Positive Adjustable Voltage Regulator

AVAILABLE AS MILITARY / SPACE SPECIFICATIONS

- SMD 5962-99517 pending
- Radiation Tolerant
- MIL-STD-883, 1.2.1 "QML" pending

FEATURES

- Guaranteed 0.5A Output Current
- Radiation Guaranteed to 100K RADS TID
- Adjustable output down to 1.2V
- Current Limit constant over temperature
- Output is short circuit protected
- 80Db Ripple Rejection

OPTIONS MARKINGS

- Packages

16 pin Cerpack Gullwing	GW16
3 Lead Metal Can	TO39

- Process / Temperature Ranges

MILITARY (-55°C to +125°C)	/XT
MIL-STD-883 paragraph 1.2.1	/883
MIL-STD-883 CLASS 'S'	/SPACE

GENERAL DESCRIPTION

The AS117 is an adjustable 3-terminal positive voltage regulator capable of supplying in excess of **.5A** over a **1.2V to 37V** output voltage range. It is exceptionally easy to use & requires only 2 external resistors to set the output voltage. Further, both line and load regulation are better than standard fixed regulators.

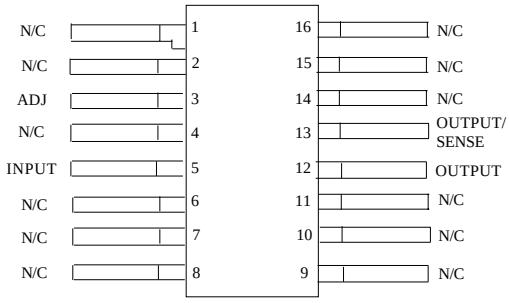
In addition to higher performance than fixed regulators, the AS117 offers full overload protection. Included on the chip are current limit, thermal overload protection and safe area protection. All overload protection circuitry remains fully functional even if the adjustment terminal is disconnected.

The AS117 is radiation tolerant to **100K Rads(Si)** total dose levels as tested by MIL-STD-883 Method 1019 Condition A. The user is encouraged to contact ASI for acopy of current radiation testing reports.

PIN ASSIGNMENT

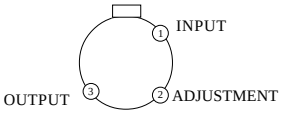
(Top View)

16 Pin CerPack Gullwing(GW16)



3 Lead Metal Can (TO39)

(Bottom View)



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TYPICAL APPLICATIONS

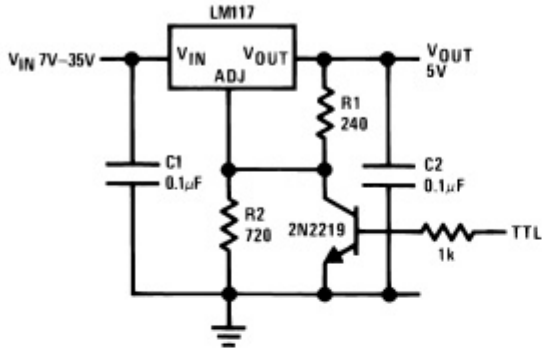
Besides replacing fixed regulators, the AS117 is useful in a wide variety of other applications. Since the regulator is "Floating" and sees only the input-to-output differential voltage, supplies of several hundred volts can be regulated as long as the maximum input to output differential is not exceeded, (i.e., avoid short circuiting the output).

Also it makes an especially simple adjustable switching regulator, a programmable output regulator, or by connecting a fixed resistor between the adjustment pin & the output pin, the AS117 can be used as a precision current regulator. Supplies with electronic shutdown can be achieved by clamping the adjustment terminal to ground which programs the output to 1.2V where most loads draw little current.

Normally no capacitors are needed unless the device is situated more than 6 inches from the input filter capacitors in which case an input bypass is needed. An optional output capacitor can be added to improve transient response. The adjustment terminal can be bypassed to achieve very high ripple rejection ratios which are difficult to achieve with standard 3-terminal regulators.

Typical Applications

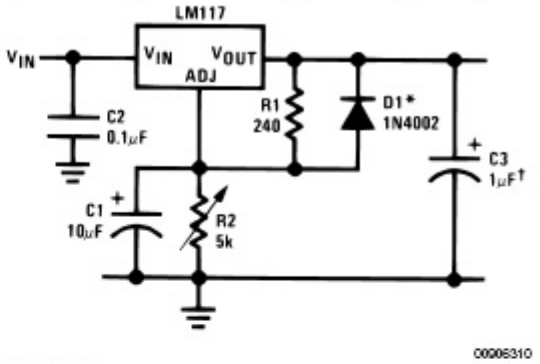
5V Logic Regulator with Electronic Shutdown*



00006303

*Min. output ≈ 1.2V

Adjustable Regulator with Improved Ripple Rejection

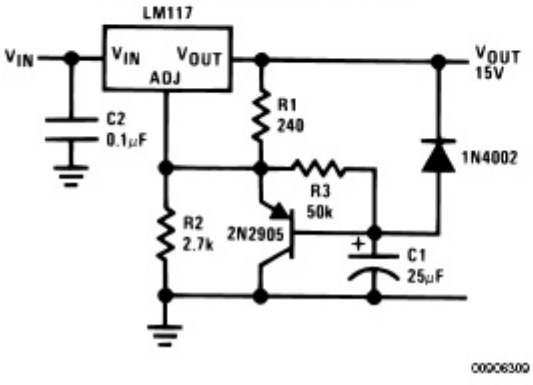


00006310

†Solid tantalum

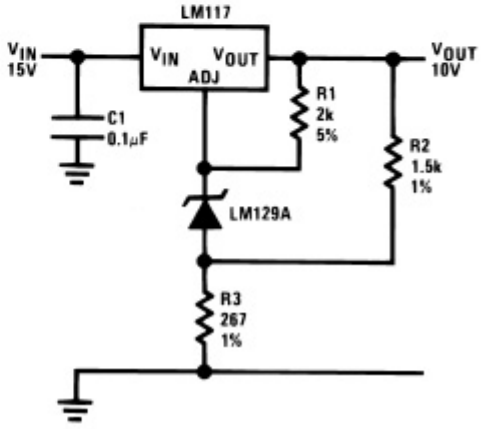
*Discharges C1 if output is shorted to ground

Slow Turn-On 15V Regulator



00006309

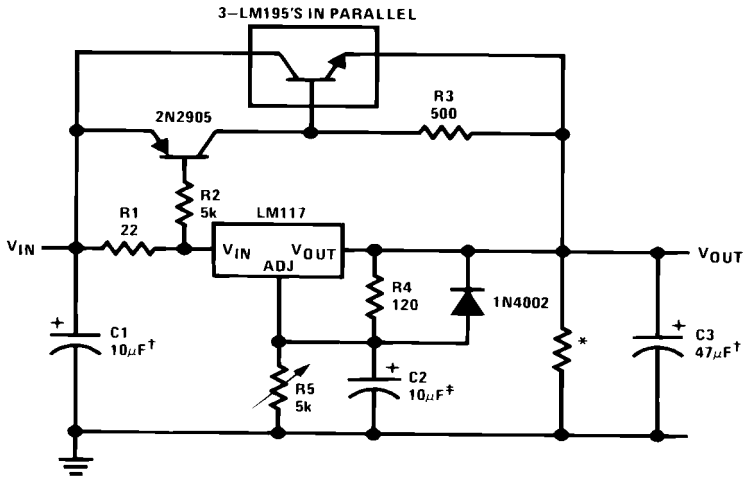
High Stability 10V Regulator



TYPICAL APPLICATIONS (CONTINUED)[3]

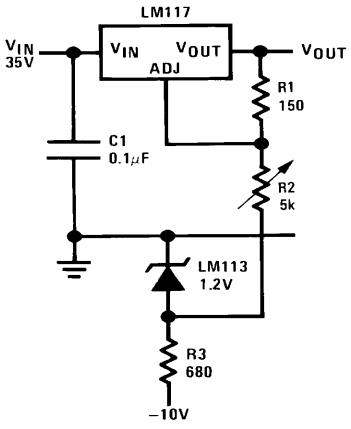
Typical Applications (Continued)

High Current Adjustable Regulator



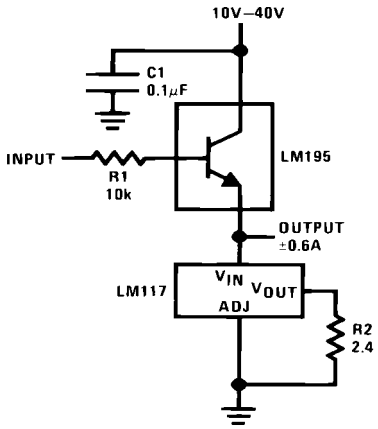
‡Optional — improves ripple rejection
†Solid tantalum
*Minimum load current = 30 mA

0 to 30V Regulator



Full output current not available at high input-output voltages

Power Follower



ABSOLUTE MAXIMUM RATINGS(note 1)

Operating Temperature Range ..... -55C ≤ Ta ≤ +125C
Maximum Junction Temperature ..... +150C
Storage Temperature Range ..... -65C ≤ Ta ≤ +150C
Lead Temperature (soldering for 10 sec) 300C

Input to Output Voltage Differential .....+40V, -0.3V
Power Dissipation ..... Internally Limited
Output Short Circuit Duration.....10 sec
Lead Temperature (Soldering, 10 sec).....300°C

Thermal Resistance:

Theta JA TO-03 Metal Can .....still air.....186C/W
.....500LF/min air flow..... 64C/W
Theta JA 16Lead Gullwing ....still air..... 115C/W
.....500LF/min air flow..... 66C/W
Theta JC TO-03 Metal Can .....still air..... 21C/W
Theta JC 16Lead Gullwing .....still air..... 3.4C/W
-(see note 3)

Package Weight:

16 Lead Cerpack Gullwing 380mg
3 Lead Metal Can 950mg

*Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operation section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

Note 1: Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating ratings indicate conditions for which the device is functional , but do not guarantee specific performance limits. For guaranteed Specs & Test conditions, see Electrical Characteristics section.
Note 2: The maximum power dissipation must be derated at elevated temperatures and is dictated by Tjmax(max Junction temp), ThetaJA (package junction to ambient thermal resistance), and TA(ambient temp). The maximum allowable power dissipation at any temperature is Pdmax (Tjmax - TA)/ThetaJA or the number given in the Absolute Maximum Rating, whichever is lower.
Note 3: For the Ceramic 16lead gullwing, device to function properly, the "OUTPUT" and "OUTPUT/SENSE" pins must be connected on the users printed circuit board.

(The following Table applies to the Subgroup column in the Electrical Characteristics Tables)

SUBGROUP	Description	TEMP(°C)
1	Static DC tests	+25
2	Static DC tests	+125
3	Static DC tests	-55
4	Dynamic Tests	+25
5	Dynamic Tests	+125
6	Dynamic Tests	-55
7	Functional Tests	+25
8A	Functional Tests	+125
8B	Functional Tests	-55

RECOMMENDED OPERATING CONDITIONS:

OPERATING TEMPERATURE Range	-55C < TA < 125c
INPUT VOLTAGE RANGE	4.25V to 41.25V

Electrical Characteristics

DC PARAMETERS: (SEE NOTE 1)

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Vout	Output Voltage	Vin = 4.25V, Il = -5mA			1.2	1.3	V	1, 2, 3
		Vin = 4.25V, Il = -500mA			1.2	1.3	V	1, 2, 3
		Vin = 41.25V, Il = -5mA			1.2	1.3	V	1, 2, 3
		Vin = 41.25V, Il = -50mA			1.2	1.3	V	1, 2, 3
Vrline	Line Regulation	4.25V ≤ Vin ≤ 41.25V, Il = -5mA			-9	9	mV	1
					-23	23	mV	2, 3
Vrload	Load Regulation	Vin = 6.25V, -500mA ≤ Il ≤ -5mA			-12	12	mV	1, 2, 3
		Vin = 41.25V, -50mA ≤ Il ≤ -5mA			-12	12	mV	1, 2, 3
Vrth	Thermal Regulation	Vin = 14.6V, Il = -500mA			-12	12	mV	1
Iadj	Adjust Pin Current	Vin = 4.25V, Il = -5mA			-100	-15	uA	1, 2, 3
		Vin = 41.25V, Il = -5mA			-100	-15	uA	1, 2, 3
Delta Iadj/Line	Adjust Pin Current Change	4.25V ≤ Vin ≤ 41.25V, Il = -5mA			-5	5	uA	1, 2, 3
Delta Iadj/Load	Adjust Pin Current Change	Vin = 6.25V, -500mA ≤ Il ≤ -5mA			-5	5	uA	1, 2, 3
Iq	Minimum Load Current	Vin = 4.25V, Forced Vout = 1.4V			-3	-0.5	mA	1, 2, 3
		Vin = 14.25V, Forced Vout = 1.4V			-3	-0.5	mA	1, 2, 3
		Vin = 41.25V, Forced Vout = 1.4V			-5	-1	mA	1, 2, 3
Ios	Output Short Circuit Current	Vin = 4.25V			-1.8	-0.5	A	1, 2, 3
		Vin = 40V			-0.5	-0.05	A	1, 2, 3
Vout (Recov)	Output Voltage Recovery	Vin = 4.25V, Rl = 2.5 Ohms, Cl = 20uF			1.2	1.3	V	1, 2, 3
		Vin = 40V, Rl = 250 Ohms			1.2	1.3	V	1, 2, 3
Vout	Output Voltage Recovery	Vin = 6.25V, Il = -5mA	2		1.2	1.3	V	2

Electrical Characteristics

DC PARAMETERS: (SEE NOTE 1) (Continued)

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Vstart	Voltage Start-Up	Vin = 4.25V, Rl = 2.5 Ohms, Cl = 20uF, Il = -500mA			1.2	1.3	V	1, 2, 3

AC PARAMETERS: (SEE NOTE 1)

Delta Vin/Delta Vout	Ripple Rejection	Vin = 6.25V, ei = 1Vrms at f = 2400Hz, Il = -125mA			65		dB	4
Vno	Output Noise Voltage	Vin = 6.25V, Il = -50mA				120	uVrms	7
Delta Vout/Delta Vin	Line Transient Response	Vin = 6.25V, Delta Vin = 3V, Il = -10mA				6	mV/V	7
Delta Vout/ Delta Il	Load Transient Response	Vin = 6.25V, Delta Il = -200mA, Il = -50mA				0.6	mV/mA	7

DC PARAMETERS: DRIFT VALUES

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: "Delta calculations performed on QMLV devices at group B, subgroup 5 ONLY."

Vout	Output Voltage	Vin = 4.25V, Il = -5mA			-0.01	0.01	V	1
		Vin = 4.25V, Il = -500mA			-0.01	0.01	V	1
		Vin = 41.25V, Il = -5mA			-0.01	0.01	V	1
		Vin = 41.25V, Il = -50mA			-0.01	0.01	V	1
Vrline	Line Regulation	4.25V ≤ Vin ≤ 41.25V, Il = -5mA			-4	4	mV	1
Iadj	Adjust Pin Current	Vin = 4.25V, Il = -5mA			-10	10	uA	1
		Vin = 41.25V, Il = -5mA			-10	10	uA	1

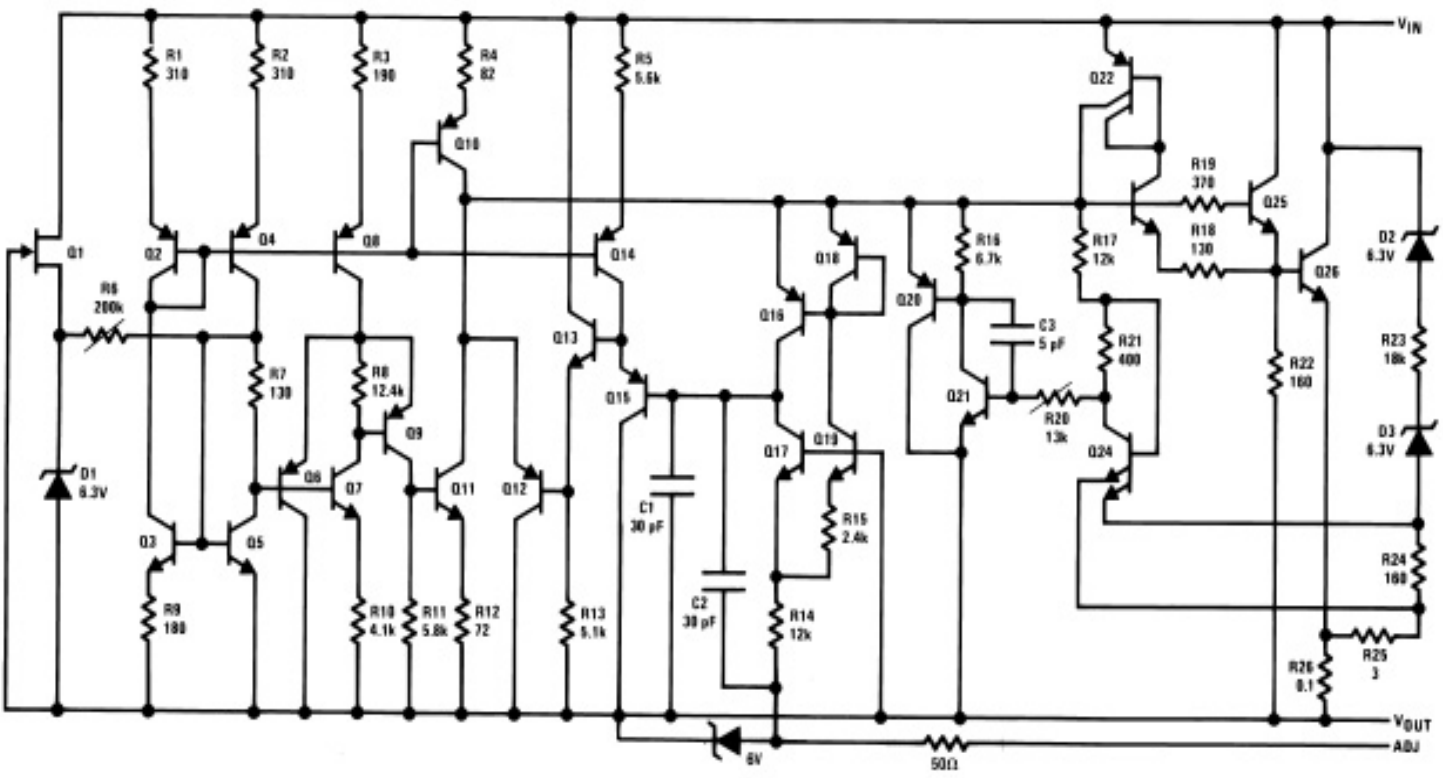
AC/DC PARAMETERS: POST RADIATION LIMITS +25 C (SEE NOTE 1)

Vout	Output Voltage	Vin = 4.25V, Il = -5mA			1.2	1.350	V	1
		Vin = 4.25V, Il = -500mA			1.2	1.350	V	1
		Vin = 41.25V, Il = -5mA			1.2	1.350	V	1
		Vin = 41.25V, Il = -50mA			1.2	1.350	V	1
Vrline	Line Regulation	4.25V ≤ Vin ≤ 41.25V, Il = -5mA			-25	25	mV	1
Delta Vin/Delta Vout	Ripple Rejection	Vin = 6.25V, ei = 1Vrms at f = 2400Hz, Il = -125mA			60		dB	4
Vout (Recov)	Output Voltage Recovery	Vin = 4.25V, Rl = 2.5 Ohms, Cl = 20uS			1.20	1.350	V	1
		Vin = 40V, Rl = 250 Ohms			1.20	1.350	V	1

NOTE 1: Pre and Post irradiation limits are identical to those listed under AC and DC electrical characteristics except as listed in the Post Radiation Limits Table. These parts may be dose rate sensitive in a space environement and demonstrate ehnaced low dose rate effect. Radiation end point limits fro the noted parameters are guaranteed only for the conditions as specified in MIL-STD-883, Method 1019.5, Cond A.

NOTE 2: Tested at TA = 125C, correlated to TA = 150C.

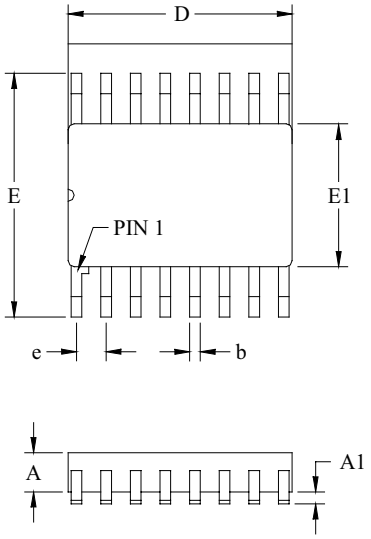
Schematic Diagram

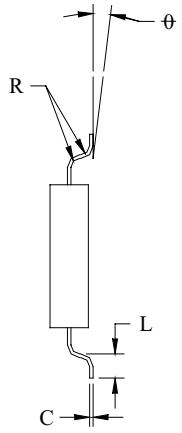


MECHANICAL DEFINITIONS*

ASI Case (Package Designator GW16)
SMD 5962-99517, Case Outline Z

MIL-STD-1835 outline drawing GDFP1-G16





	Min	Max
A	.050	.080
A1	.004	.012
b	.015	.022
C	.004	.009
D	.228	.253
E	.400	.420
E1	.235	.260
e	.050 BSC	
L	.037	.043
R	.013	.017
θ	0	7

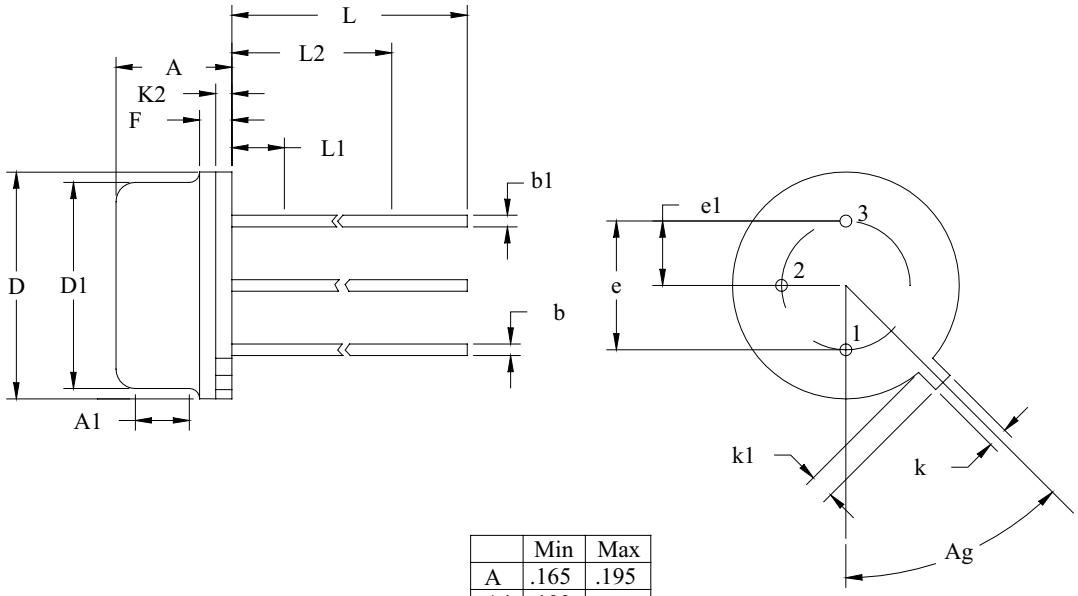
Notes:
1. Lead Finish: Solder dipped with Sn 60 or Sn63 solder conforming to MIL-PRF-38535 to a min thickness of 200 micro-inches. Solder may be applied over lead base metal or Sn plate. Max limit may be increased by .003 inches after lead finish applied.
2. Lead 1 identification shall be:
a) A notch or other mark within this area.
b) a TAB on lead 1, either side.

All measurements are in inches.

MECHANICAL DEFINITIONS*

ASI Case (Package Designator TO-39)

Mil Std 5962-99517 case X
3-Lead CAN TO-39 Case Outline



	Min	Max
A	.165	.195
A1	.100	----
b	.016	.019
b1	.016	.021
D	.335	.370
D1	.305	.335
e	.200 BSC	
e1	.100 BSC	
F	----	.050
k	.028	.034
k1	.029	.045
K2	.009	.041
L	.500	----
L1	----	.050
L2	.250	----
Ag	45 T.P.	

All measurements are in inches.

ORDERING INFORMATION

EXAMPLE: AS117PGW16/SPACE

Device Number	RAD Level	Package Type	Process
AS117	P,R, or blank	GW16	/*

EXAMPLE: AS117RTO39/SPACE

Device Number	RAD Level	Package Type	Process
AS117	P,R or blank	TO39	/*

+ RADIATION Levels:
BLANK = No Radiation Guarantee
P = 30K Rads(Si) Total Dose
R = 100K Rads(Si) Total Dose

***AVAILABLE PROCESSES:**

XT = Extended Temperature Range -55°C to +125°C
/883C = MIL-STD-883 paragraph 1.2.1 -55°C to +125°C
/SPACE = MIL-STD-883 para 1.2.1 -55°C to +125°C

NOTE: ASI supports Customer specified drawings (SCDs), please contact your SALES or Factory Representative for information.

ASI TO DSCC PART NUMBER CROSS REFERENCE

ASI PART NUMBER	DSCC PART NUMBER

DSCC part numbers pending , contact your ASI Sales or factory rep for updated status. This will be updated in the near future to include the DSCC part numbers as soon as ASI receives certification..

** ASI part number is for reference only. Orders received referencing the SMD part number will be processed per the SMD.*