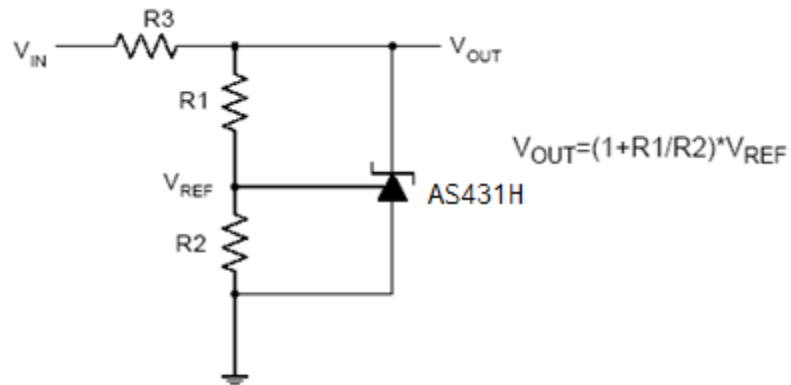
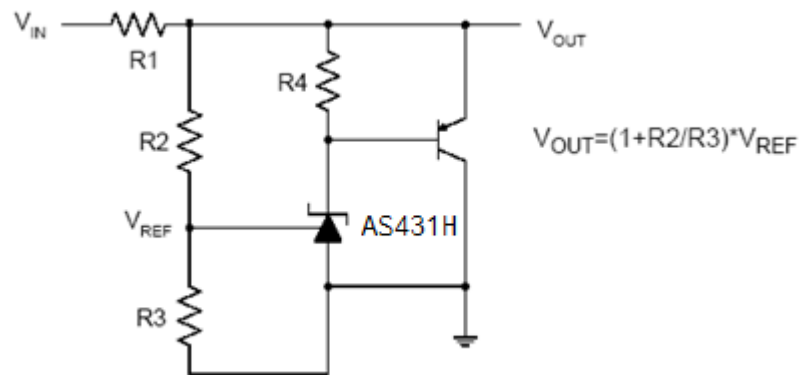


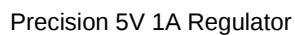
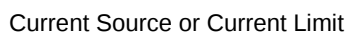
Typical Applications Circuit



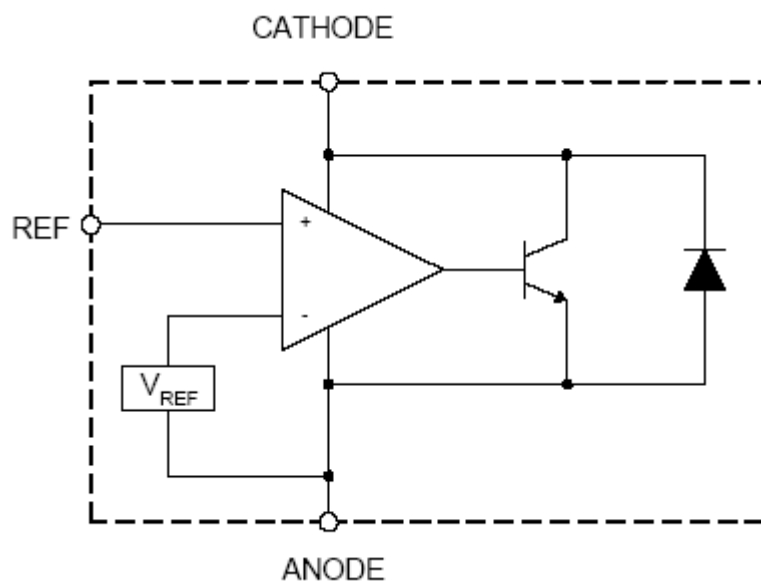
Shunt Regulator



High Current Shunt Regulator



Functional Block Diagram



Absolute Maximum Ratings (Note 4)

Symbol	Parameter	Rating		Unit
V_{KA}	Cathode Voltage	40		V
I_{KA}	Cathode Current Range (Continuous)	-100 to 150		mA
I_{REF}	Reference Input Current Range	10		mA
θ_{JA}	Thermal Resistance	SOT23	380	°C/W
		TO92 (Ammo Packing)	165	
T_J	Junction Temperature	+150		°C
T_{STG}	Storage Temperature Range	-65 to +150		°C
ESD	ESD (Human Body Model)	2000		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

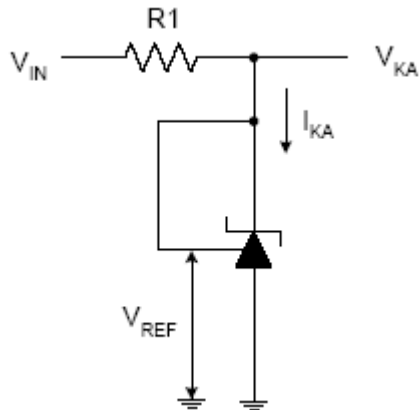
Symbol	Parameter	Min	Max	Unit
V_{KA}	Cathode Voltage	V_{REF}	36	V
I_{KA}	Cathode Current	0.5	100	mA
T_A	Operating Ambient Temperature Range	-40	+125	°C

Electrical Characteristics

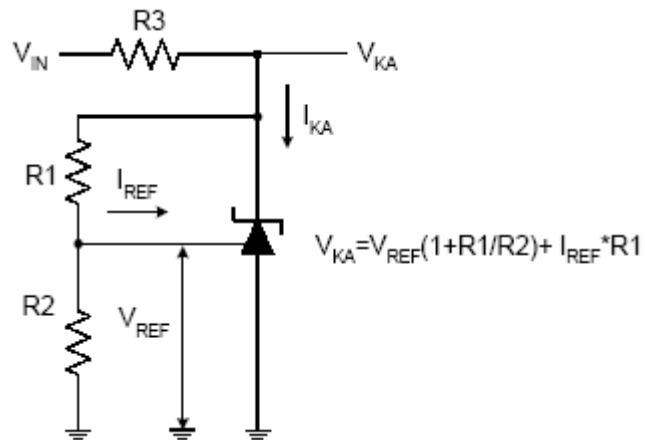
(Operating Conditions: $T_A = +25^{\circ}\text{C}$, unless otherwise specified.)

Symbol	Parameter	Test Circuit	Conditions	Min	Typ	Max	Unit
V_{REF}	Reference Voltage	4	$V_{KA} = V_{REF}$, $I_{KA} = 10\text{mA}$	2.483	2.495	2.507	V
				2.470	2.495	2.520	
ΔV_{REF}	Deviation of Reference Voltage Over Full Temperature Range	4	$V_{KA} = V_{REF}$, $I_{KA} = 10\text{mA}$	—	5	8	mV
			0 to $+70^{\circ}\text{C}$	—	5	14	
			-40 to $+85^{\circ}\text{C}$	—	5	16	
$\frac{\Delta V_{REF}}{\Delta V_{KA}}$	Ratio of Change in Reference Voltage to the Change in Cathode Voltage	5	$I_{KA} = 10\text{mA}$	$\Delta V_{KA} = 10\text{V to } V_{REF}$	—	-1.0	mV/V
				$\Delta V_{KA} = 36\text{V to } 10\text{V}$	—	-0.5	
I_{REF}	Reference Current	5	$I_{KA} = 10\text{mA}$, $R1 = 10\text{k}\Omega$, $R2 = \infty$	—	0.7	4	μA
ΔI_{REF}	Deviation of Reference Current Over Full Temperature Range	5	$I_{KA} = 10\text{mA}$, $R1 = 10\text{k}\Omega$, $R2 = \infty$, $T_A = -40$ to $+125^{\circ}\text{C}$	—	0.4	1.2	μA
I_{KA} (Min)	Minimum Cathode Current for Regulation	4	$V_{KA} = V_{REF}$	—	0.35	0.5	mA
I_{KA} (Off)	Off-state Cathode Current	6	$V_{KA} = 36\text{V}$, $V_{REF} = 0$	—	0.002	0.5	μA
Z_{KA}	Dynamic Impedance	4	$V_{KA} = V_{REF}$, $I_{KA} = 0.5$ to 100mA , $f \leq 1.0\text{KHz}$	—	0.15	0.5	Ω
θ_{JC}	Thermal Resistance	—	SOT23	—	136	—	$^{\circ}\text{C/W}$
			TO92 (Ammo Packing)	—	80	—	

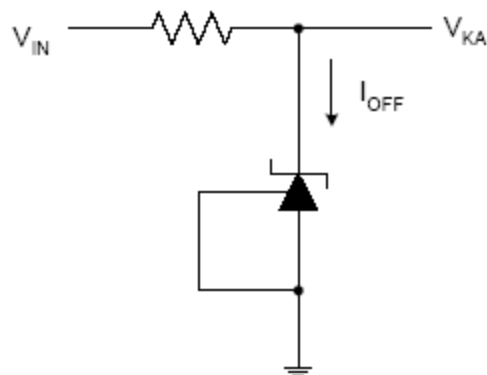
Electrical Characteristics (Cont.)



Test Circuit 4 for $V_{KA} = V_{REF}$



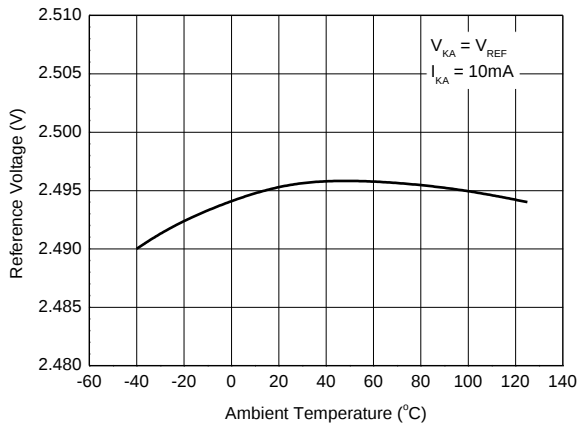
Test Circuit 5 for $V_{KA} > V_{REF}$



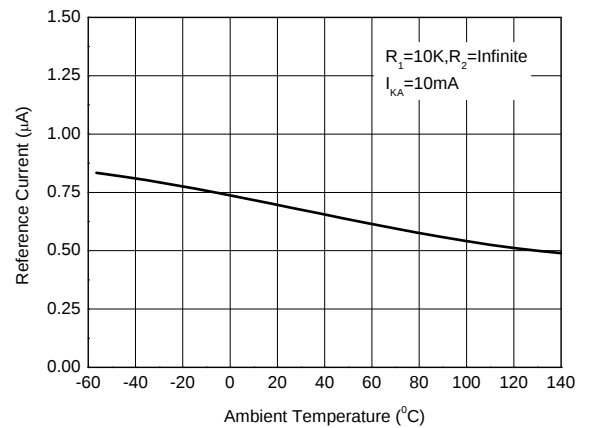
Test Circuit 6 for I_{OFF}

Performance Characteristics

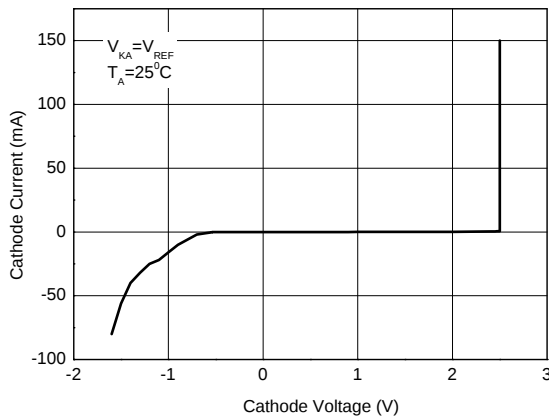
Reference Voltage vs. Ambient Temperature



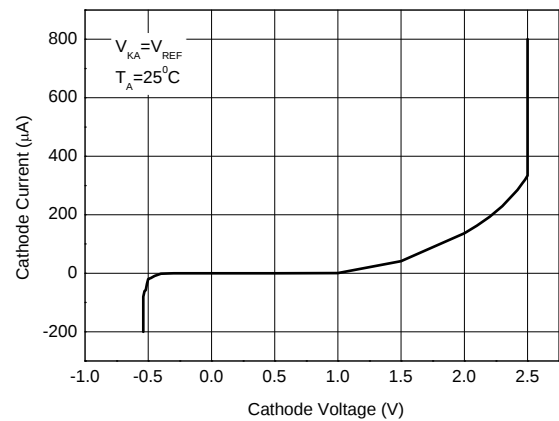
Reference Current vs. Ambient Temperature



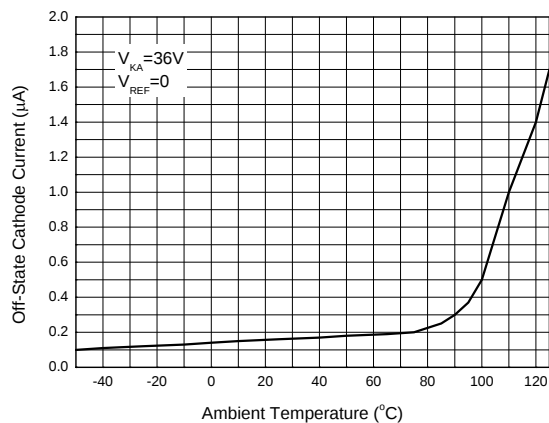
Cathode Current vs. Cathode Voltage



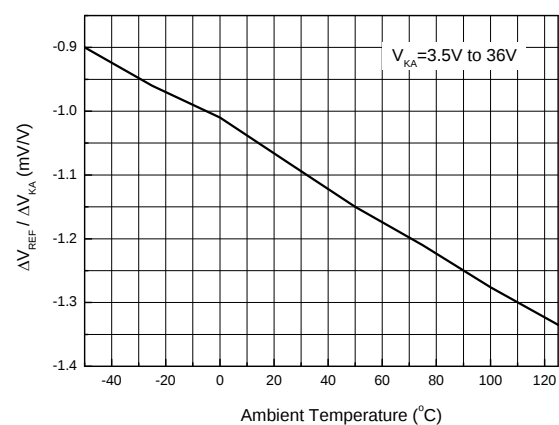
Cathode Current vs. Cathode Voltage



Off-State Cathode Current vs. Ambient Temperature

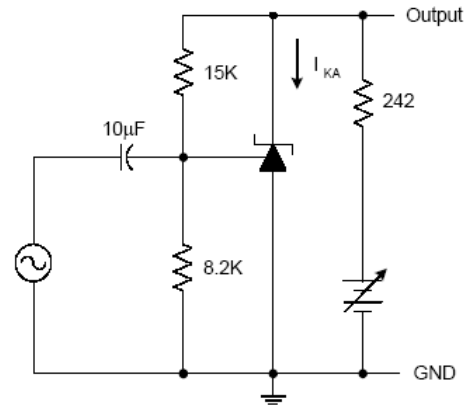
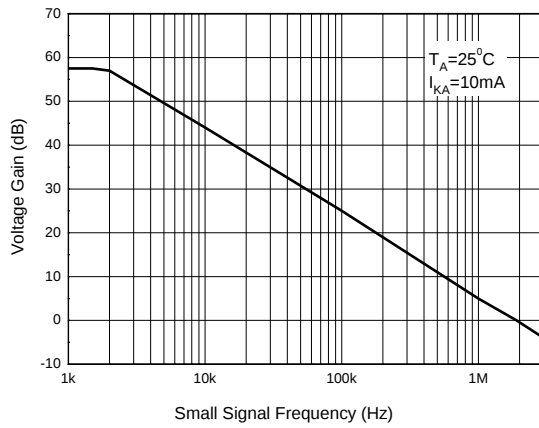


Ratio of Delta Reference Voltage to the Ratio of Delta Cathode Voltage

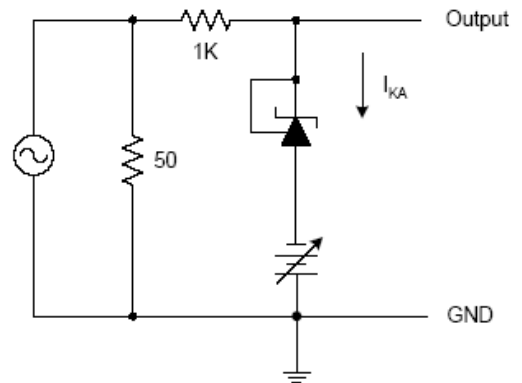
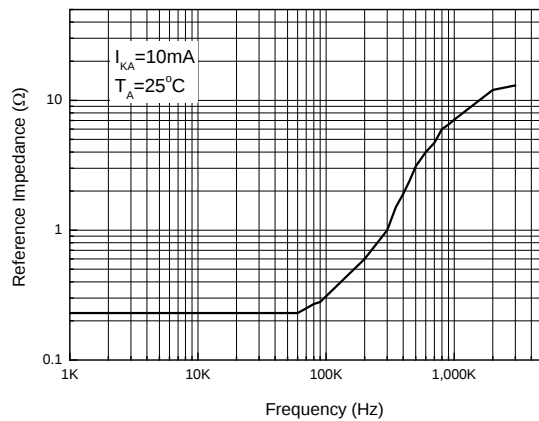


Performance Characteristics (Cont.)

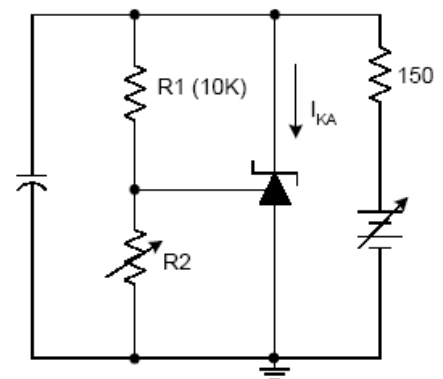
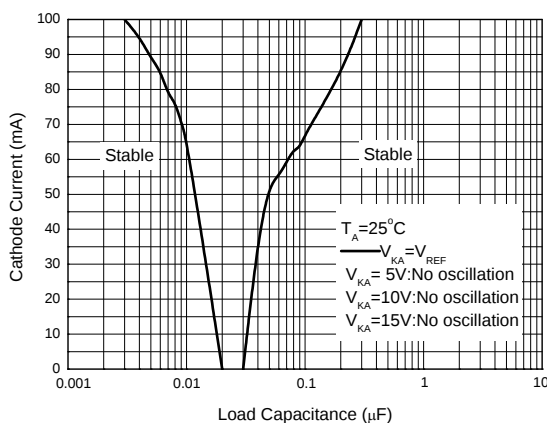
Small Signal Voltage Gain vs. Frequency



Reference Impedance vs. Frequency

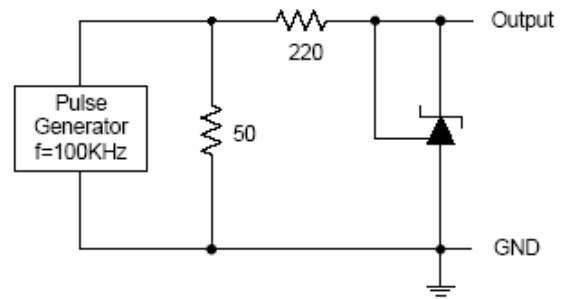
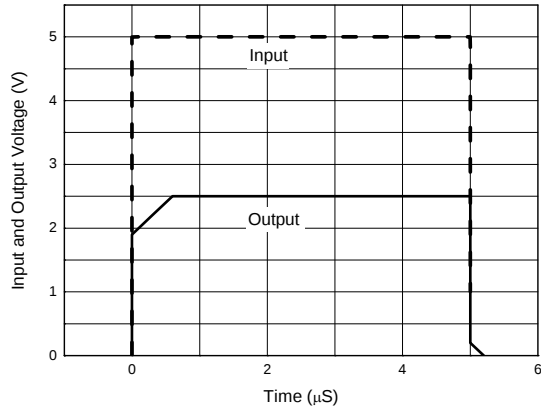


Stability Boundary Conditions vs. Load Capacitance

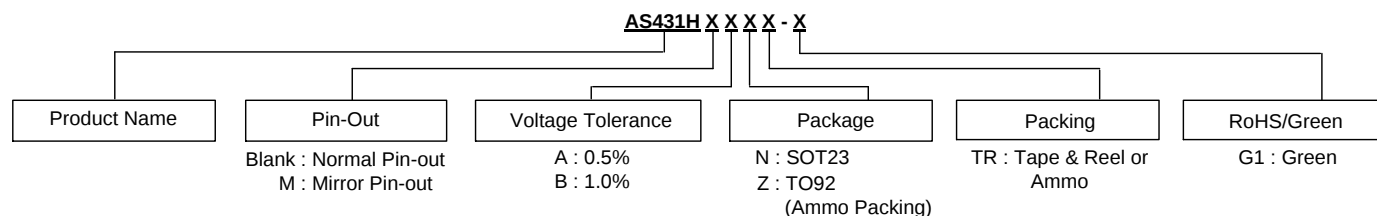


Performance Characteristics (Cont.)

Pulse Response of Input and Output Voltage



Ordering Information

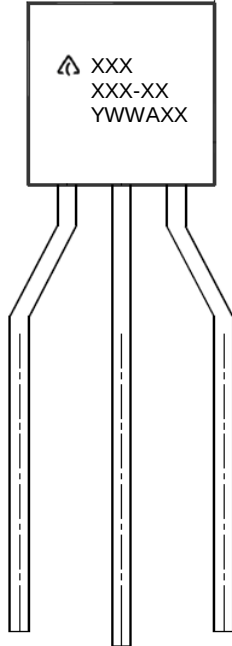


Package	Temperature Range	Pin-Out	Voltage Tolerance	Part Number	Marking ID	Packing
SOT23	-40 to +125°C	Normal Pin-out	0.5%	AS431HANTR-G1	GJA	3000/Tape & Reel
			1.0%	AS431HBNTR-G1	GJB	3000/Tape & Reel
SOT23	-40 to +125°C	Mirror Pin-out	0.5%	AS431HMANTR-G1	GM5	3000/Tape & Reel
			1.0%	AS431HMBNTR-G1	GM6	3000/Tape & Reel
TO92 (Ammo Packing)	-40 to +125°C	Normal Pin-out	0.5%	AS431HAZTR-G1	431HAZ-G1	2000/Ammo
			1.0%	AS431HBZTR-G1	431HBZ-G1	2000/Ammo

Marking Information

(1) TO92 (Ammo Packing)

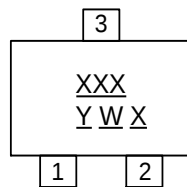
(Top View)



First and Second Line: Logo and Marking ID
(See Ordering Information)
Third Line: Date Code
Y: Year
WW: Work Week of Molding
A: Assembly House Code
XX: Internal Code.

(2) SOT23

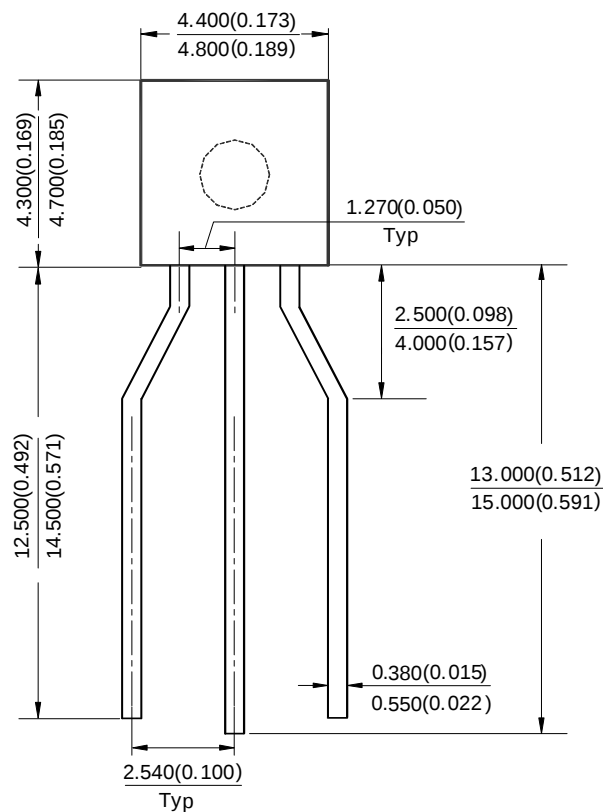
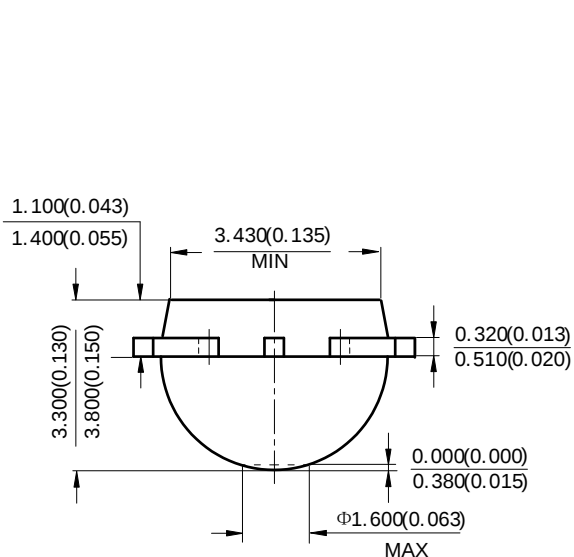
(Top View)



XXX : Identification Code
Y : Year 0 to 9
W : Week : A to Z : 1 to 26 week;
a to z : 27 to 52 week; z represents
52 and 53 week
X : Internal Code

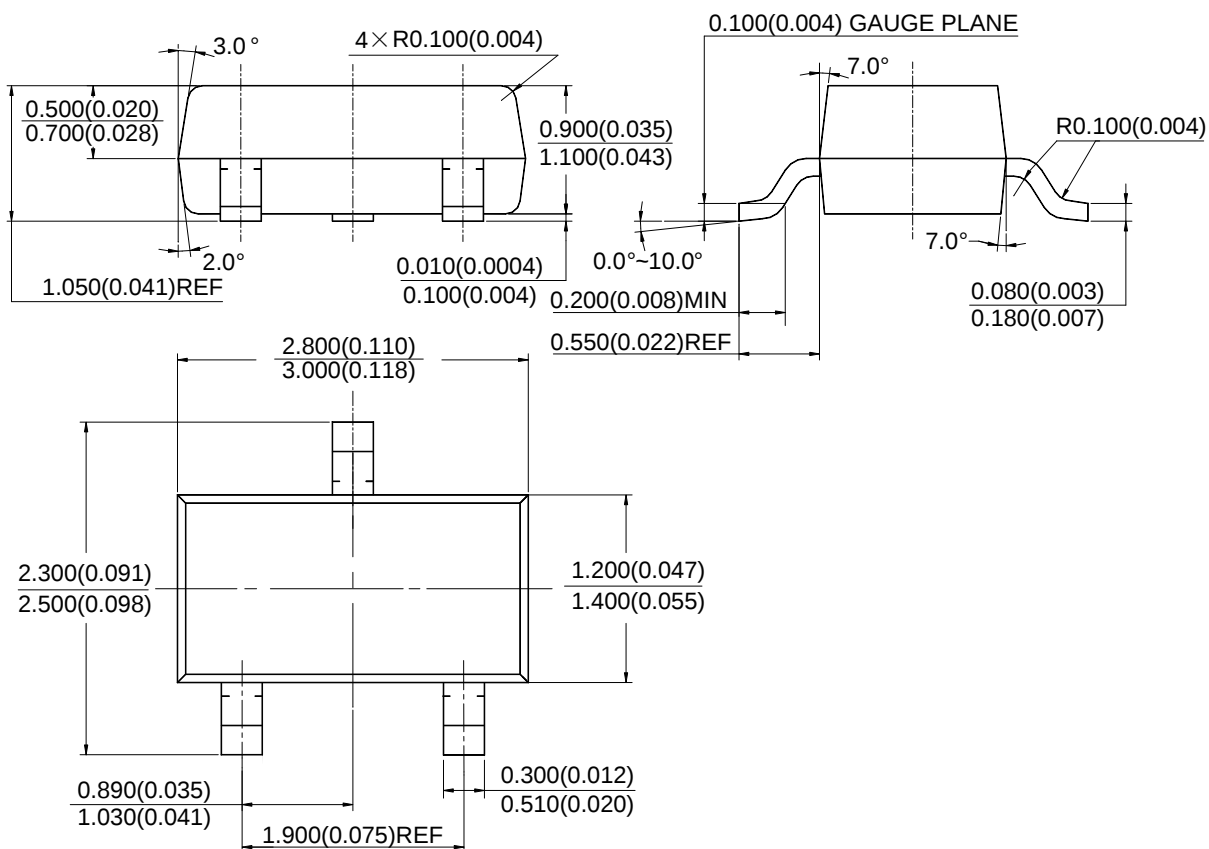
Package Outline Dimensions (All dimensions in mm.)

(1) TO92 (Ammo Packing)



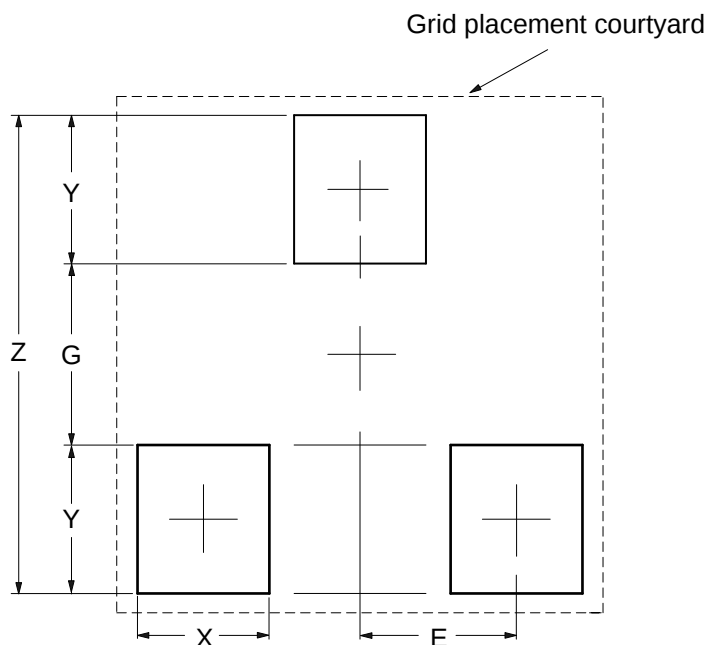
Package Outline Dimensions (Cont. All dimensions in mm.)

(2) SOT23



Suggested Pad Layout

(1) SOT23



Dimensions	Z (mm)/(inch)	G (mm)/(inch)	X (mm)/(inch)	Y (mm)/(inch)	E (mm)/(inch)
Value	2.900/0.114	1.100/0.043	0.800/0.031	0.900/0.035	0.950/0.037

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