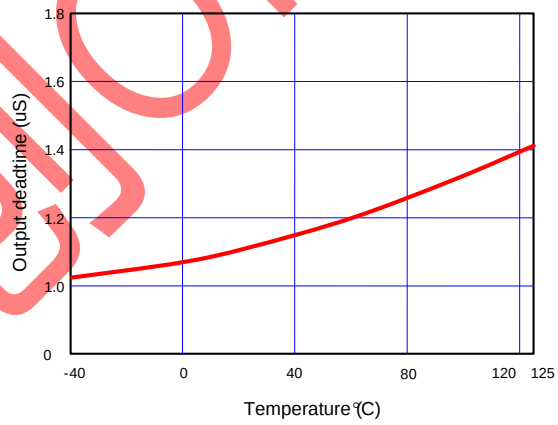


Fig. 4 Output deadtime vs. Temperature

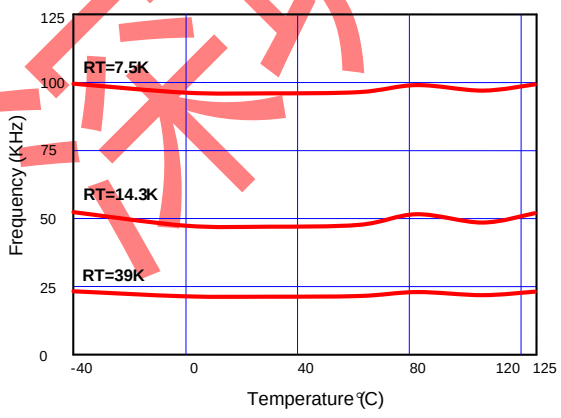
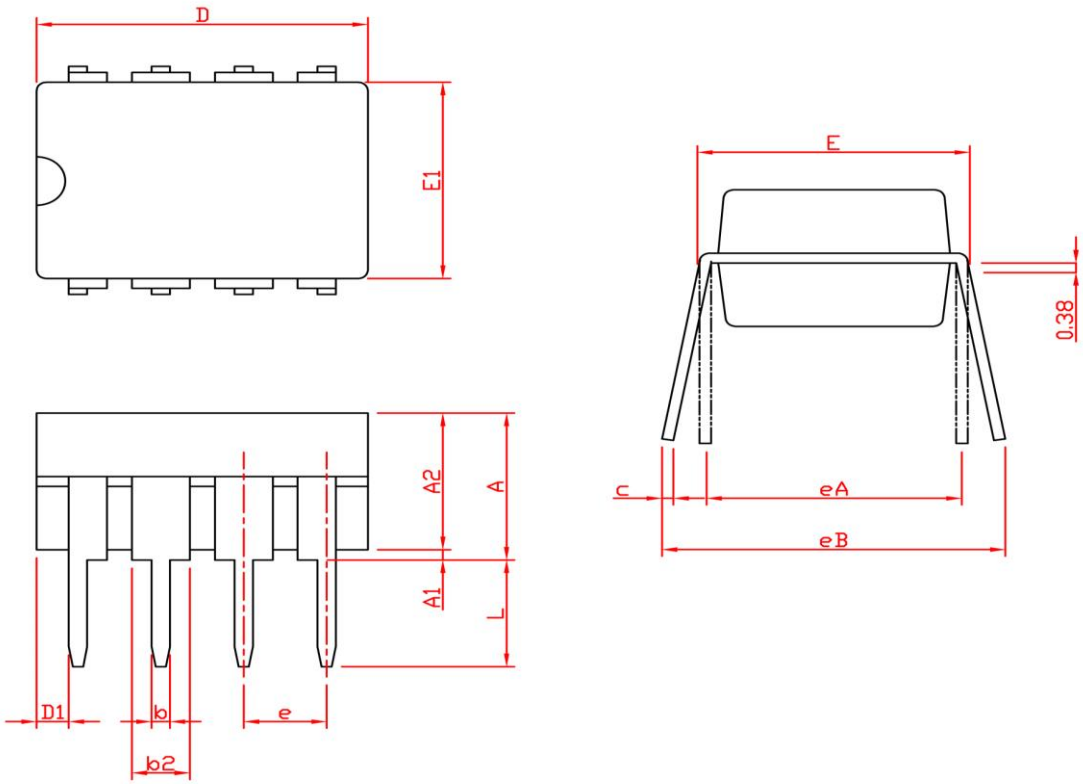


Fig.5 Frequency vs. Temperature

Package Information

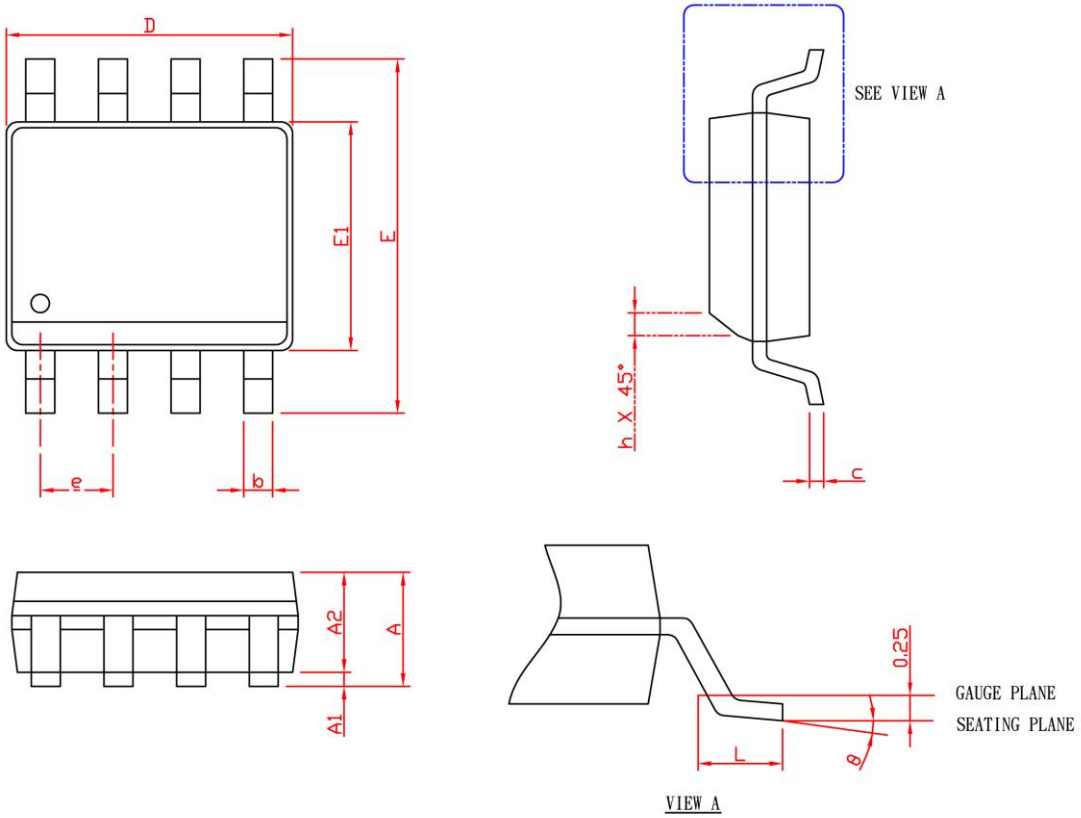


SYMBOL	DIP-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A		5.33		0.210
A1	0.38		0.015	
A2	2.92	4.95	0.115	0.195
b	0.36	0.56	0.014	0.022
b2	1.14	1.78	0.045	0.070
c	0.20	0.35	0.008	0.014
D	9.01	10.16	0.355	0.400
D1	0.13		0.005	
E	7.62	8.26	0.300	0.325
E1	6.10	7.11	0.240	0.280
e	2.54 BSC		0.100 BSC	
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^o	8^o	0^o	8^o

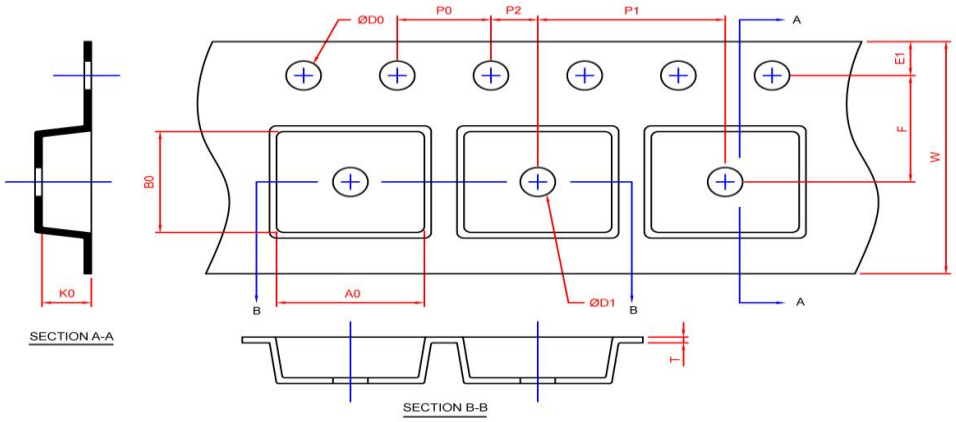
Note: 1. Followed from JEDEC MS-012 AA.

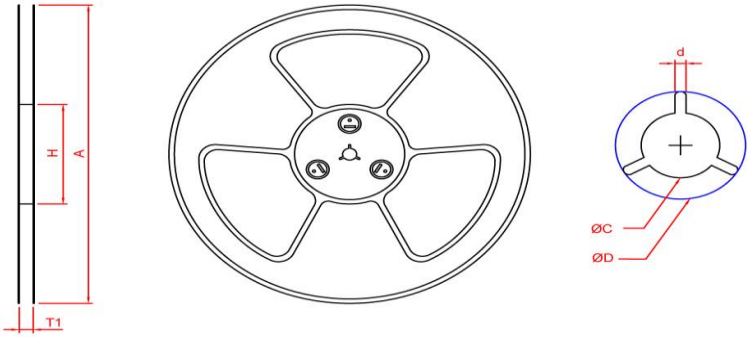
2. Dimension “D” does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 6 mil per side.

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