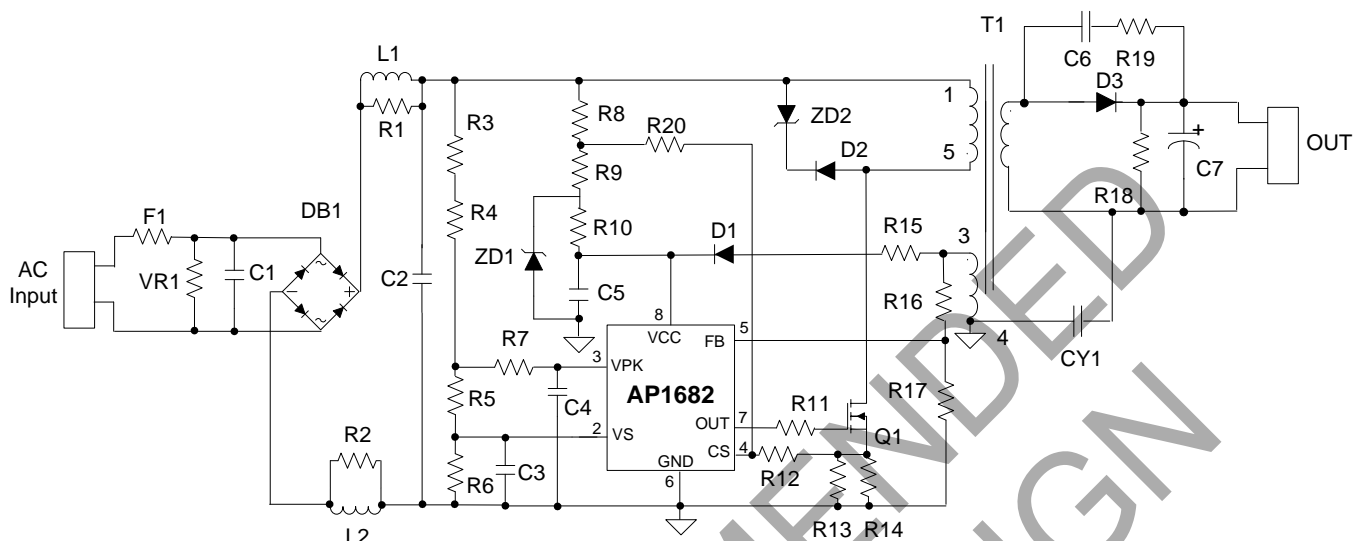


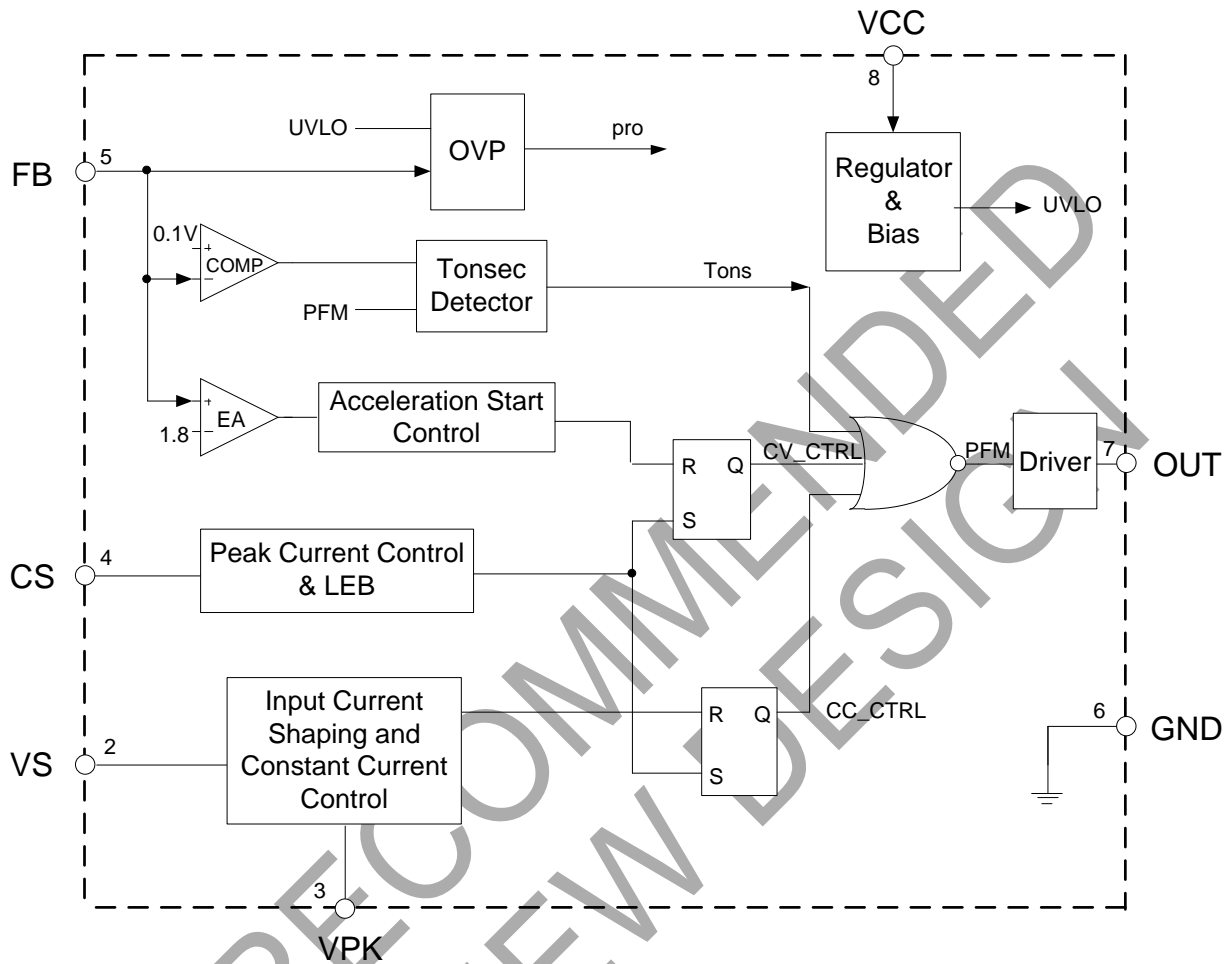
## Typical Applications Circuit



## Pin Descriptions

Pin Number	Pin Name	Function
1	NC	No connection
2	VS	The rectified input voltage sensing pin. The pin is detecting the instantaneous rectified sine waveform of input voltage
3	VPK	The rectified input voltage peak value sensing pin. The pin is detecting the rectified sine waveform peak value of input voltage
4	CS	Primary current sensing
5	FB	This pin captures the feedback voltage from the auxiliary winding. FB voltage is used to control no load output voltage and determine acceleration stop point at start-up phase
6	GND	Ground. Current return for gate driver and control circuits of the IC
7	OUT	Gate driver output
8	VCC	Supply voltage of gate driver and control circuits of the IC

## Functional Block Diagram



## Absolute Maximum Ratings (Note 4)

Symbol	Parameter	Value	Unit
$V_{CC}$	Power Supply Voltage	-0.3 to 30	V
$I_{OUT}$	Driver Output Current	300	mA
$V_{VS}, V_{PK}, V_{CS}$	Voltage at VS, VPK, CS	-0.3 to 7	V
$V_{FB}$	FB Input Voltage	-40 to 10	V
$T_J$	Operating Junction Temperature	+150	°C
$T_{STG}$	Storage Temperature	-65 to +150	°C
$T_{LEAD}$	Lead Temperature (Soldering, 10s)	+300	°C
$P_D$	Power Dissipation at $T_A=+50^{\circ}\text{C}$	0.65	W
$\theta_{JA}$	Thermal Resistance (Junction-to-Ambient)	190	°C/W
—	ESD (Machine Model)	200	V
—	ESD (Human Body Model)	3000	V

Note 4: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

## Recommended Operating Conditions

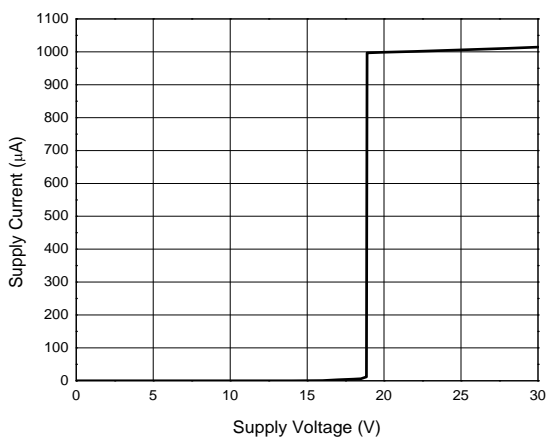
Parameter	Symbol	Min	Max	Unit
Power Supply Voltage	$V_{CC}$	9	21	V
Ambient Temperature	$T_A$	-40	+105	°C

## Electrical Characteristics (V<sub>CC</sub> = 15V, T<sub>A</sub> = +25°C, unless otherwise specified.)

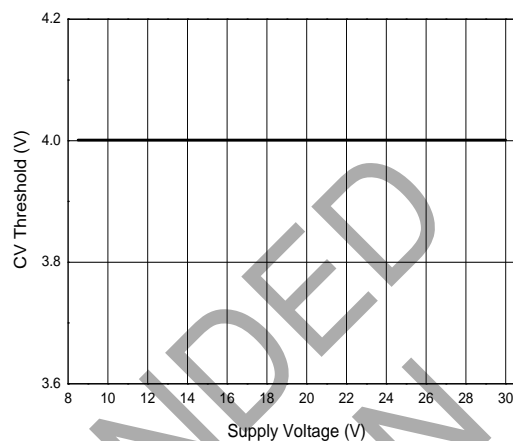
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
UVLO Section						
V <sub>TH</sub> (ST)	Start-up Threshold	—	18	19	20	V
V <sub>OPR</sub> (Min)	Minimal Operating Voltage	After turn on	7	8	9	
V <sub>CC_OVP</sub>	VCC OVP Voltage	—	28	32	36	
Standby Current Section						
I <sub>ST</sub>	Start-up Current	V <sub>CC</sub> =V <sub>TH</sub> (ST)-0.5V, Before start up	—	—	20	μA
I <sub>CC</sub> (Max)	Maximum Operating Current	V <sub>VS</sub> =V <sub>PK</sub> =3V	—	1000	1300	
Drive Output Section						
V <sub>OH</sub>	Output High Level Voltage	I <sub>GD-SOURCE</sub> =20mA V <sub>CC</sub> =12V	10	—	—	V
V <sub>OL</sub>	Output Low Level Voltage	I <sub>GD-SINK</sub> =20mA V <sub>CC</sub> =12V	—	—	1	V
t <sub>R</sub>	Output Voltage Rise Time	C <sub>L</sub> =1nF	100	140	190	ns
t <sub>F</sub>	Output Voltage Fall Time	C <sub>L</sub> =1nF	30	60	90	ns
V <sub>O-CLAMP</sub>	Output Clamp Voltage	I <sub>GD-SOURCE</sub> =5mA V <sub>CC</sub> =20V	12	13.5	15	V
V <sub>UVLO</sub>	UVLO Saturation Voltage	V <sub>CC</sub> =0 to V <sub>CC-ON</sub> I <sub>SINK</sub> =10mA	—	—	1.1	V
VS Input Section						
V <sub>VS</sub> /V <sub>PK</sub> (Max)	Maximum Ratio	V <sub>VS</sub> =V <sub>PK</sub> =3V	0.8	1	1.2	V
V <sub>VS</sub> /V <sub>PK</sub> (Min)	Minimum Ratio	V <sub>VS</sub> =0V, V <sub>PK</sub> =3V	—	—	0.2	V
Current Sense Section						
t <sub>ON</sub> (Min)	Minimum On Time	—	500	750	1000	ns
V <sub>SOCP</sub>	Short Circuit Protection Voltage	—	3	4	—	V
Feedback Input Section						
I <sub>FB</sub>	FB Pin Input Leakage Current	V <sub>FB</sub> =4V	—	2	8	μA
V <sub>FB</sub> (ACC)	Acceleration Start Threshold	—	1.4	1.8	2.2	V
V <sub>FB</sub> (CV)	CV Threshold	—	3.2	4.2	5.2	V
V <sub>FB</sub> (OVP)	Over Voltage Protection	—	4.5	6	7.5	V
Over Temperature Protection Section						
—	Shutdown Temperature	—	—	+140	—	°C
—	Temperature Hysteresis	—	—	+20	—	°C

## Performance Characteristics

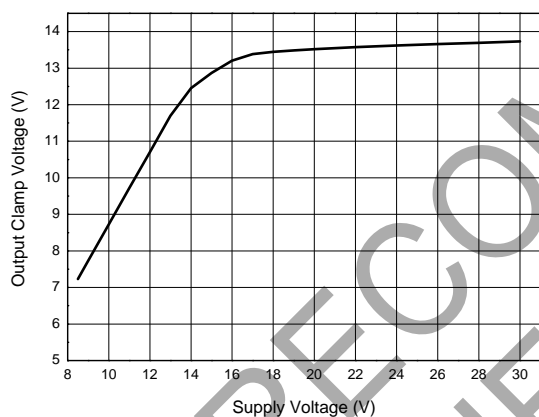
**Supply Current vs. Supply Voltage**



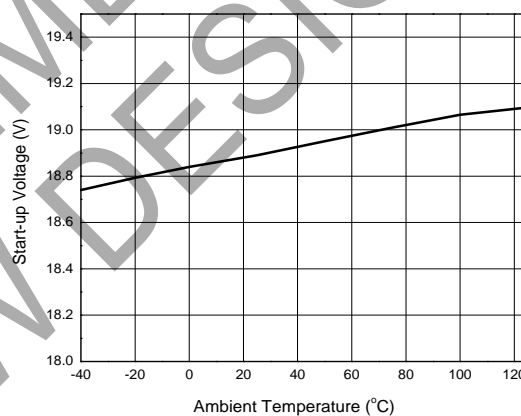
**CV Threshold Vs. Supply Voltage**



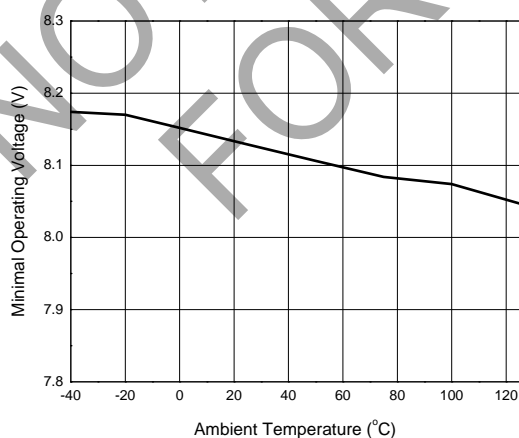
**Output Clamp Voltage vs. Supply Voltage**



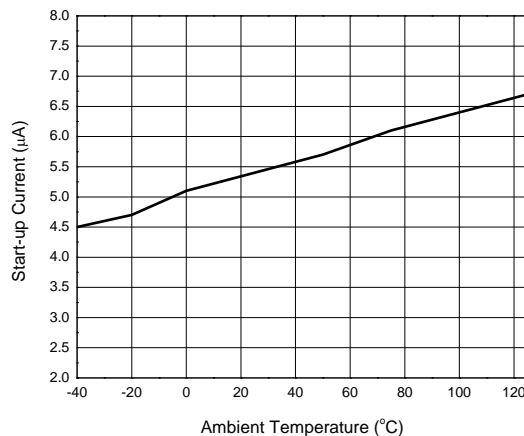
**Start-up Voltage vs. Ambient Temperature**



**Minimal Operating Voltage vs. Ambient Temperature**

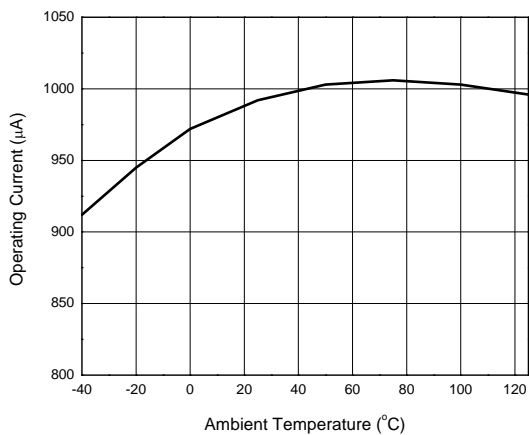


**Start-up Current vs. Ambient Temperature**

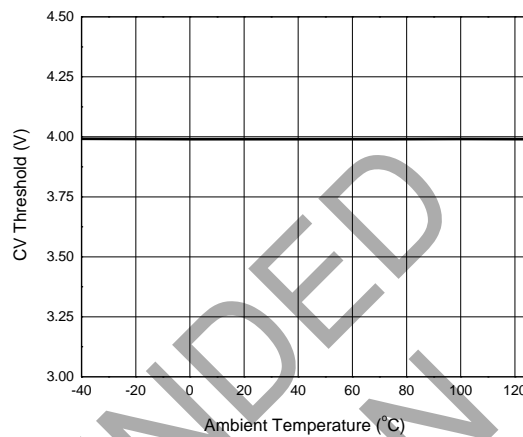


## Performance Characteristics (Cont.)

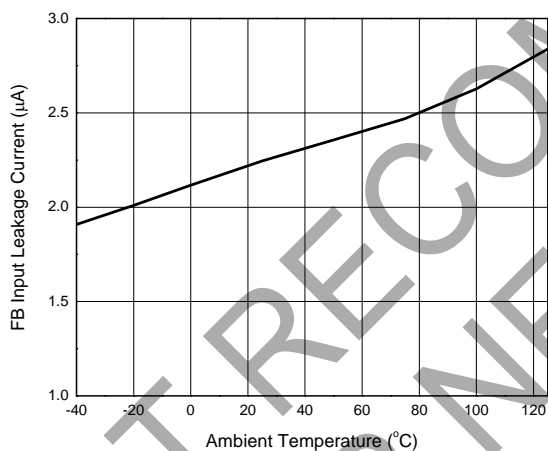
**Operating Current vs. Ambient Temperature**



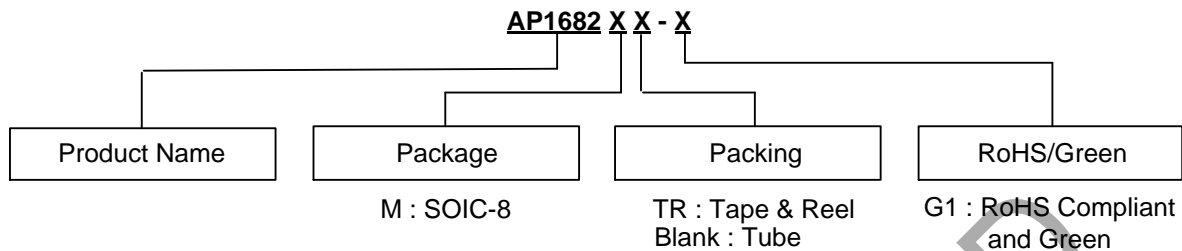
**CV Threshold Vs. Ambient Temperature**



**FB Input Leakage Current vs. Ambient Temperature**



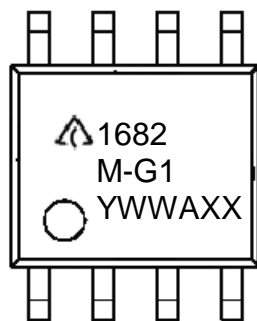
## Ordering Information



Package	Temperature Range	Part Number	Marking ID	Packing
SOIC-8	-40 to +105°C	AP1682M-G1	1682M-G1	Tube
		AP1682MTR-G1	1682M-G1	4000/ 13" Tape & Reel

## Marking Information

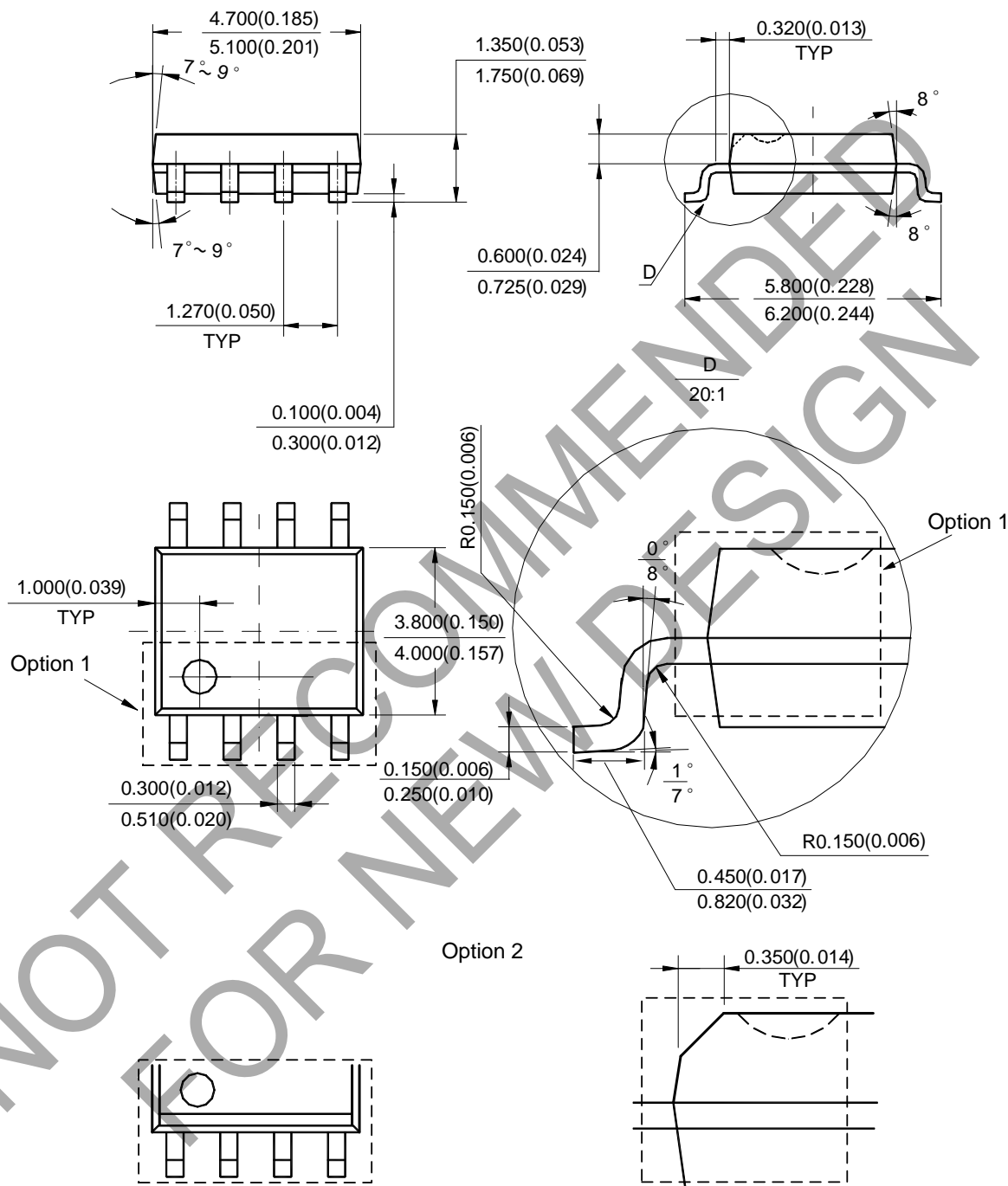
(Top View)



First and Second Lines: Logo and Marking ID  
(See Ordering Information)  
 Third Line: Date Code  
 Y: Year  
 WW: Work Week of Molding  
 A: Assembly House Code  
 XX: 7<sup>th</sup> and 8<sup>th</sup> Digits of Batch No.

**Package Outline Dimensions** (All dimensions in mm(inch).)

(1) Package Type: SOIC-8

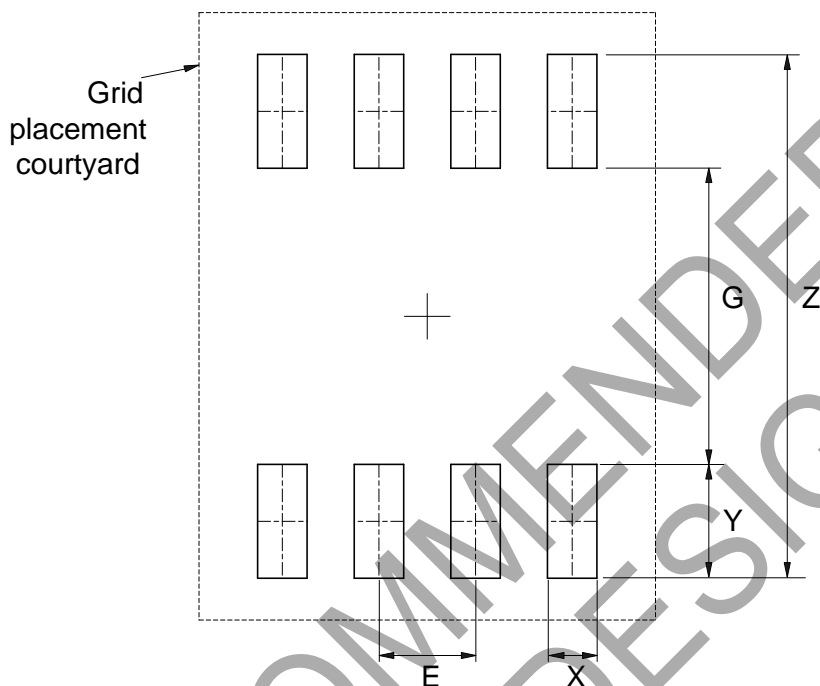


Note: Eject hole, oriented hole and mold mark is optional.



## Suggested Pad Layout

(1) Package Type: SOIC-8



Dimensions	Z (mm)/(inch)	G (mm)/(inch)	X (mm)/(inch)	Y (mm)/(inch)	E (mm)/(inch)
Value	6.900/0.272	3.900/0.154	0.650/0.026	1.500/0.059	1.270/0.050

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