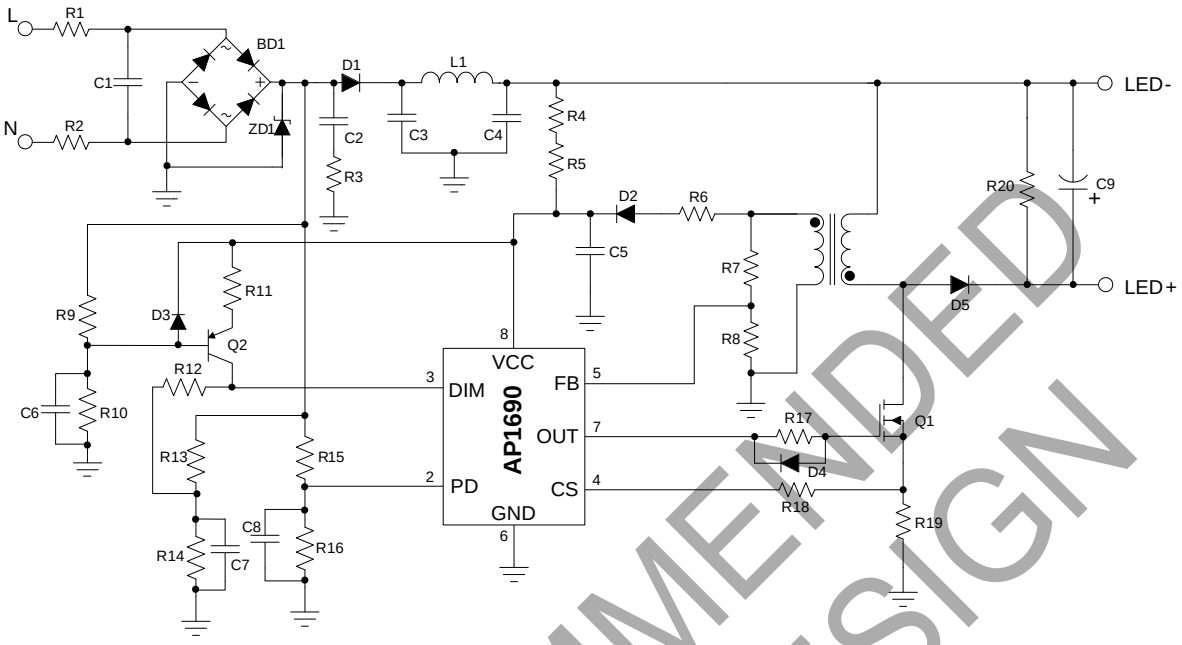
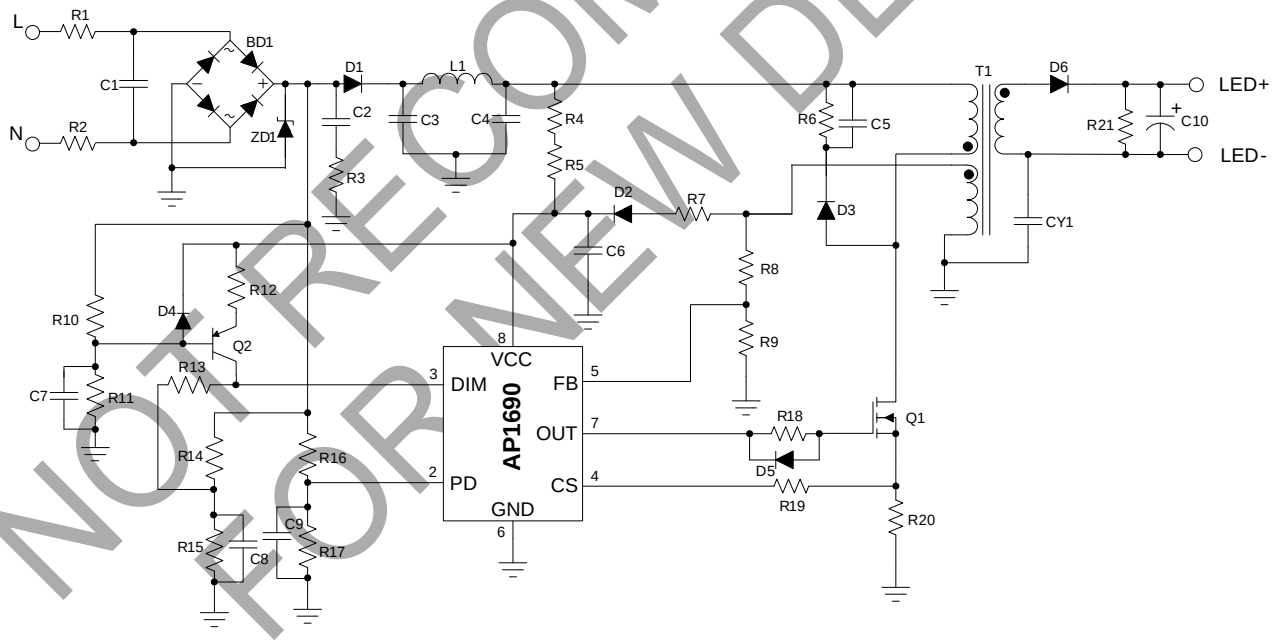
Typical Applications Circuit



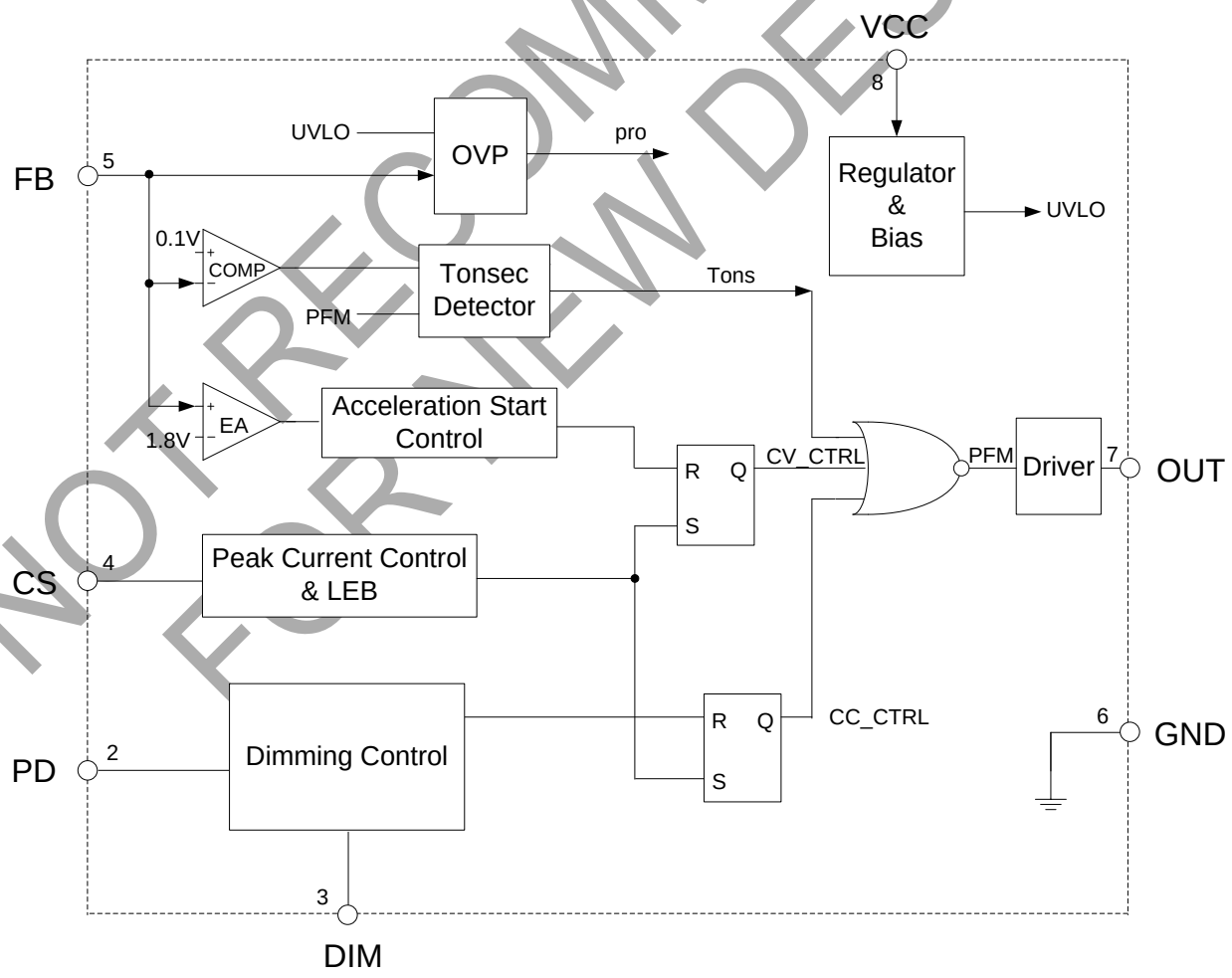


Isolated

Pin Descriptions

Pin Number	Pin Name	Function
1	NC	No connection
2	PD	The rectified input voltage sensing pin. The pin is detecting the phase of dimmer
3	DIM	The rectified input voltage sensing pin. The pin is detecting the average AC 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	Rating	Unit
V_{CC}	Power Supply Voltage	-0.3 to 30	V
I_{OUT}	Driver Output Current	300	mA
V_{PD}, V_{DIM}, V_{CS}	Voltage at PD, DIM, CS	-0.3 to 7	V
V_{FB}	FB Input Voltage	-40 to 10	V
T_J	Operating Junction Temperature	+150	ºC
T_{STG}	Storage Temperature	-65 to +150	ºC
T_{LEAD}	Lead Temperature (Soldering, 10 sec)	+300	ºC
P_D	Power Dissipation at T_A = +50°C	0.65	W
θ_{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

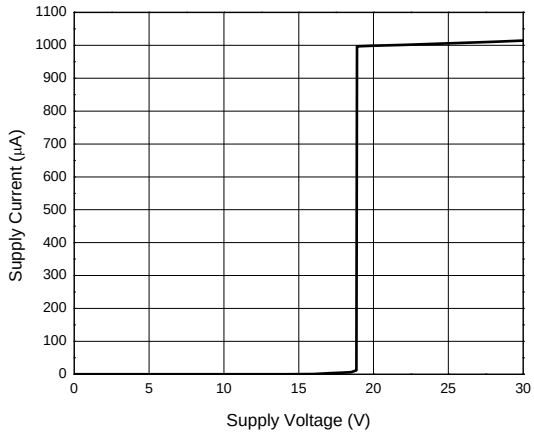
Symbol	Parameter	Min	Max	Unit
V_{CC}	Power Supply Voltage	9	21	V
T_A	Ambient Temperature	-40	+105	ºC

Electrical Characteristics (@V_{CC} = 15V, T_A = +25°C, unless otherwise specified.)

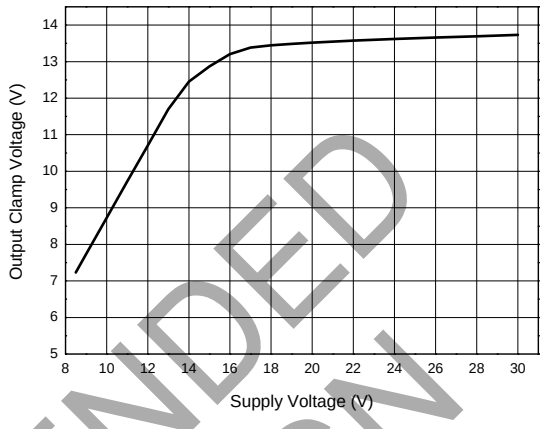
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
UVLO Section						
V_{TH} (ST)	Start-up Threshold	–	18	19	20	V
V_{OPR} (Min)	Minimal Operating Voltage	After turn on	7	8	9	
V_{CC_OVP}	VCC OVP Voltage	–	28	32	36	
Standby Current Section						
I_{ST}	Start-up Current	V_{CC} = V_{TH} (ST)-0.5V, Before start up	–	–	100	µA
I_{CC} (Max)	Maximum Operating Current	V_{PD} = V_{DIM} = 3V	–	1500	2000	
Drive Output Section						
V_{OH}	Output High Level Voltage	$I_{GD-SOURCE}$ = 20mA V_{CC} = 12V	10	–	–	V
V_{OL}	Output Low Level Voltage	$I_{GD-SINK}$ = 20mA V_{CC} = 12V	–	–	1	V
t_R	Output Voltage Rise Time	C_L = 1nF	100	140	190	ns
t_F	Output Voltage Fall Time	C_L = 1nF	30	60	90	ns
$V_{O-CLAMP}$	Output Clamp Voltage	$I_{GD-SOURCE}$ = 5mA V_{CC} = 20V	12	13.5	15	V
Current Sense Section						
t_{ON} (Min)	Minimum On Time	–	500	750	1000	ns
V_{SOCP}	Short Circuit Protection Voltage	–	3	4	–	V
Feedback Input Section						
I_{FB}	FB Pin Input Leakage Current	V_{FB} = 4V	–	2	8	µA
V_{FB} (ACC)	Acceleration Start Threshold	–	1.4	1.8	2.2	V
V_{FB} (OVP)	Over Voltage Protection	–	4.5	6	7.5	V
Dimming Section						
V_{IN}	PD Pin and DIM Pin Input Voltage Range	–	–	3	6	V

Performance Characteristics

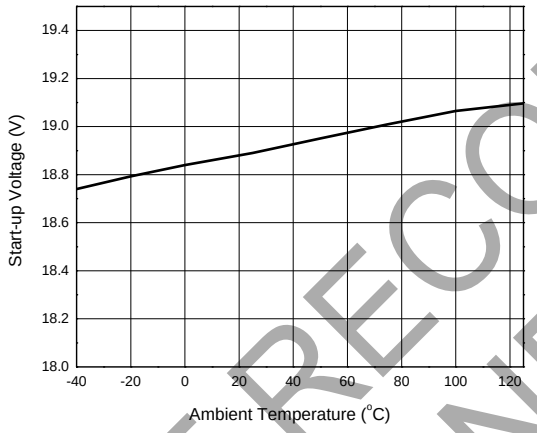
Supply Current vs. Supply Voltage



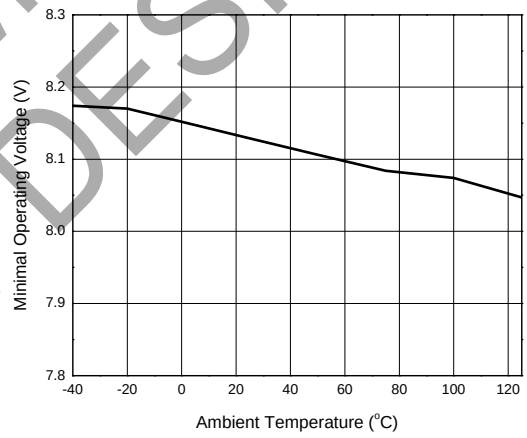
Output Clamp Voltage vs. Supply Voltage



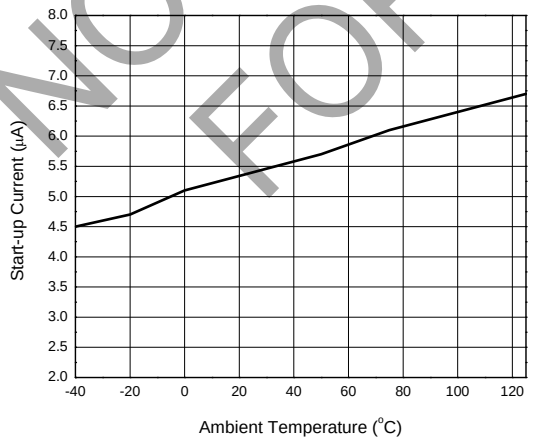
Start-up Voltage vs. Ambient Temperature



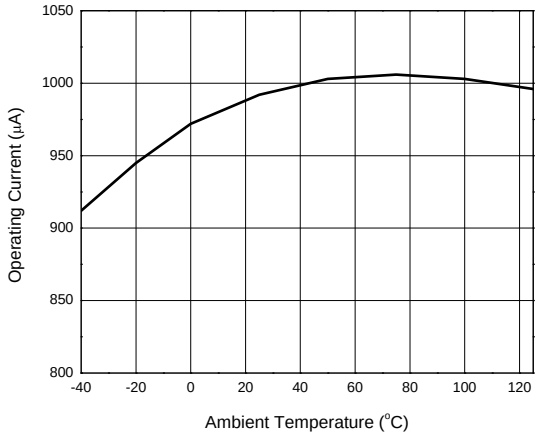
Minimal Operating Voltage vs. Ambient Temperature



Start-up Current vs. Ambient Temperature

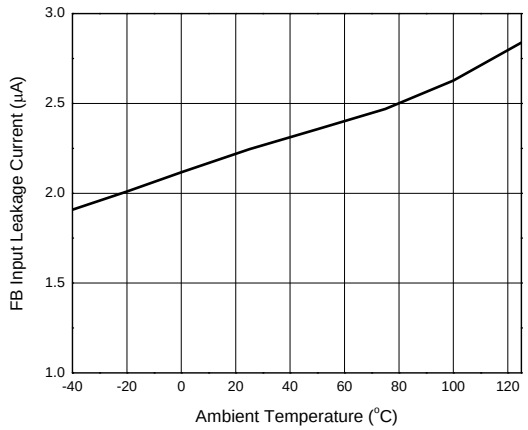


Operating Current vs. Ambient Temperature



Performance Characteristics (Cont.)

FB Input Leakage Current vs. Ambient Temperature



Ordering Information

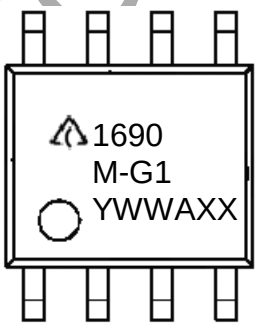
AP1690 X XX - G1

Product Name	Package	Packing	RoHS/Green
	M : SO-8	TR : Tape & Reel	G1 : Green

Package	Temperature Range	Part Number	Marking ID	Packing
SO-8	-40 to +105°C	AP1690MTR-G1	1690M-G1	4000/13''Tape & Reel

Marking Information

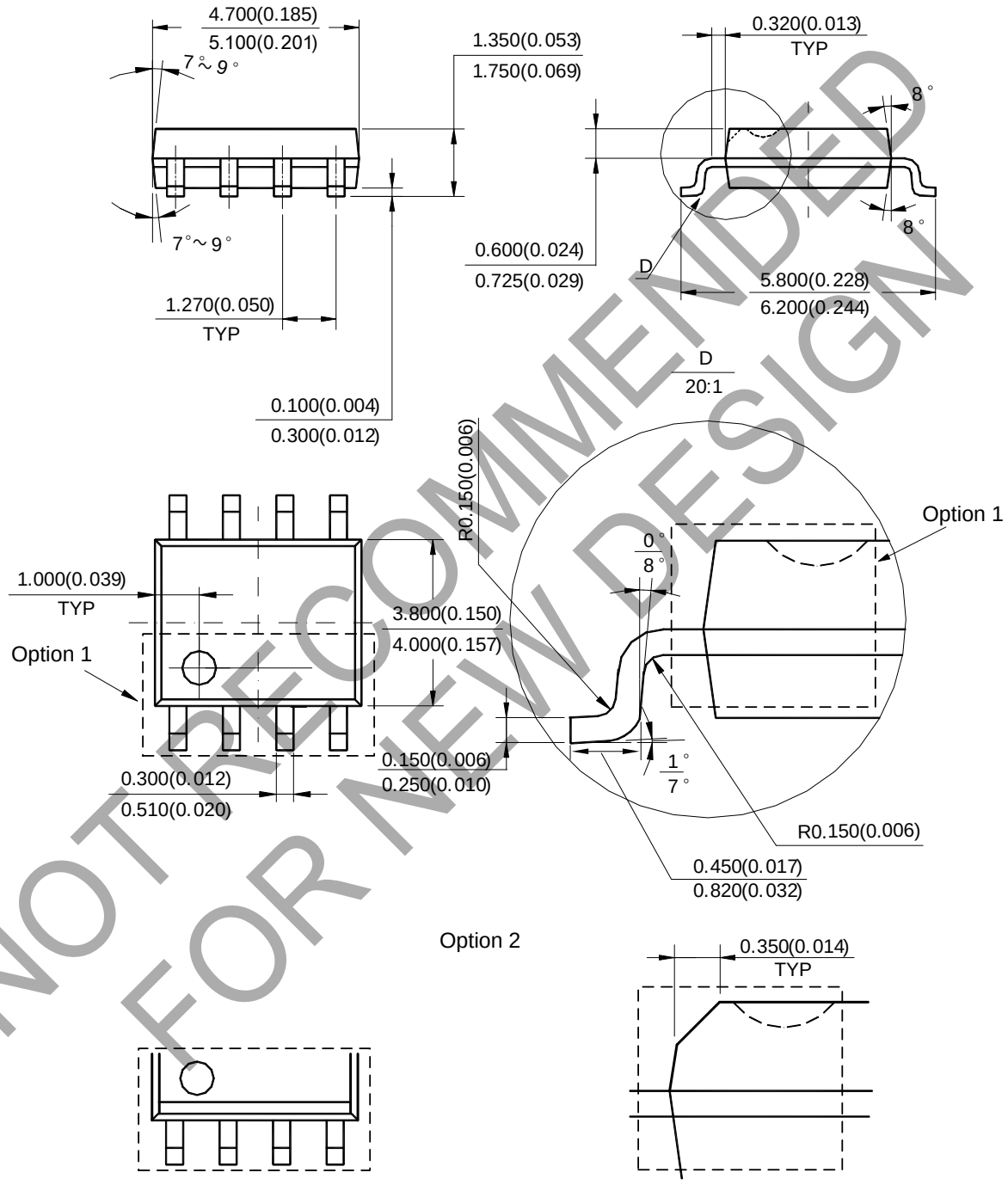
(Top View)



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: 7th and 8th Digits of Batch No.

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

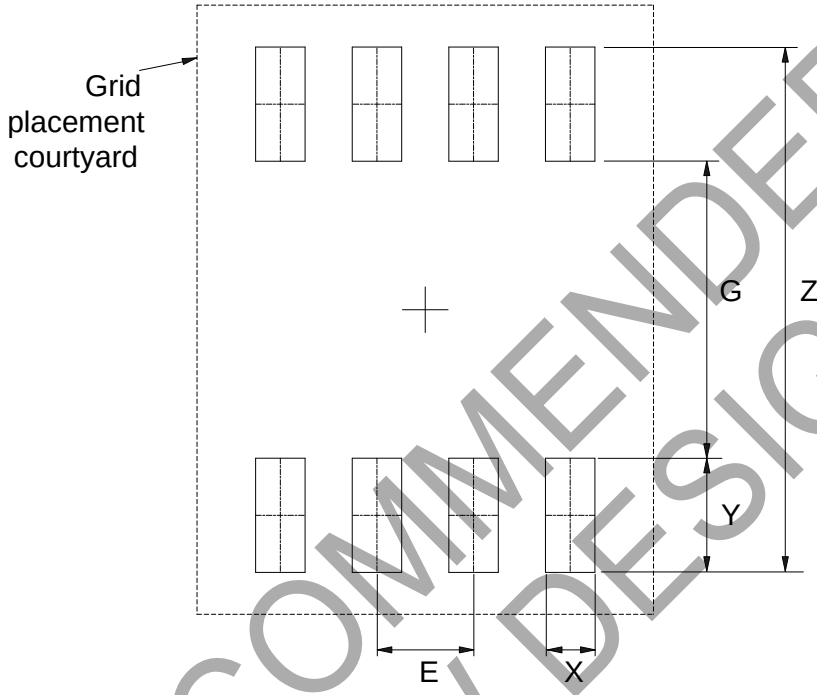
(1) Package Type: SO-8



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

Suggested Pad Layout

(1) Package Type: SO-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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