NEW PRODUCT

Description

The AZ2117 is a low dropout three-terminal regulator.

The AZ2117 has been optimized for low voltage where transient response and minimum input voltage are critical. It provides current limit and thermal shutdown. Its circuit includes a trimmed bandgap reference to assure output voltage accuracy to be within ±1%. On-chip thermal shutdown provides protection against a combination of high current and ambient temperature that would create excessive junction temperature.

The AZ2117 is available in ADJ output voltage version. It is available in an adjustable version which can set the output voltage with two external resistors.

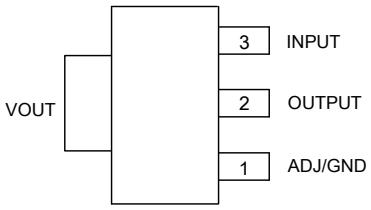
The AZ2117 is available in the industry-standard SOT223 Series power packages.

Features

- Current Limit: 1.35A (Typ)
- Output Noise from 10Hz to 10kHz: 0.003% of V_{OUT}
- PSRR at I_{OUT} = 300mA and f = 120Hz: 60dB
- Output Voltage Accuracy: ±1%
- On-chip Thermal Shutdown
- Maximum Quiescent Current: I_{QMAX} = 1mA
- Compatible with Low ESR Ceramic Capacitor
- Operation Junction Temperature: -40°C to +125°C
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Pin Assignments

(Top View)



SOT223

Applications

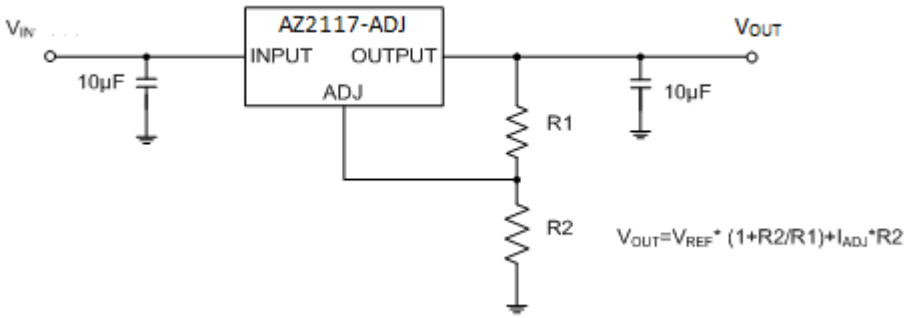
- USB Device
- Add-on Card
- DVD Player
- PC Motherboard

Notes: 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.

2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.

3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

Typical Applications Circuit (Note 4)



Note 4: The AZ2117 is compatible with low ESR ceramic capacitor.
The ESR of the output capacitors must be less than 20Ω.
A minimum of 1µF output capacitor is required.

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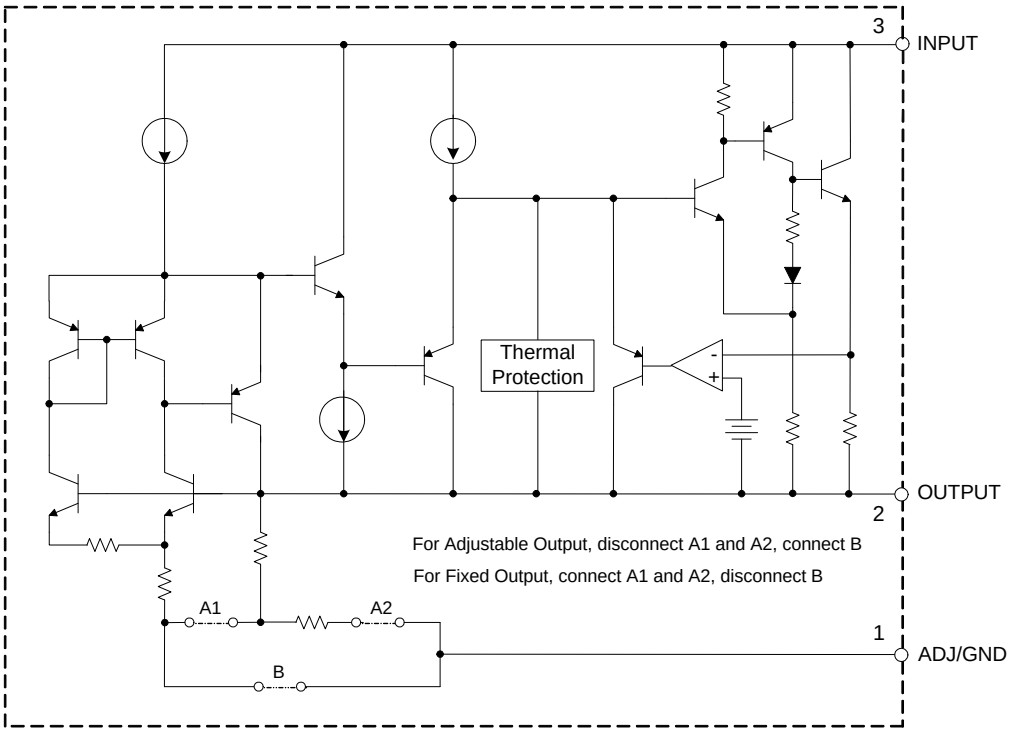
Functional Block Diagram



Absolute Maximum Ratings (Note 5)

Symbol	Parameter	Rating		Unit
V_{IN}	Input Voltage	18		V
T_J	Operating Junction Temperature Range	+150		°C
T_{STG}	Storage Temperature Range	-65 to +150		°C
θ_{JA}	Thermal Resistance (Without Heatsink)	SOT223	125	°C/W
θ_{JA}	Thermal Resistance (With Heatsink) (Note 6)	SOT223	100	°C/W
T_{LEAD}	Lead Temperature (Soldering, 10sec)	+260		°C

Notes: 5. 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.

6. Chip is soldered to 100mm^2(10mm*10mm) copper (top side solder mask) on 2oz.2 layers FR-4 PCB with 8*0.5mm vias.

Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
V_{IN}	Input Voltage	—	15	V
T_J	Operating Junction Temperature Range	-40	+125	°C

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Electrical Characteristics

(Operating Conditions: $V_{IN} \leq 10V$, I_{OUT} = 10mA, T_J = +25°C, unless otherwise specified. (P ≤ maximum power dissipation). Limits appearing in **Boldface** type apply over the entire junction temperature range for operation, -40°C to +125°C.)

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{REF}	Reference Voltage	V_{OUT}+1.75V ≤ V_{IN} ≤ 12V, I_{OUT} = 10mA		1.238	1.250	1.262	V
				98%*V_{OUT}	V_{OUT}	**102%*V_{OUT}**	V
V_{DROP}	Dropout Voltage	I_{OUT} = 1A		—	1.3	1.5	V
I_{LIMIT} (Note 7)	Maximum Output Current	1.75V ≤ V_{IN}-V_{OUT}		1.25	1.35	1.5	A
V_{RLOAD}	Load Regulation	V_{IN} = V_{OUT}+1.75V 1mA ≤ I_{OUT} ≤ 1A		—	0.2	0.6	%/A
V_{RLINE}	Line Regulation	1.75V ≤ V_{IN}-V_{OUT} ≤ 10V, I_{OUT} = 30mA		—	0.001	0.04	%/V
I_Q	Quiescent Current	I_{OUT} = 0		—	0.35	1	mA
—	Minimum Load Current	For ADJ Version, 1.75V ≤ V_{IN}-V_{OUT} ≤ 10V		—	0.3	1	mA
I_{ADJ}	Adjustable Pin Current	—		—	7	10	µA
—	Adjustable Pin Current Change	1.75V ≤ V_{IN}-V_{OUT} ≤ 10V		—	0.3	2	µA
PSRR	Power Supply Rejection Ratio	Ripple 1.0 Vp-p V_{IN} = V_{OUT}+2V, I_{OUT} = 100mA	f = 120Hz	—	60	—	dB
			f = 1kHz	—	60	—	
$\frac{\Delta V_{OUT} / V_{OUT}}{\Delta T}$	Output Voltage Temperature Coefficient	I_{OUT} = 30mA		—	±100	—	ppm/°C
V_{NOISE}	RMS Output Noise	10Hz ≤ f ≤ 100kHz, No Load		—	0.003	—	%
T_{OTSD}	Thermal Shutdown Temperature	—		—	+170	—	°C
T_{HYOTSD}	Thermal Shutdown Hysteresis	—		—	+20	—	°C
θ_{JC}	Thermal Resistance (Junction to Case)	SOT223		—	40	—	°C/W

Note 7: Make the V_{OUT} down to about 98% of the test values, I_{OUT} value is set to I_{LIMIT} at this time.

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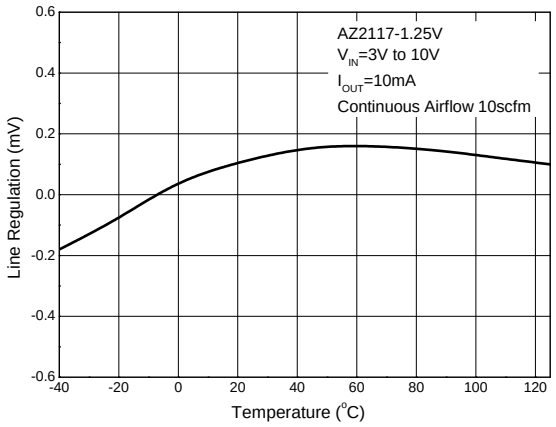
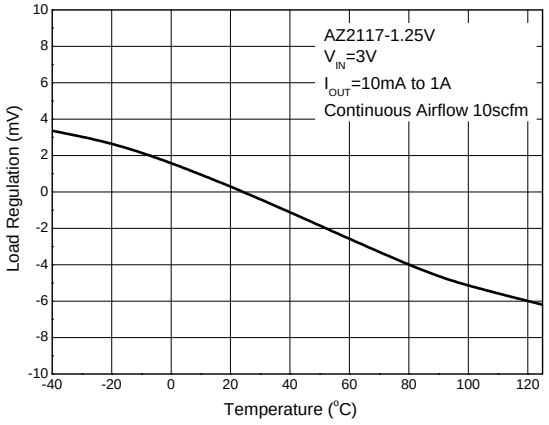
Performance Characteristics

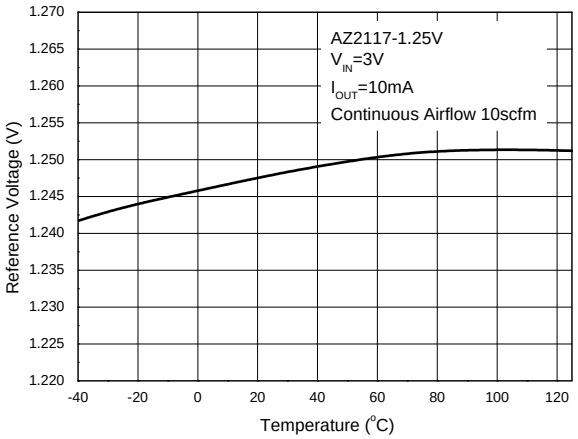
Line Regulation vs. Temperature



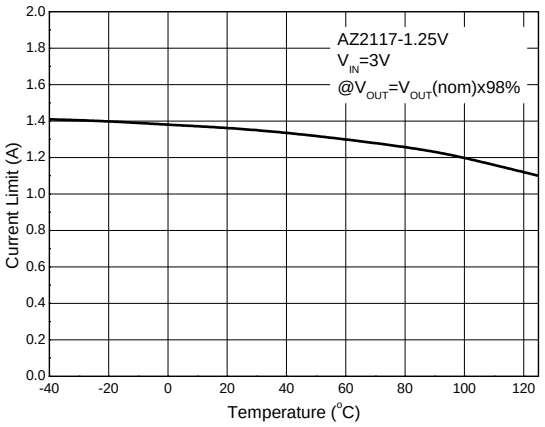
Load Regulation vs. Temperature



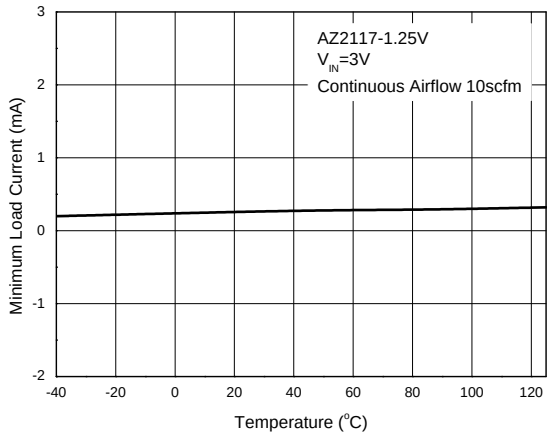
Reference Voltage vs. Temperature



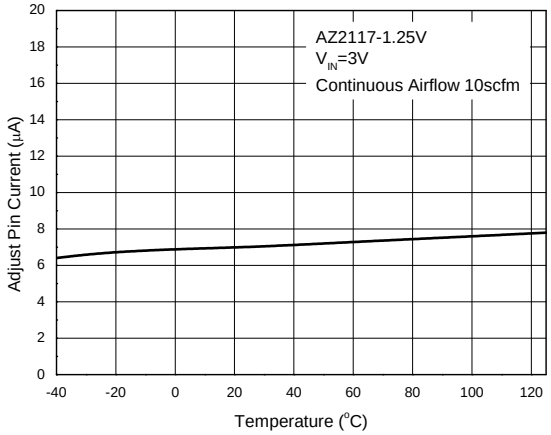
Current Limit vs. Temperature



Minimum Load Current vs. Temperature



Adjust Pin Current vs. Temperature



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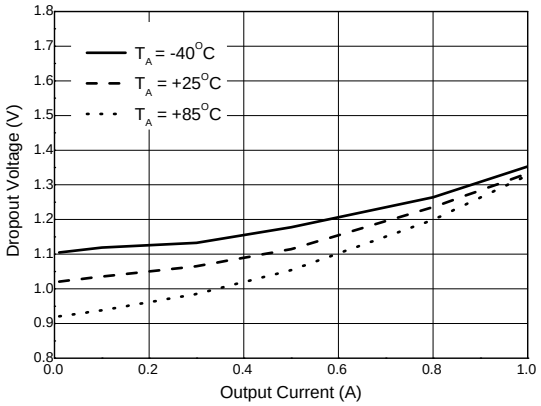
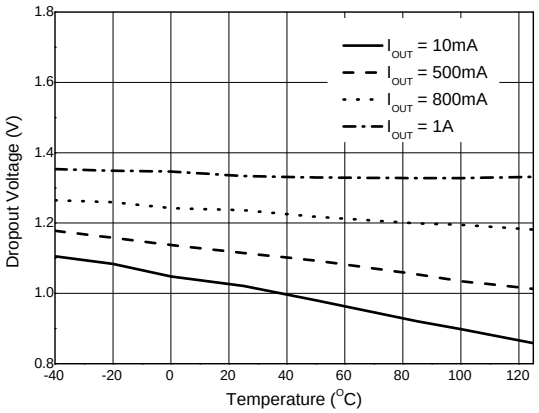
Performance Characteristics (Cont.)

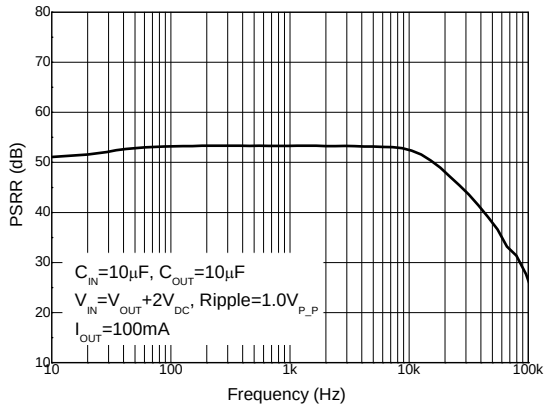
Dropout Voltage vs. Output Current



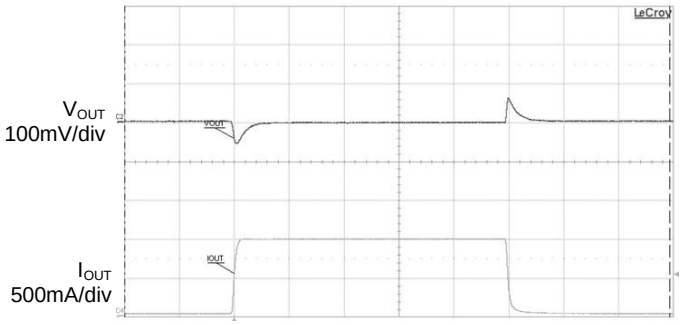
Dropout Voltage vs. Temperature



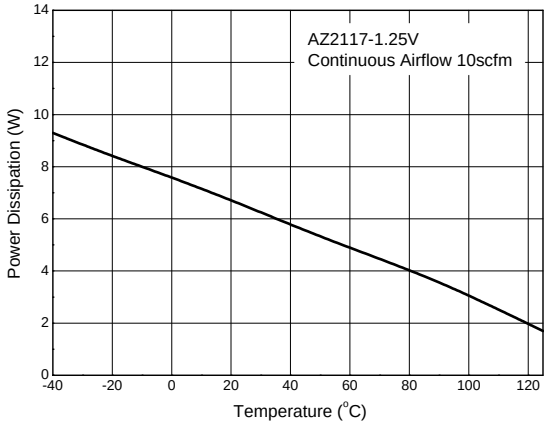
PSRR vs. Frequency



Load Transient Response



Power Dissipation vs. Temperature



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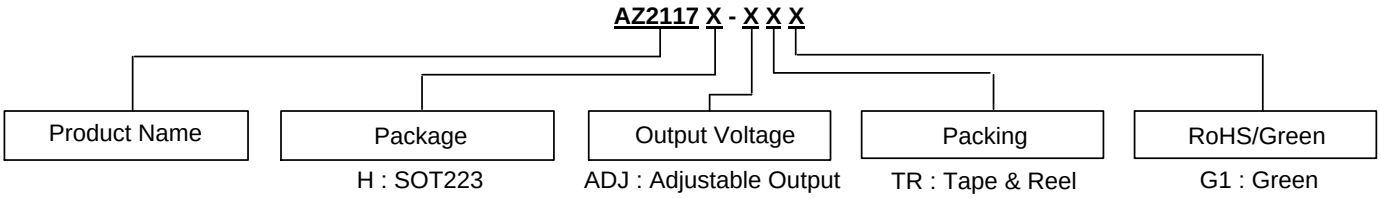
Ordering Information

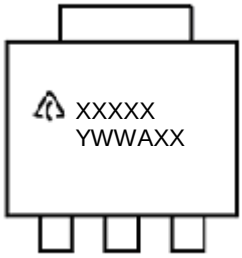


Package	Temperature Range	Part Number	Marking ID	Packing
SOT223	-40°C to +125°C	AZ2117H-ADJTRG1	GH15P	4000/Tape & Reel

Marking Information

(1) SOT223

(Top View)



First Line: Logo and Marking ID
(See Ordering Information)
Second Line: Date Code
Y: Year
WW: Work Week of Molding
A: Assembly House Code
XX: 7th and 8th Digits of Batch Number

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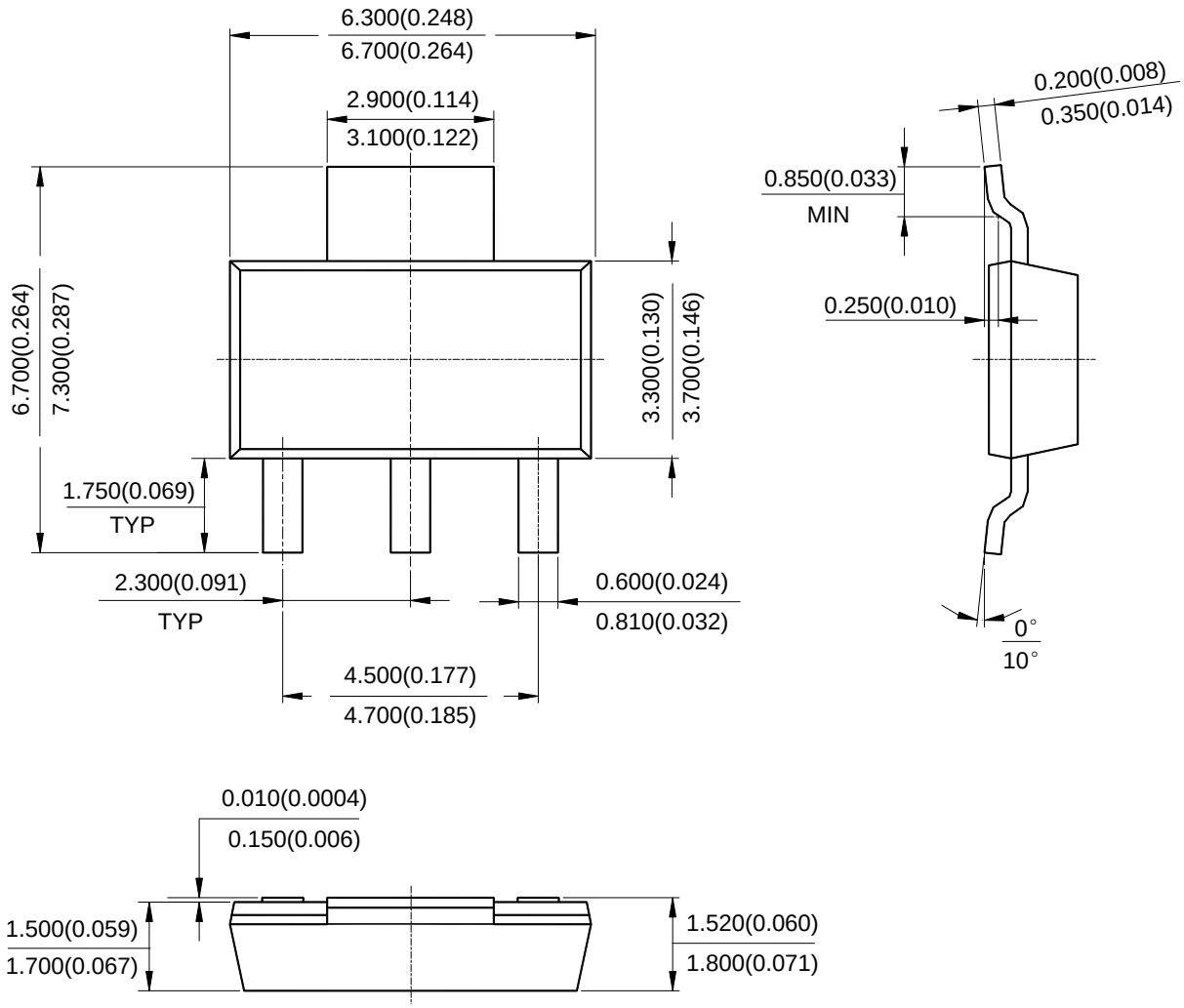
Package Outline Dimensions (All dimensions in mm (inch).)

(1) Package Type: SOT223



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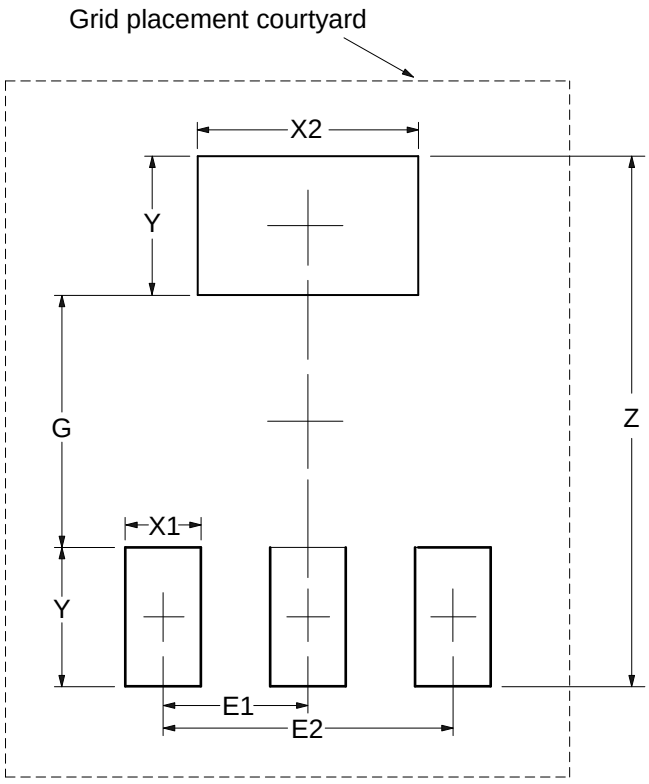
Suggested Pad Layout

(1) Package Type: SOT223



Dimensions	Z (mm)/(inch)	G (mm)/(inch)	X1 (mm)/(inch)	X2 (mm)/(inch)	Y (mm)/(inch)	E1 (mm)/(inch)	E2 (mm)/(inch)
Value	8.400/0.331	4.000/0.157	1.200/0.047	3.500/0.138	2.200/0.087	2.300/0.091	4.600/0.181

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