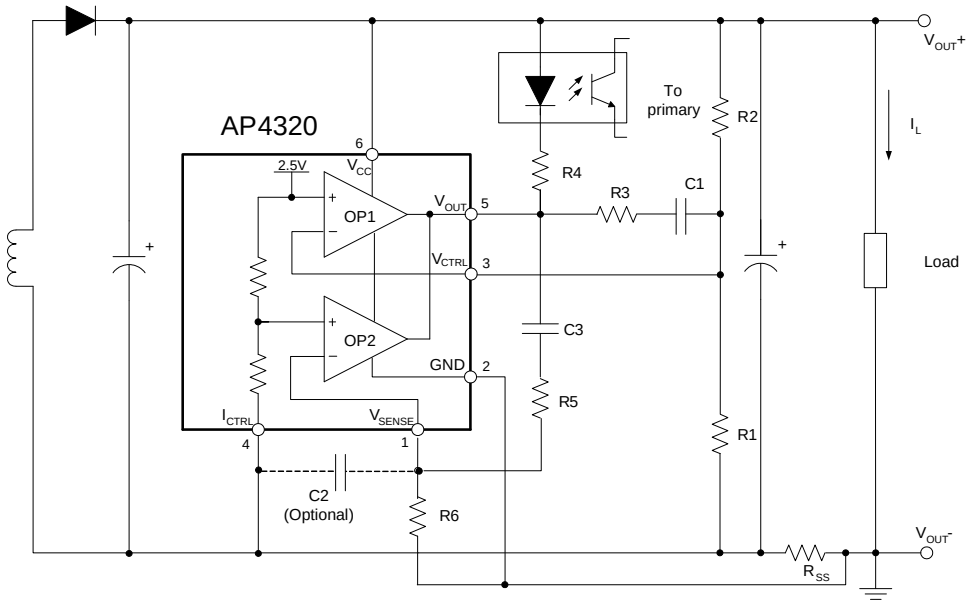
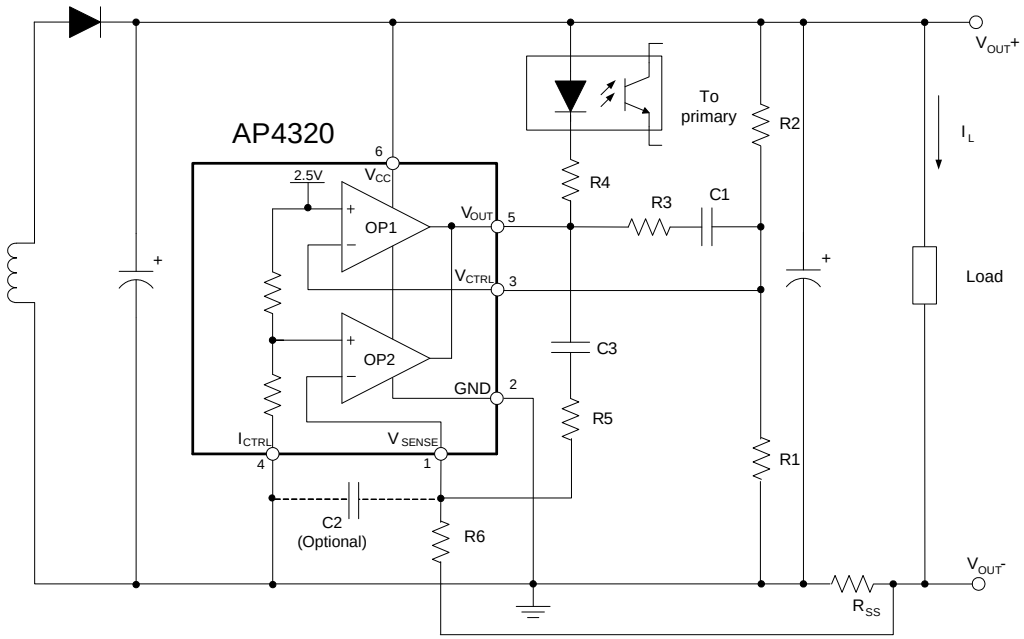
Typical Applications Circuit (Cont.)



$$V_{OUT} = [V_{REF} + (I_L \times R_{SS})] \times \frac{R1 + R2}{R1} - (I_L \times R_{SS}) \qquad CurrentLimit = \frac{V_{SENSE}}{R_{SS}}$$

Typical Application 2



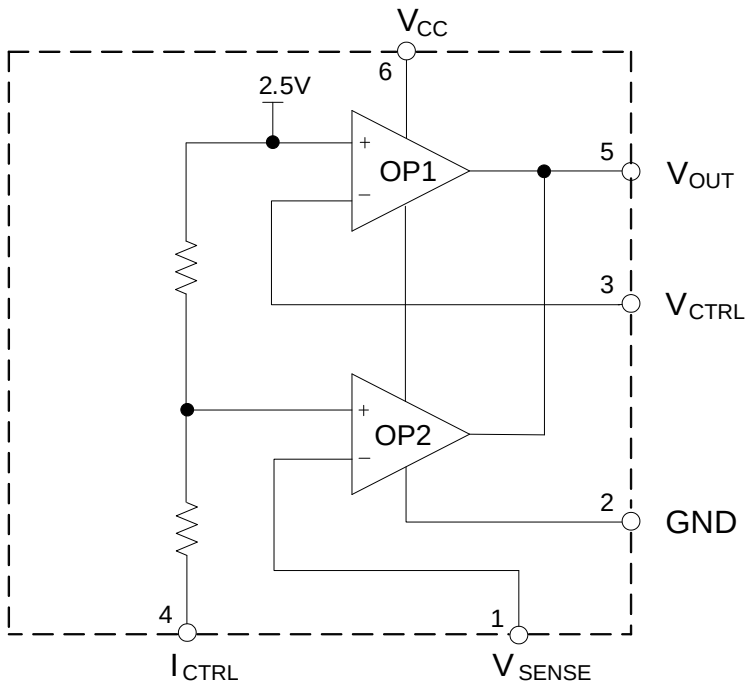
$$V_{OUT} = V_{REF} \times \frac{R1 + R2}{R1} - (I_L \times R_{SS}) \qquad CurrentLimit = \frac{V_{SENSE} \times V_{REF}}{(V_{SENSE} + V_{REF}) \times R_{SS}}$$

Typical Application 3

Pin Descriptions

Pin Number	Pin Name	Function
1	V_{SENSE}	Input pin of the current control loop
2	GND	Ground
3	V_{CTRL}	Input pin of the voltage control loop
4	I_{CTRL}	Input pin of the current control loop
5	V_{OUT}	Output pin. Sinking current only
6	V_{CC}	Power Supply

Functional Block Diagram



Absolute Maximum Ratings (Note 4)

Symbol	Parameter	Rating	Unit
V_{CC}	Power Supply Voltage	-0.3 to 38	V
V_{OUT}	Input Voltage (V_{OUT} Pin)	-0.3 to V_{CC}	V
V_{ICTRL}	Input Voltage (I_{CTRL} Pin)	-0.3 to 18	V
V_{SENSE}	Input Voltage (V_{SENSE} Pin)	-0.3 to 18	V
V_{VCTRL}	Input Voltage (V_{CTRL} Pin)	-0.3 to 18	V
T_J	Junction Temperature	+150	°C
T_{STG}	Storage Temperature	-55 to +150	°C
T_{LEAD}	Lead Temperature (Soldering, 5sec)	+260	°C
θ_{JA}	Thermal Resistance (Junction to Ambient)	250	°C/W

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

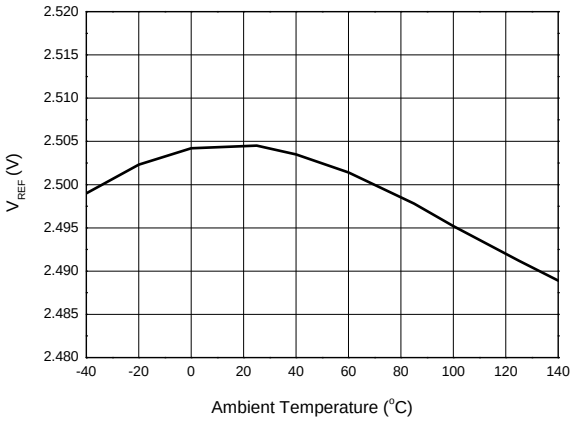
Symbol	Parameter	Min	Max	Unit
V_{CC}	Power Supply Voltage	3.5	36	V

Electrical Characteristics (@V_{CC}=20V, -25°C <T_A<+125°C, unless otherwise specified.)

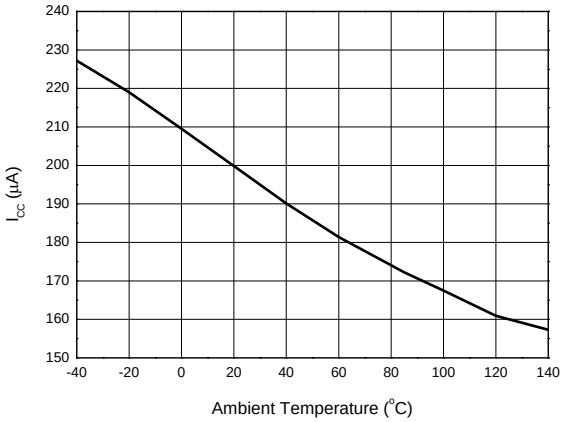
Symbol	Parameters	Conditions		Min	Typ	Max	Unit
TOTAL CURRENT CONSUMPTION							
I_{CC}	Total Supply Current Not Including the Output Sinking Current	V_{ICTRL}=V_{SENSE}=0V, V_{OUT}=Open		–	190	–	μA
VOLTAGE CONTROL LOOP							
Gmv	Transconduction Gain (V_{CTRL}). Sink Current Only	–		1	3.5	–	mA/mV
V_{REF}	Voltage Control Loop Reference	T_A=+25°C		2.488	2.50	2.512	V
		–		2.48	–	2.52	
I_{IBV}	Input Bias Current (V_{CTRL})	–		–	25	–	nA
CURRENT CONTROL LOOP							
Gmi	Transconduction Gain (I_{CTRL}). Sink Current Only	–		1.5	7	–	mA/mV
V_{SENSE}	Current Control Loop Reference	AP4320A	T_A = +25°C	29	30	31	mV
			–	28	30	32	
		AP4320B	T_A = +25°C	48.5	50	51.5	
			–	46	50	54	
I_{IBI}	Current Out of Pin I_{CTRL} at V_{SENSE}	AP4320A	V_{ICTRL}=-30mV	–	16	–	μA
		AP4320B	V_{ICTRL}=-50mV	–	16	–	
OUTPUT STAGE							
V_{OL}	Low Output Voltage at 2mA Sinking Current	–		–	30	100	mV
I_{OS}	Output Short Circuit Current. Sink Current Only	V_{OUT}=4V		–	30	–	mA

Performance Characteristics

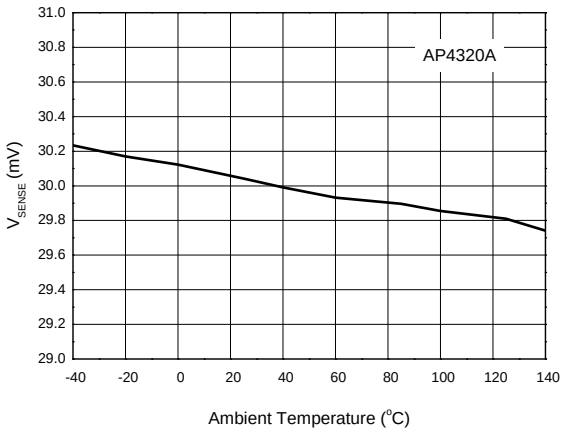
V_{REF} vs. Ambient Temperature



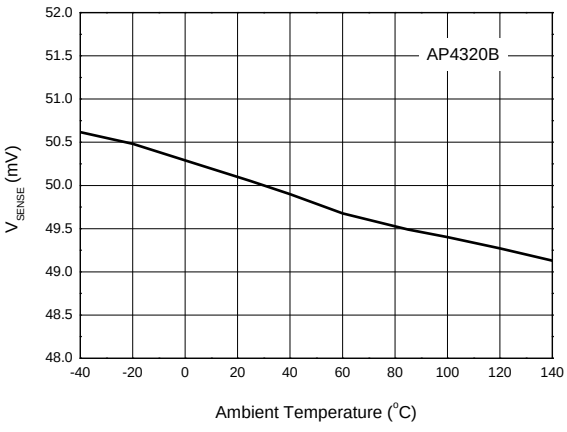
I_{CC} vs. Ambient Temperature



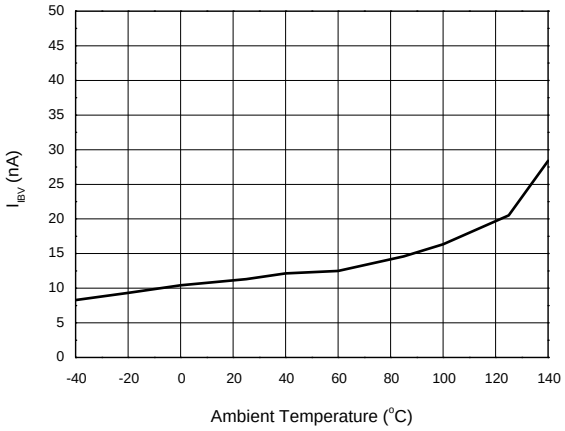
V_{SENSE} vs. Ambient Temperature



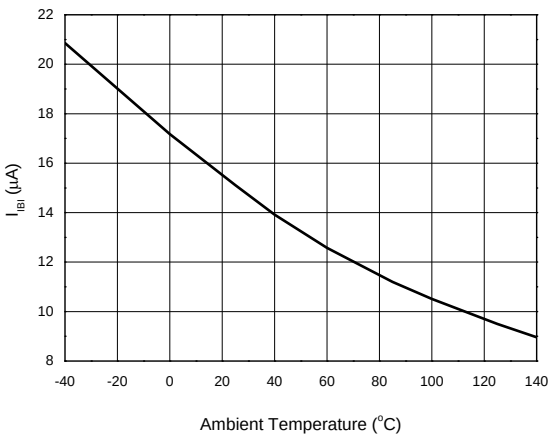
V_{SENSE} vs. Ambient Temperature



I_{IBV} vs. Ambient Temperature

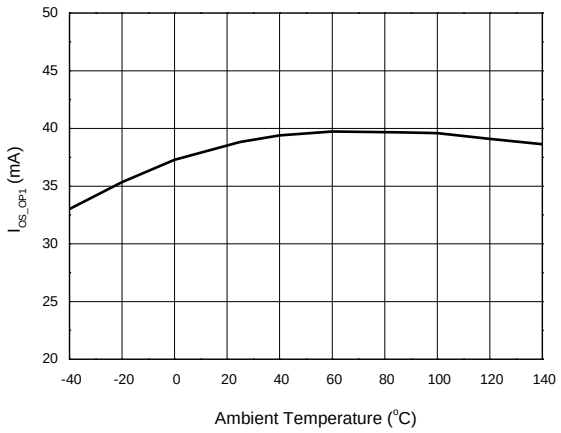


I_{IBI} vs. Ambient Temperature

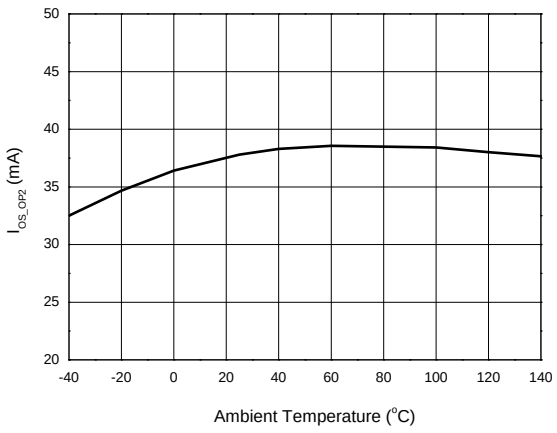


Performance Characteristics (Cont.)

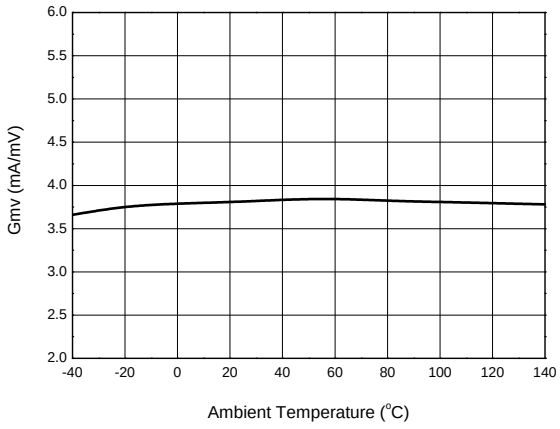
I_{OS_OP1} vs. Ambient Temperature



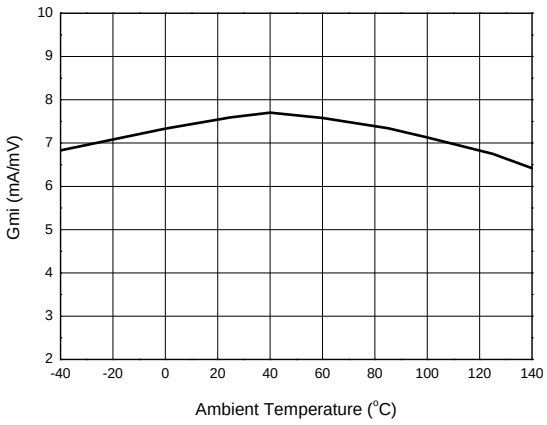
I_{OS_OP2} vs. Ambient Temperature



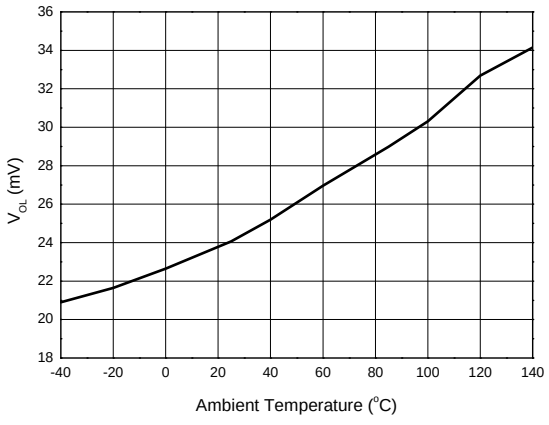
Gmv vs. Ambient Temperature



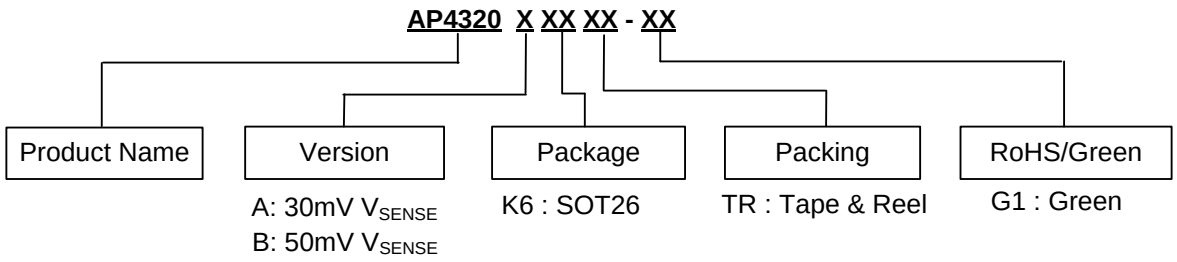
Gmi vs. Ambient Temperature



V_{OL} vs. Ambient Temperature



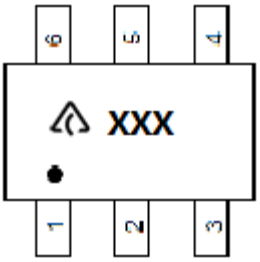
Ordering Information



Diodes IC's Pb-free products with "G1" suffix in the part number, are RoHS compliant and green.

Package	Version	Part Number	Marking ID	Packing
SOT26	30mV V_{SENSE}	AP4320AK6TR-G1	GJZ	3000/Tape and Reel
	50mV V_{SENSE}	AP4320BK6TR-G1	GKW	

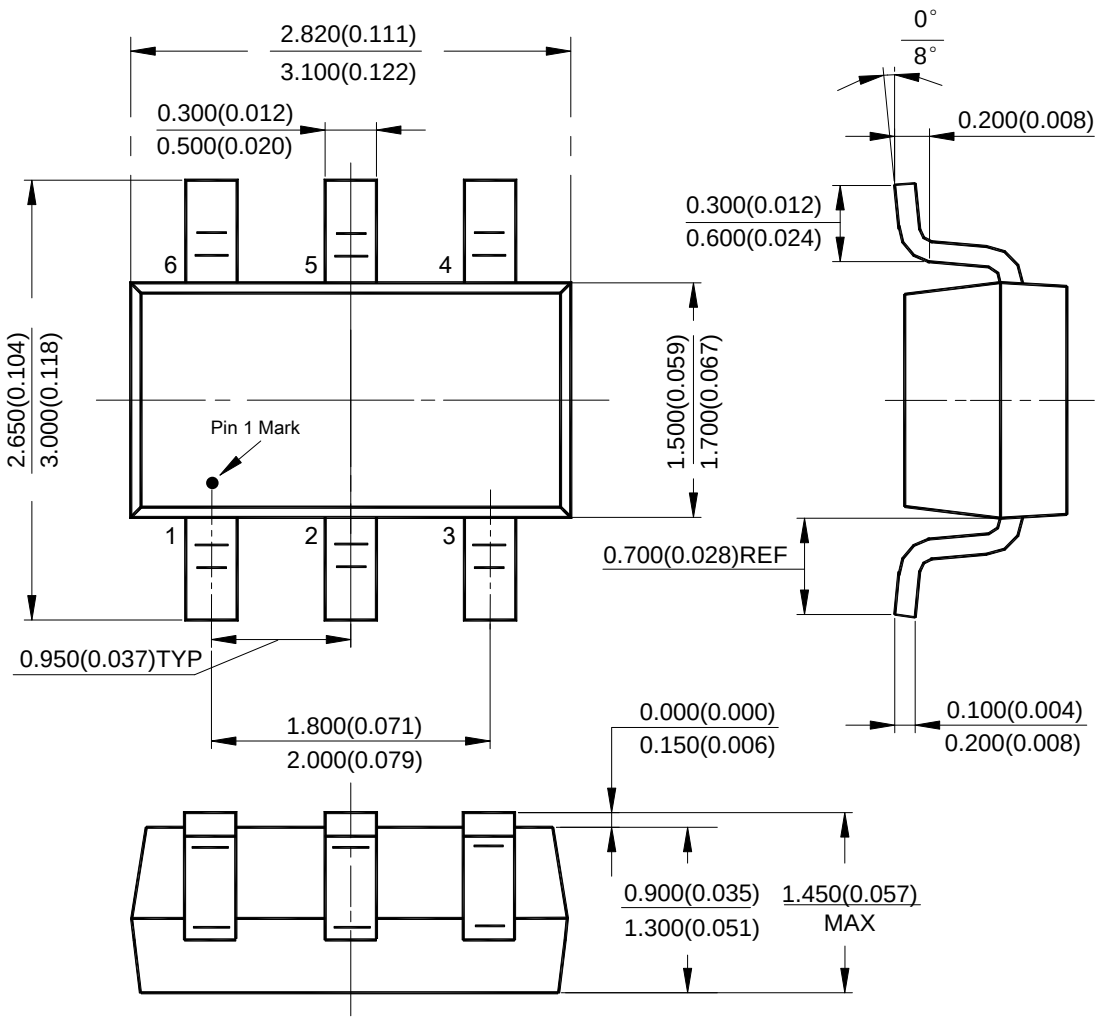
Marking Information



: Logo
XXX: Marking ID (See details from ordering information)

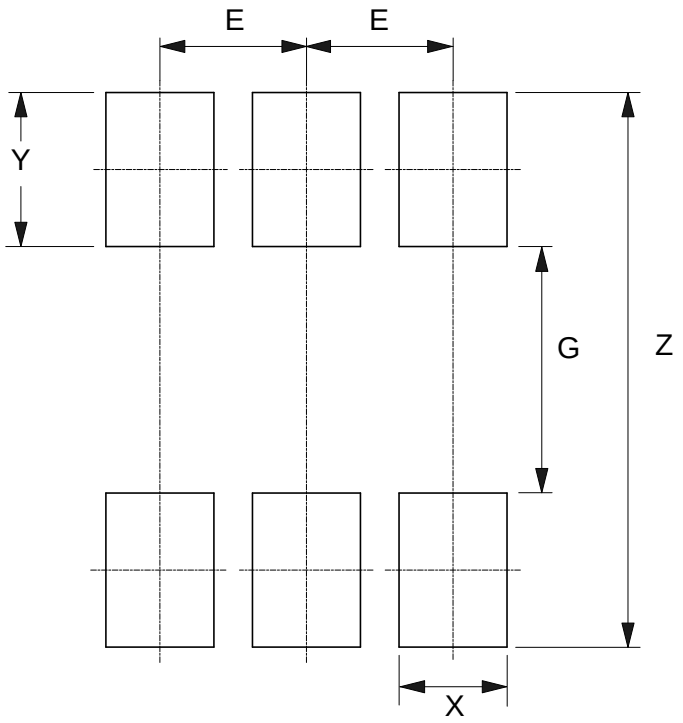
Package Outline Dimensions (All dimensions in mm(inch).)

(1) Package Type: SOT26



Suggested Pad Layout

(1) Package Type: SOT26



Dimensions	Z (mm)/(inch)	G (mm)/(inch)	X (mm)/(inch)	Y (mm)/(inch)	E (mm)/(inch)
Value	3.600/0.142	1.600/0.063	0.700/0.028	1.000/0.039	0.950/0.037

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