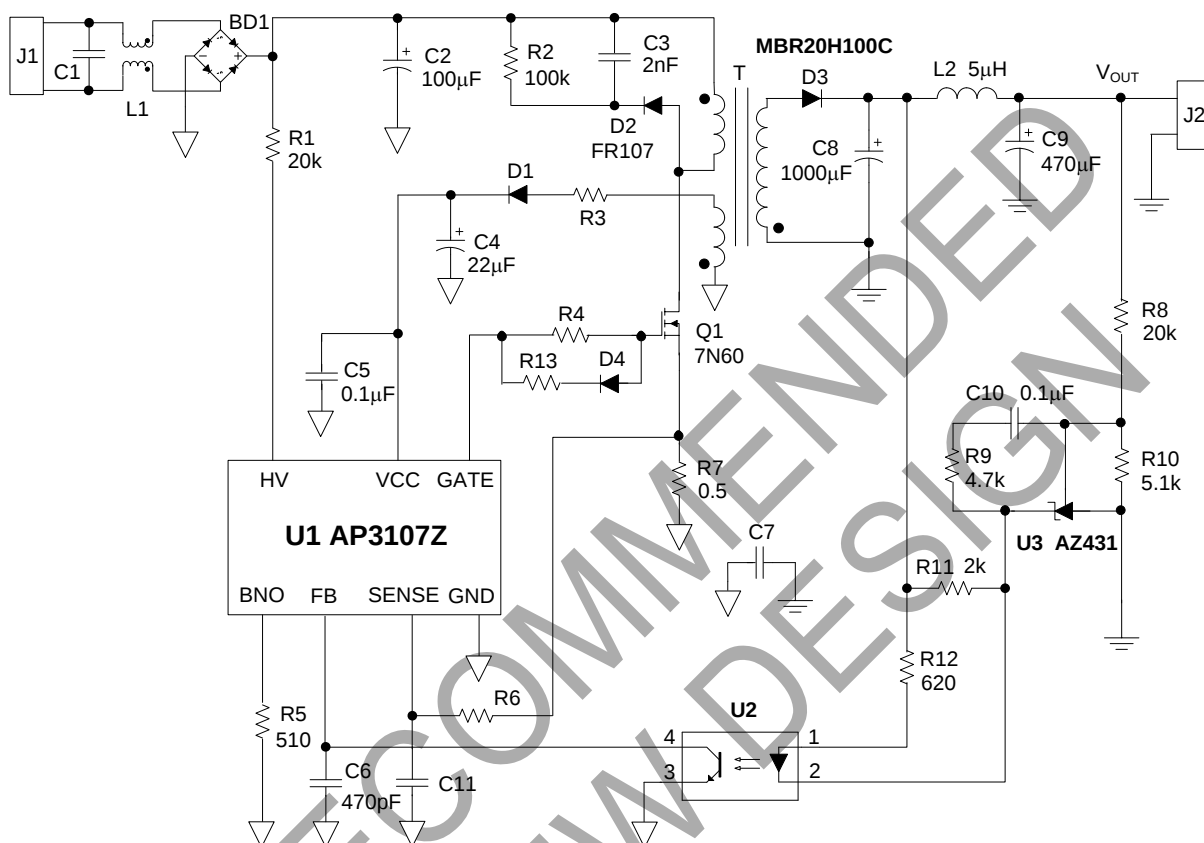


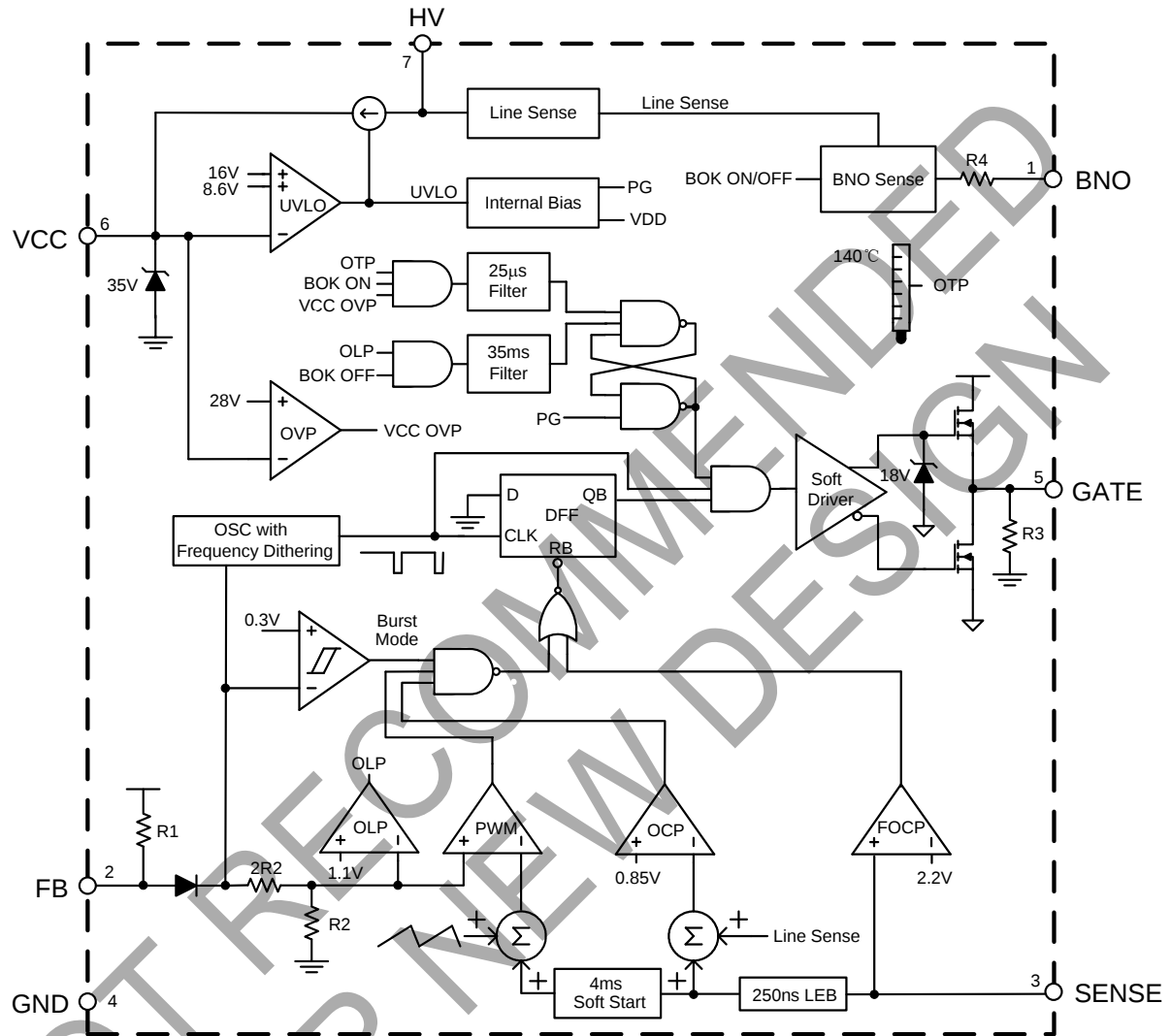
Typical Applications Circuit



Pin Descriptions

Pin Number	Pin Name	Function
1	BNO	Brownout Protection Pin. Connected to GND by a resistor to set the brownout level. This pin is shortened to the ground to set the maximum brownout voltage
2	FB	Voltage Feedback Pin., Connecting it with an opto-coupler to close the control loop can achieve system regulation
3	SENSE	Current Sense Pin. Connect it to sense the MOSFET current
4	GND	Ground
5	GATE	Gate drive output to drive the external MOSFET
6	VCC	Supply Voltage Pin
7	HV	Connect this pin to the positive terminal of bulk capacitor to provide start-up current for the controller. When VCC voltage reaches UVLO (on), this HV loop will be turned off to save the power loss of the start-up circuit

Functional Block Diagram



Absolute Maximum Ratings (Note 4)

Parameter	Symbol	Value	Unit
Supply Voltage	V_{CC}	30	V
Input Voltage to HV	V_{HV}	600	V
GATE Output Current	I_{GATE}	500	mA
Input Voltage to FB, SENSE	V_{FB}, V_{SENSE}	-0.3 to 7	V
Thermal Resistance (Junction to Ambient)	θ_{JA}	186	°C/W
Power dissipation at $T_A < 25^\circ\text{C}$	P_D	550	mW
Operating Junction Temperature	T_J	-40 to +150	°C
Storage Temperature	T_{STG}	+150	°C
ESD (Human Body Model)	—	3000	V
ESD (Machine Model)	—	300	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

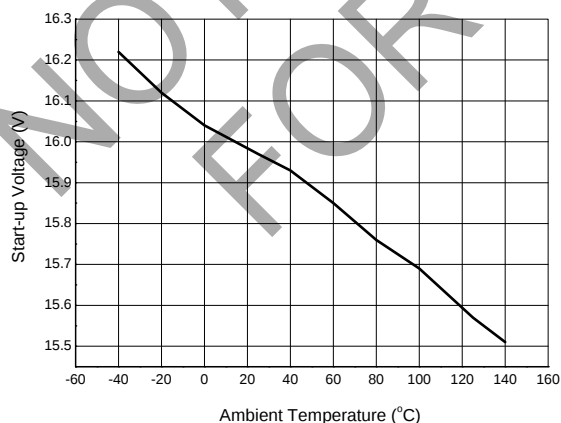
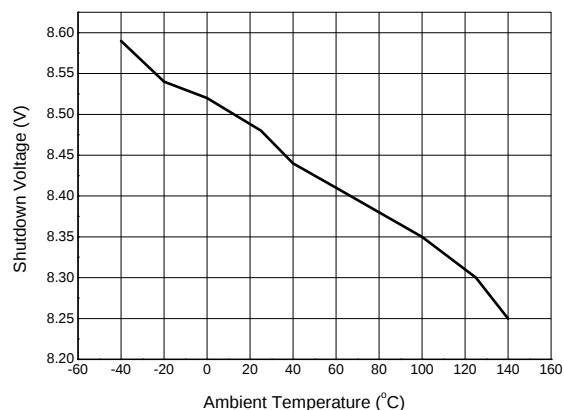
Parameter	Symbol	Min	Max	Unit
Supply Voltage	V_{CC}	10	25	V
Ambient Temperature	T_A	-40	+85	°C

Electrical Characteristics (@V_{CC}=16V, T_A=+25°C, unless otherwise specified.)

Parameter	Conditions	Min	Typ	Max	Unit
High-voltage Supply (HV Pin)					
High-voltage Current Source	V _{CC} <UVLO (on), V _{HV} =400V	1	2	3.5	mA
Off-state Leakage Current	V _{CC} >UVLO (off), V _{HV} =100V	–	2.5	–	μA
	V _{CC} >UVLO (off), V _{HV} =400V	–	10	18	μA
Supply Voltage (VCC Pin)					
Start-up Current	V _{CC} =14.8V	–	5	15	μA
Operation Supply Current	V _{FB} =0V, C _L =1nF	0.1	0.6	1	mA
	V _{FB} =3V, C _L =1nF	1.5	2.5	3.5	
UVLO (On)	–	15	16	17	V
UVLO (Off)	–	7.6	8.6	9.6	V
VCC OVP	–	27	28	30	V
VCC Clamp	I _{CC} =5mA	–	35	–	V
De-latch VCC	–	3.8	5.7	7	V
Oscillator Section					
Maximum Duty Cycle	–	70	75	80	%
Minimum Duty Cycle	–	–	0	–	%
Oscillation Frequency	Center frequency	60	65	70	kHz
Green Mode Frequency	–	–	28	–	kHz
Frequency Temperature Stability	-40 to +85°C	–	–	5	%
Frequency Voltage Stability	V _{CC} =12V to 30V	–	–	5	%
Frequency Dithering	Δf/center frequency	–	±6	–	%
Current Sense Section (SENSE Pin)					
Maximum SENSE Voltage	V _{HV} =100V	0.8	0.85	0.9	V
The Ratio of Input Voltage to Current Sense Voltage	–	2.5	3	3.5	V/V
LEB Time of SENSE	Center frequency	150	250	350	ns
Delay to Output	–	–	100	–	ns
Soft Start Time	Center frequency	3	4	5	ms
Feedback Input Section (FB Pin)					
Short Circuit Current	V _{FB} =0V	–	-0.18	–	mA
Green Mode Threshold, V _{FB}	–	–	2.1	–	V
Burst Mode Threshold, V _{FB}	–	–	1.35	–	V
Open Loop Voltage	FB pin open	–	4.6	–	V
Input Impedence	–	–	26	–	kΩ

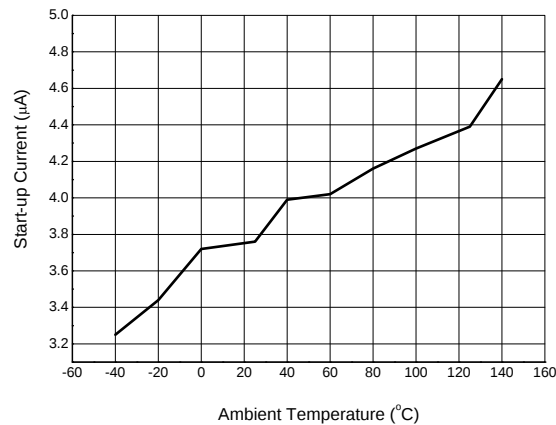
Electrical Characteristics (@V_{CC}=16V, T_A=+25°C, unless otherwise specified. Cont.)

Parameter	Conditions	Min	Typ	Max	Unit
Output Section (GATE Pin)					
Output Low Level	I _{GATE} =50mA, V _{CC} =12V	–	–	1	V
Output High Level	I _{GATE} =50mA, V _{CC} =12V	8	–	–	V
Output Clamping	–	15.5	17.5	19.5	V
Rising Time	C _L =1nF	150	250	350	ns
Falling Time	C _L =1nF	30	50	90	ns
Brownout Protection					
Turn-on DC Input (HV), V _{ON}	R=0k	92	99	106	V
Turn-off DC Input (HV), V _{OFF}	R=0k	–	V _{ON} -5	–	V
De-bounce Time of Enable	–	–	25	–	µs
De-bounce Time of Turn off	V _{FB} =3V	25	35	45	ms
Over-temperature Protection					
Shutdown Temperature	–	–	+140	–	°C
Temperature Hysteresis	–	–	+20	–	°C
Delay Time Section					
Delay 1	Center frequency Short circuit, OLP	25	35	45	ms
Delay 2	Center frequency VCC OVP	–	25	–	µs

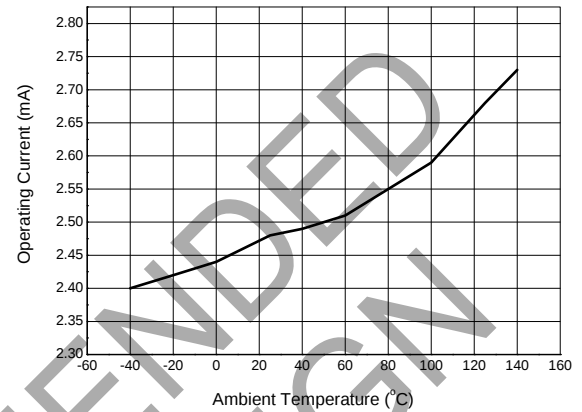
Performance Characteristics
Start-up Voltage vs. Ambient Temperature

Shutdown Voltage vs. Ambient Temperature


Performance Characteristics (Cont.)

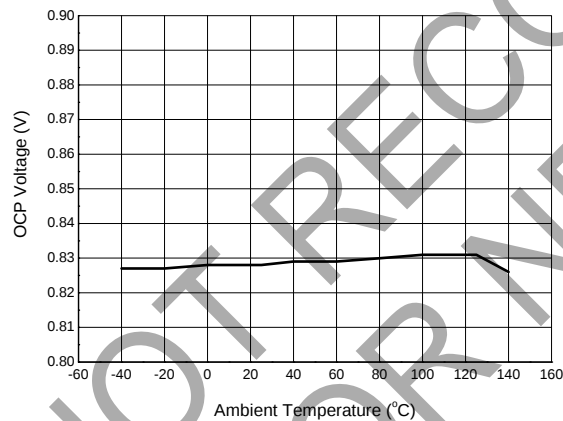
Start-up Current vs. Ambient Temperature



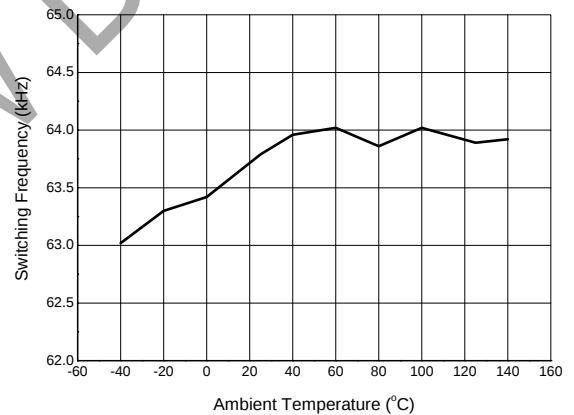
Operating Current vs. Ambient Temperature



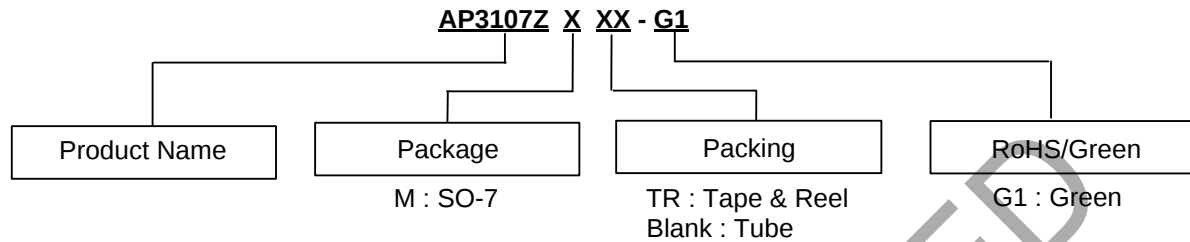
OCP Voltage vs. Ambient Temperature



Switching Frequency vs. Ambient Temperature



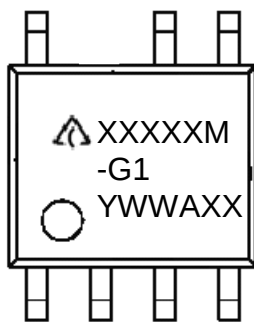
Ordering Information



Package	Temperature Range	Part Number	Marking ID	Packing
SO-7	-40 to +85°C	AP3107ZM-G1	3107ZM-G1	100/Tube
		AP3107ZMTR-G1	3107ZM-G1	4000/Tape & Reel

Marking Information

(Top View)



First and Second Lines: Logo and Marking ID
(See Ordering Information)

Third Line: Date Code

Y: Year

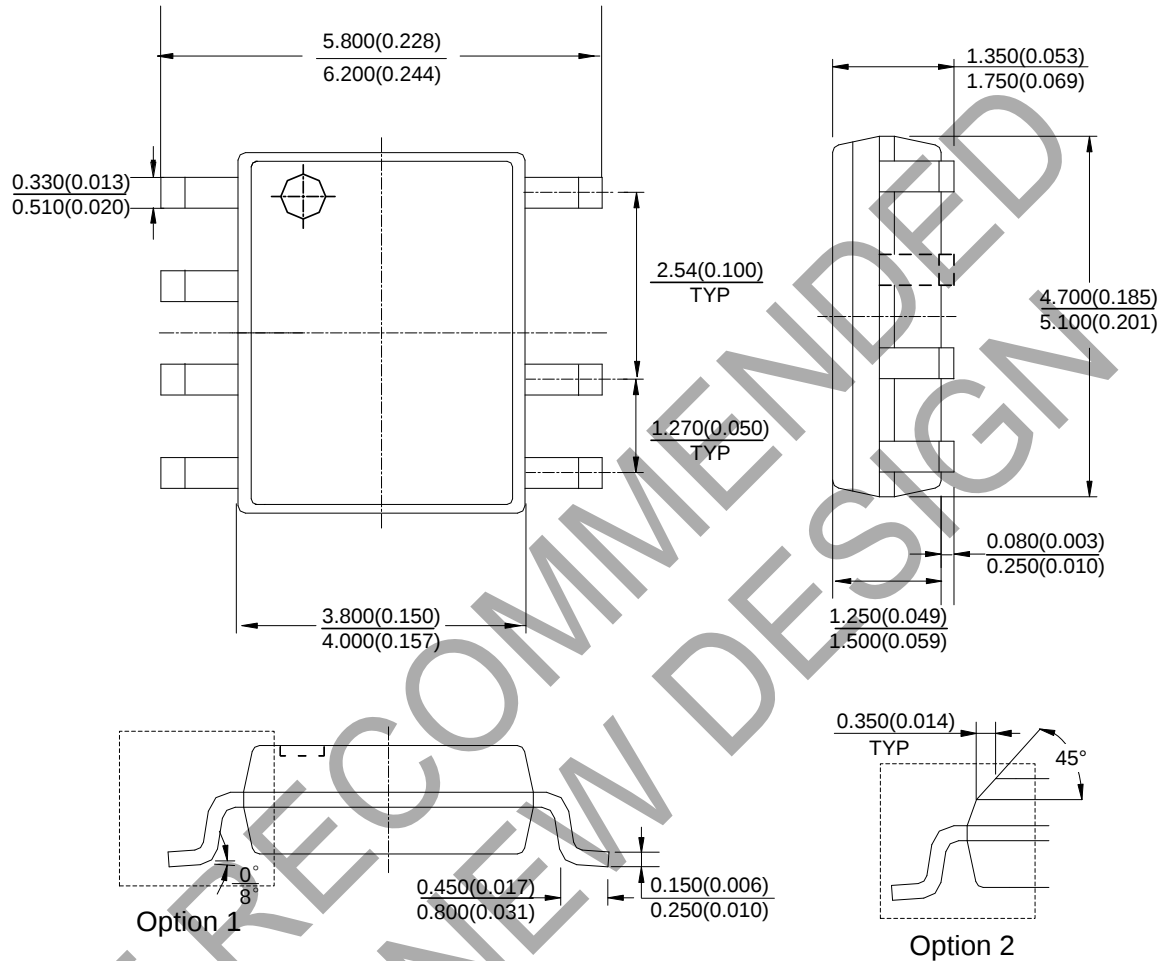
WW: Work Week of Molding

A: Assembly House Code

XX: 7th and 8th Digits of Batch No.

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

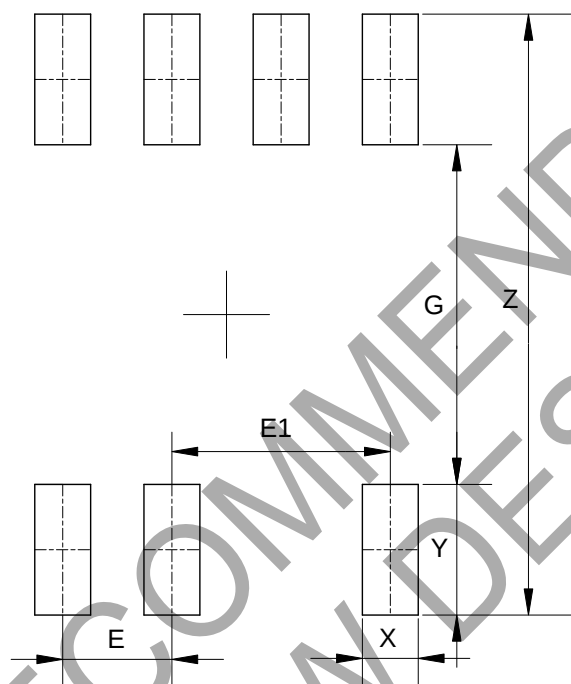
(1) Package Type: SO-7



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

Suggested Pad Layout

(1) Package Type: SO-7



Dimensions	Z (mm)/(inch)	G (mm)/(inch)	X (mm)/(inch)	Y (mm)/(inch)	E (mm)/(inch)	E1 (mm)/(inch)
Value	6.900/0.272	3.900/0.154	0.650/0.026	1.500/0.059	1.270/0.050	2.540/0.100

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