Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

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Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

AS78LXX

100mA POSITIVE VOLTAGE REGULATOR

DATA SHEET

Description

The AS78LXX series are three terminal positive regulators designed for a wide variety of applications including local, on-card regulation.

This series of regulators are complete with internal current limiting, thermal shutdown protection, and safe-area compensation which make them virtually immune from output overload. If adequate heat sinking are provided, these regulators can deliver output currents up to 100mA.

The AS78LXX series are available in TO-92 (bulk or ammo packing), SOT-89 and SOIC-8 packages.

Features

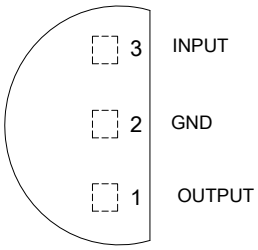
- Output Current up to 100mA
- Fixed Output Voltages of 5V, 12V and 15V
- Output Voltage Accuracy of ±5% over the Full Temperature Range
- Internal Short Circuit Current Limiting
- Internal Thermal Overload Protection
- No External Components
- Output Transistor Safe-area Protection

Applications

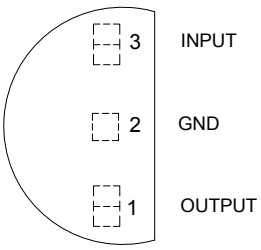
- Consumer Electronics
- Microprocessor Power Supply
- Mother Board

Pin Assignments

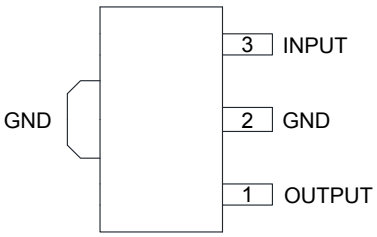
Z Package
(TO-92(Bulk Packing))



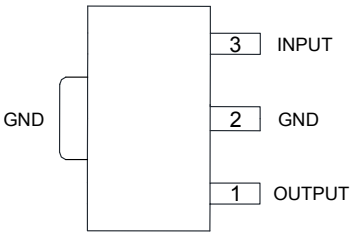
Z Package
(TO-92(Ammo Packing))



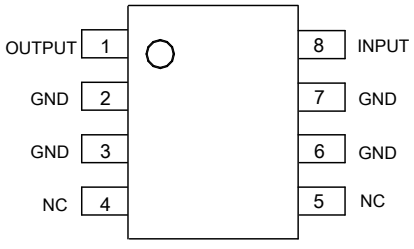
R Package
(SOT-89 Option 1)



R Package
(SOT-89 Option 2)

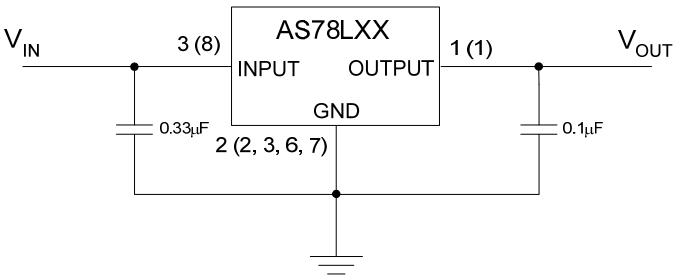


M Package
(SOIC-8)



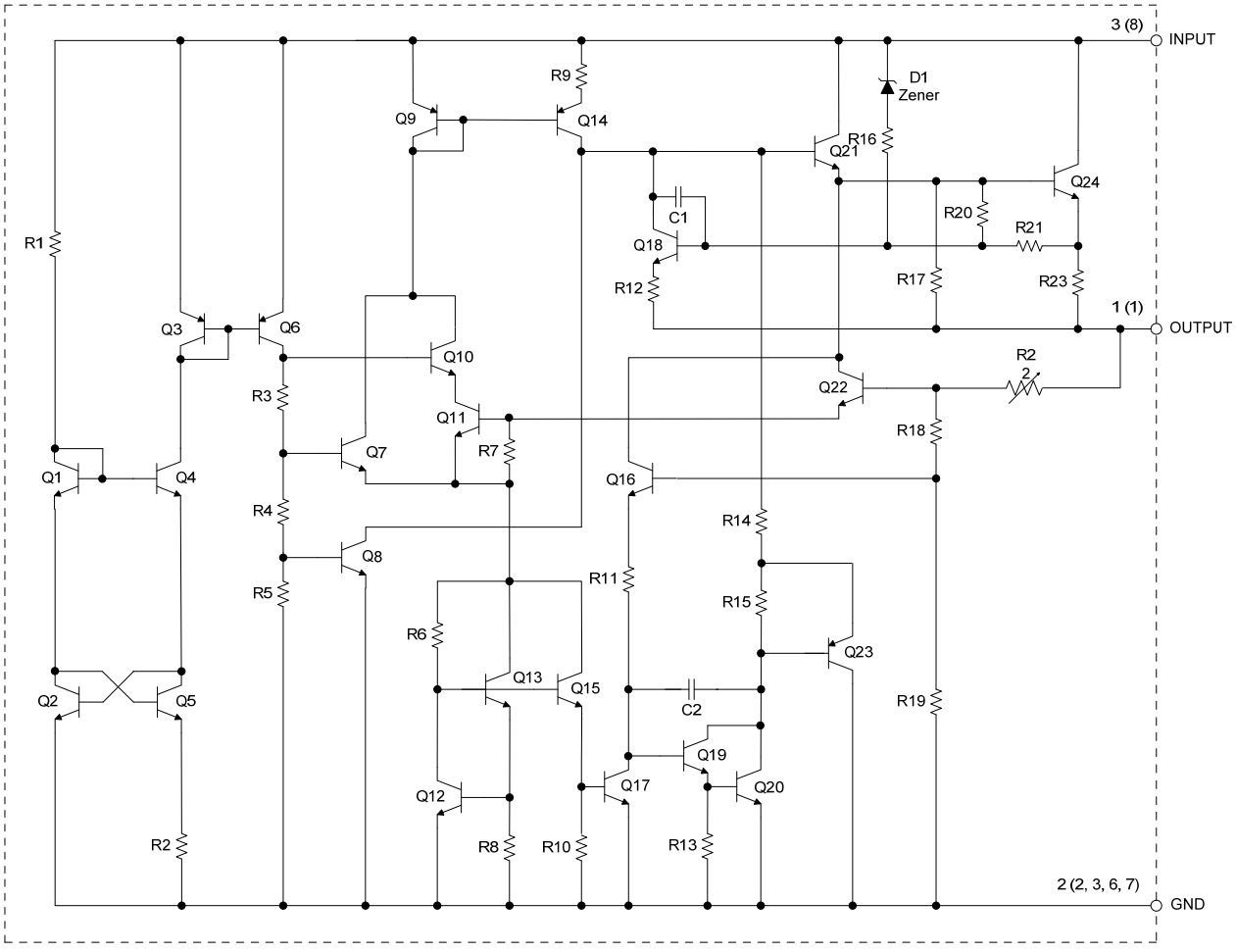
DATA SHEET

Typical Applications Circuit



A (B)
A for 3-pin B for 8-pin

Functional Block Diagram



A (B)
A for 3-pin B for 8-pin

DATA SHEET

Absolute Maximum Ratings (Note 1)

Symbol	Parameter	Rating		Unit
V_{IN}	Input Voltage	36		V
T_J	Operating Junction Temperature	150		ºC
T_{LEAD}	Lead Temperature (Soldering, 10sec)	260		ºC
P_D	Power Dissipation	750		mW
T_{STG}	Storage Temperature Range	-65 to 150		ºC
θ_{JA}	Thermal Resistance	TO-92	180	ºC/W
ESD	ESD (Human Body Model)	2000		V
ESD	ESD (Machine Model)	200		V

Note 1: 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_{IN}	Input Voltage	AS78L05		30	V
		AS78L12		36	
		AS78L15		36	
T_J	Operating Junction Temperature Range		-40	125	ºC

DATA SHEET

Electrical Characteristics

AS78L05 (@ V_{IN}=10V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, T_J=25ºC, **Bold** typeface applies over -40°C≤T_J≤125°C, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OUT}	Output Voltage		4.8	5.0	5.2	V
		7V≤V_{IN}≤20V, 1mA≤I_{OUT}≤100mA, P_D≤0.75W	**4.75**		**5.25**	
V_{RLINE}	Line Regulation	7V≤V_{IN}≤20V		8	150	mV
V_{RLOAD}	Load Regulation	1mA≤I_{OUT}≤100mA		10	60	mV
I_Q	Quiescent Current			3	5.5	mA
ΔI_Q	Quiescent Current Change	8V≤V_{IN}≤20V			**1.5**	mA
		1mA≤I_{OUT}≤40mA			**0.1**	
PSRR	Ripple Rejection	f=120Hz, 8V≤V_{IN}≤18V	47	62		dB
V_{DROP}	Dropout Voltage	I_{OUT}=40mA		1.7		V
		I_{OUT}=100mA		1.8		
N_O	Output Noise Voltage	10Hz≤f≤100kHz (Note 2)		40		μV
$\Delta V_{OUT}/\Delta T$	Output Voltage Temperature Coefficient	I_{OUT}=5mA		0.42		mV/°C
$(\Delta V_{OUT}/V_{OUT})/\Delta T$				84		ppm/°C
θ_{JC}	Thermal Resistance	TO-92		40		°C/W
		SOT-89		28.3		
		SOIC-8		62		

Note 2: 0.01μF minimum load capacitance is recommended to limit high frequency noise.

DATA SHEET

Electrical Characteristics (Cont.)

AS78L05C (@ V_{IN}=10V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, T_J=25°C, **Bold** typeface applies over -40°C≤T_J≤125°C, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OUT}	Output Voltage		5.0		5.1	V
V_{RLINE}	Line Regulation	7V≤V_{IN}≤20V		8	150	mV
V_{RLOAD}	Load Regulation	1mA≤I_{OUT}≤100mA		10	60	mV
I_Q	Quiescent Current			3	5.5	mA
ΔI_Q	Quiescent Current Change	8V≤V_{IN}≤20V			**1.5**	mA
		1mA≤I_{OUT}≤40mA			**0.1**	
PSRR	Ripple Rejection	f=120Hz, 8V≤V_{IN}≤18V	47	62		dB
V_{DROP}	Dropout Voltage	I_{OUT}=40mA		1.7		V
		I_{OUT}=100mA		1.8		
N_O	Output Noise Voltage	10Hz≤f≤100kHz (Note 2)		40		μV
$\Delta V_{OUT}/\Delta T$	Output Voltage Temperature Coefficient	I_{OUT}=5mA		0.42		mV/°C
$(\Delta V_{OUT}/V_{OUT})/\Delta T$				84		ppm/°C
θ_{JC}	Thermal Resistance	TO-92		40		°C/W
		SOT-89		28.3		
		SOIC-8		62		

Note 2: 0.01μF minimum load capacitance is recommended to limit high frequency noise.

DATA SHEET

Electrical Characteristics (Cont.)

AS78L12 (@ V_{IN}=19V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, T_J=25ºC, **Bold** typeface applies over -40°C≤T_J≤125°C, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OUT}	Output Voltage		11.5	12.0	12.5	V
		14.5V≤V_{IN}≤27V, 1mA≤I_{OUT}≤100mA, P_D≤0.75W	**11.4**		**12.6**	
V_{RLINE}	Line Regulation	14.5V≤V_{IN}≤27V		20	250	mV
V_{RLOAD}	Load Regulation	1mA≤I_{OUT}≤100mA		20	100	mV
I_Q	Quiescent Current			3	6	mA
ΔI_Q	Quiescent Current Change	16V≤V_{IN}≤27V			**1.5**	mA
		1mA≤I_{OUT}≤40mA			**0.1**	
PSRR	Ripple Rejection	f=120Hz, 15V≤V_{IN}≤25V	37	42		dB
V_{DROP}	Dropout Voltage	I_{OUT}=40mA		1.7		V
		I_{OUT}=100mA		1.8		
N_O	Output Noise Voltage	10Hz≤f≤100kHz (Note 2)		80		μV
$\Delta V_{OUT}/\Delta T$	Output Voltage Temperature Coefficient	I_{OUT}=5mA		1		mV/°C
$(\Delta V_{OUT}/V_{OUT})/\Delta T$				84		ppm/°C
θ_{JC}	Thermal Resistance	TO-92		40		ºC/W
		SOT-89		28.3		
		SOIC-8		62		

Note 2: 0.01μF minimum load capacitance is recommended to limit high frequency noise.

DATA SHEET

Electrical Characteristics (Cont.)

AS78L15 (@ V_{IN}=23V, I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF, T_J=25ºC, **Bold** typeface applies over -40°C≤T_J≤125°C, unless otherwise specified.)

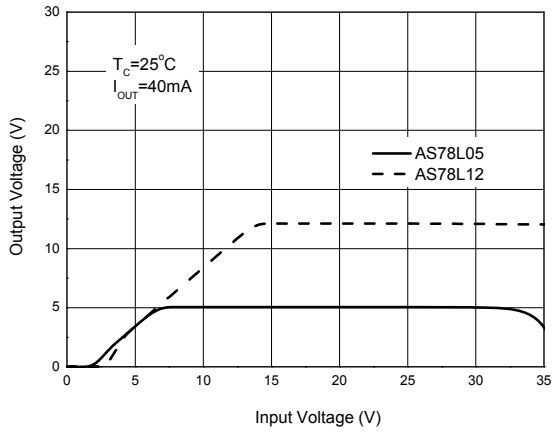
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OUT}	Output Voltage		14.4	15.0	15.6	V
		17.5V≤V_{IN}≤30V, 1mA≤I_{OUT}≤100mA, P_D≤0.75W	**14.25**		**15.75**	
V_{RLINE}	Line Regulation	17.5V≤V_{IN}≤30V		25	250	mV
V_{RLOAD}	Load Regulation	1mA≤I_{OUT}≤100mA		25	150	mV
I_Q	Quiescent Current			3	6	mA
ΔI_Q	Quiescent Current Change	20V≤V_{IN}≤30V			**1.5**	mA
		1mA≤I_{OUT}≤40mA			**0.1**	
PSRR	Ripple Rejection	f=120Hz, 18.5V≤V_{IN}≤28.5V	34	39		dB
V_{DROP}	Dropout Voltage	I_{OUT}=40mA		1.7		V
		I_{OUT}=100mA		1.8		
N_O	Output Noise Voltage	10Hz≤f≤100kHz (Note 2)		90		μV
$\Delta V_{OUT}/\Delta T$	Output Voltage Temperature Coefficient	I_{OUT}=5mA		1.25		mV/°C
$(\Delta V_{OUT}/V_{OUT})/\Delta T$				84		ppm/°C
θ_{JC}	Thermal Resistance	TO-92		40		°C/W
		SOT-89		28.3		
		SOIC-8		62		

Note 2: 0.01μF minimum load capacitance is recommended to limit high frequency noise.

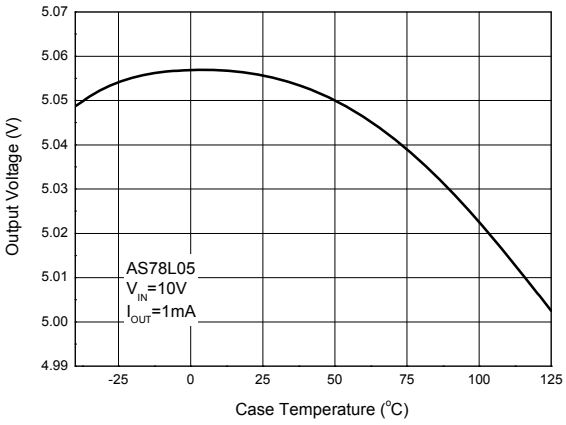
DATA SHEET

Performance Characteristics

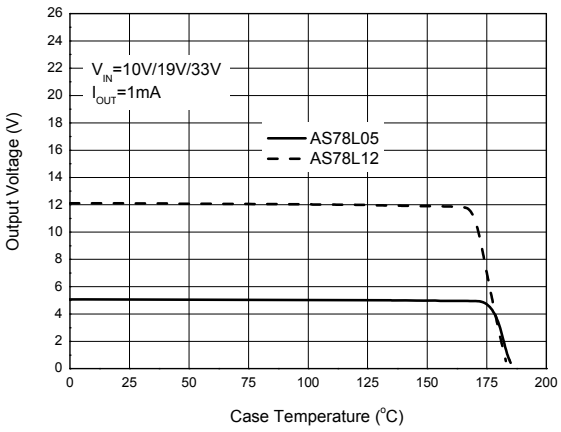
Output Voltage vs. Input Voltage



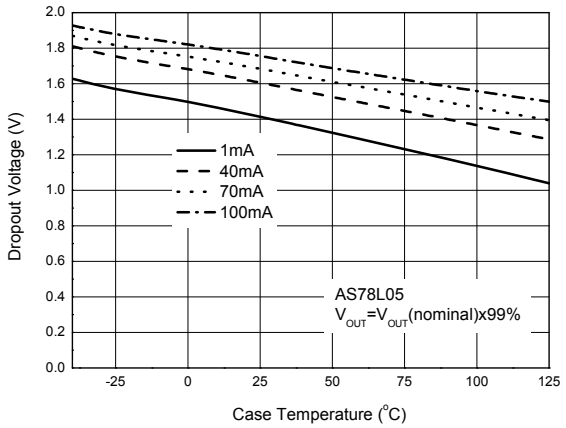
Output Voltage vs. Case Temperature



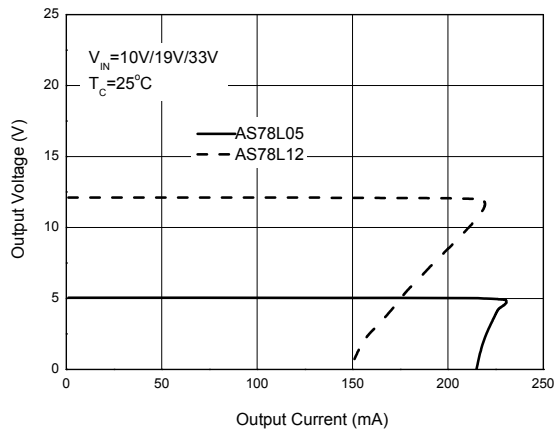
Over Temperature Protection



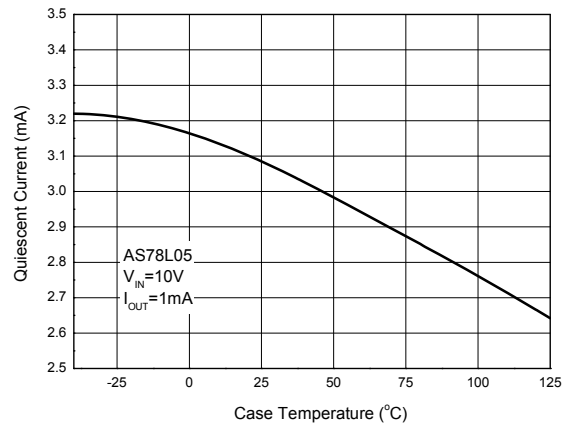
Dropout Voltage vs. Case Temperature



Output Voltage vs. Output Current



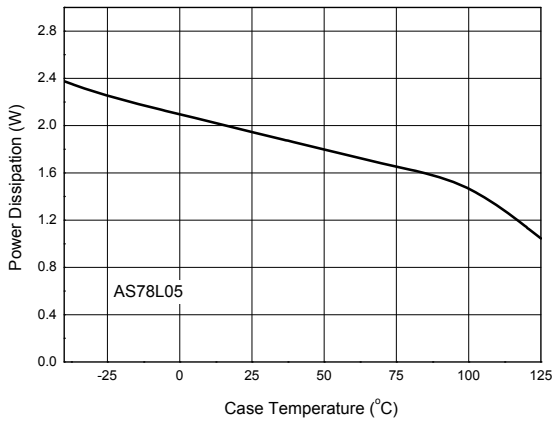
Quiescent Current vs. Case Temperature



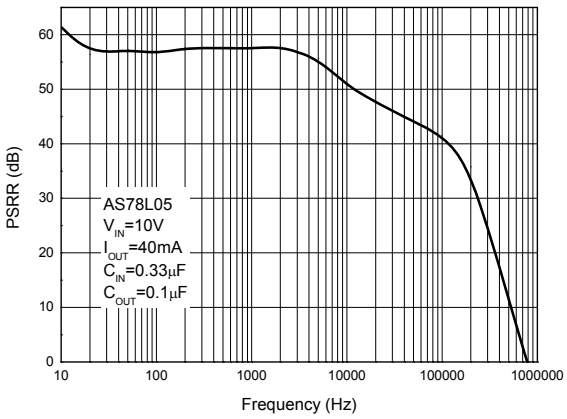
DATA SHEET

Performance Characteristics (Cont.)

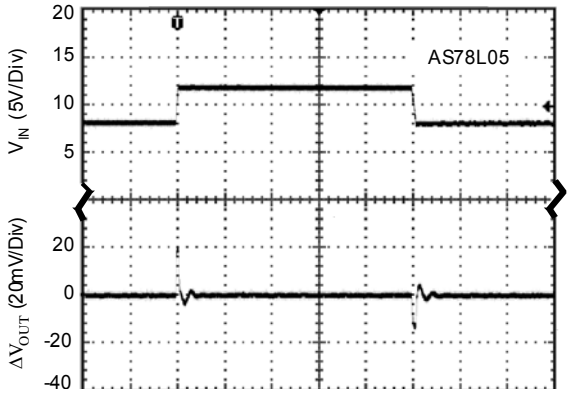
Power Dissipation vs. Case Temperature



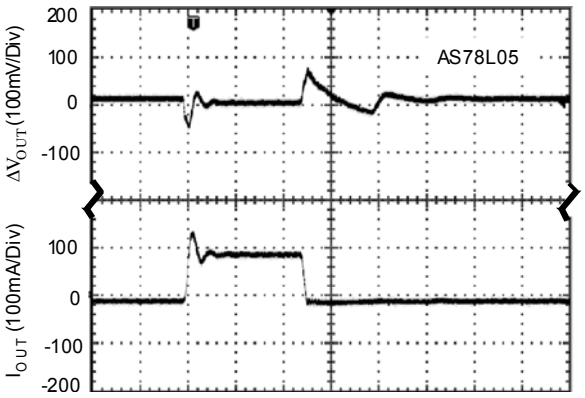
PSRR vs. Frequency



Line Transient
(Conditions: I_{OUT}=40mA, C_{IN}=0.33µF, C_{OUT}=0.1µF)

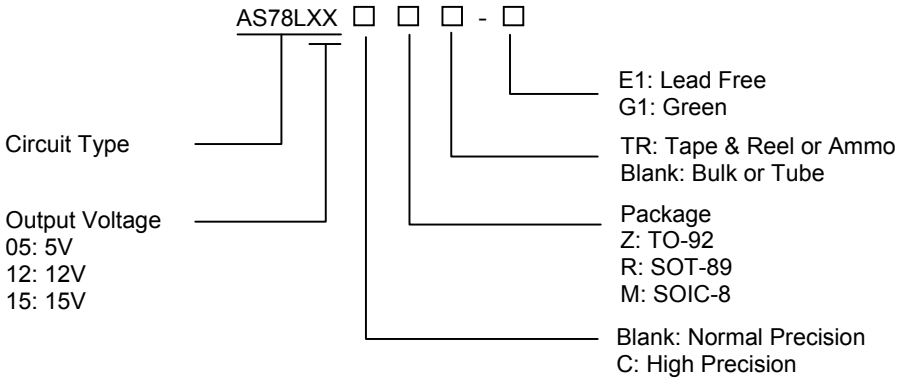


Load Transient
(Conditions: V_{IN}=10V, C_{IN}=0.33µF, C_{OUT}=0.1µF)



DATA SHEET

Ordering Information



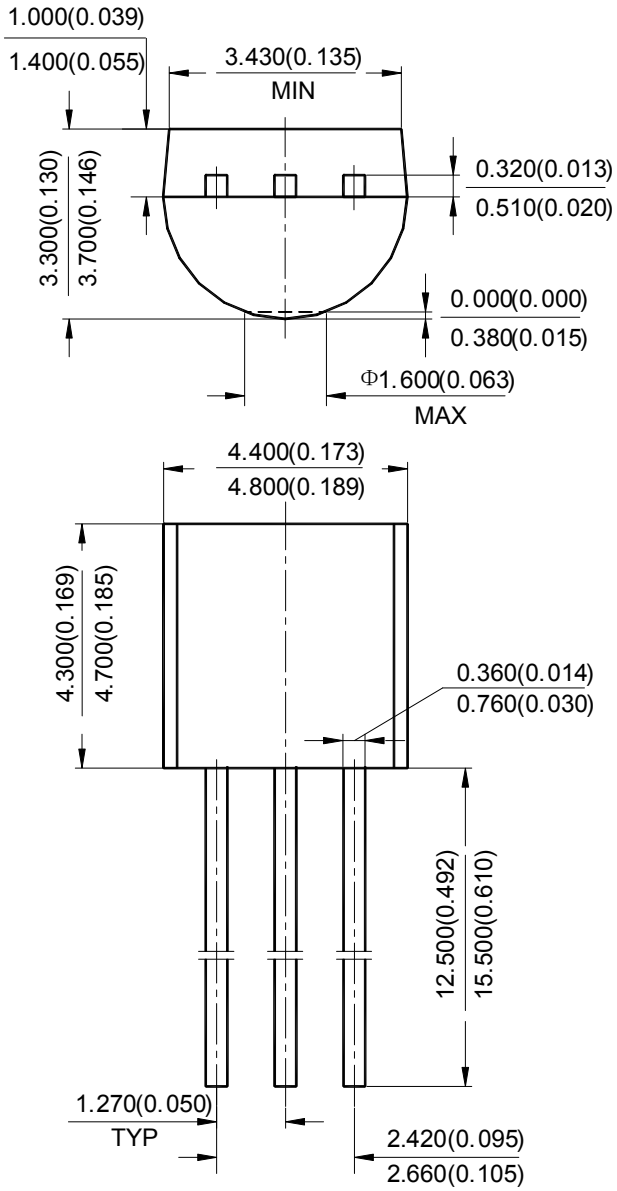
Package	Temperature Range	Part Number		Marking ID		Packing Type
		Lead Free	Green	Lead Free	Green	
TO-92	-40 to 125°C	AS78L05Z-E1	AS78L05Z-G1	AS78L05Z-E1	AS78L05Z-G1	Bulk
		AS78L05ZTR-E1	AS78L05ZTR-G1	AS78L05Z-E1	AS78L05Z-G1	Ammo
		AS78L05CZTR-E1	AS78L05CZTR-G1	AS78L05Z-E1	AS78L05Z-G1	Ammo
		AS78L12Z-E1	AS78L12Z-G1	AS78L12Z-E1	AS78L12Z-G1	Bulk
		AS78L12ZTR-E1	AS78L12ZTR-G1	AS78L12Z-E1	AS78L12Z-G1	Ammo
		AS78L15Z-E1	AS78L15Z-G1	AS78L15Z-E1	AS78L15Z-G1	Bulk
		AS78L15ZTR-E1	AS78L15ZTR-G1	AS78L15Z-E1	AS78L15Z-G1	Ammo
SOT-89	-40 to 125°C	AS78L05RTR-E1	AS78L05RTR-G1	E78E	G78E	Tape & Reel
		AS78L12RTR-E1	AS78L12RTR-G1	E78F	G78F	Tape & Reel
		AS78L15RTR-E1	AS78L15RTR-G1	E78G	G78G	Tape & Reel
SOIC-8	-40 to 125°C	AS78L05M-E1	AS78L05M-G1	AS78L05M-E1	AS78L05M-G1	Tube
		AS78L05MTR-E1	AS78L05MTR-G1	AS78L05M-E1	AS78L05M-G1	Tape & Reel
		AS78L12M-E1	AS78L12M-G1	AS78L12M-E1	AS78L12M-G1	Tube
		AS78L12MTR-E1	AS78L12MTR-G1	AS78L12M-E1	AS78L12M-G1	Tape & Reel
		AS78L15M-E1	AS78L15M-G1	AS78L15M-E1	AS78L15M-G1	Tube
		AS78L15MTR-E1	AS78L15MTR-G1	AS78L15M-E1	AS78L15M-G1	Tape & Reel

BCD Semiconductor's Pb-free products, as designated with "E1" suffix in the part number, are RoHS compliant. Products with "G1" suffix are available in green packages.

DATA SHEET

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

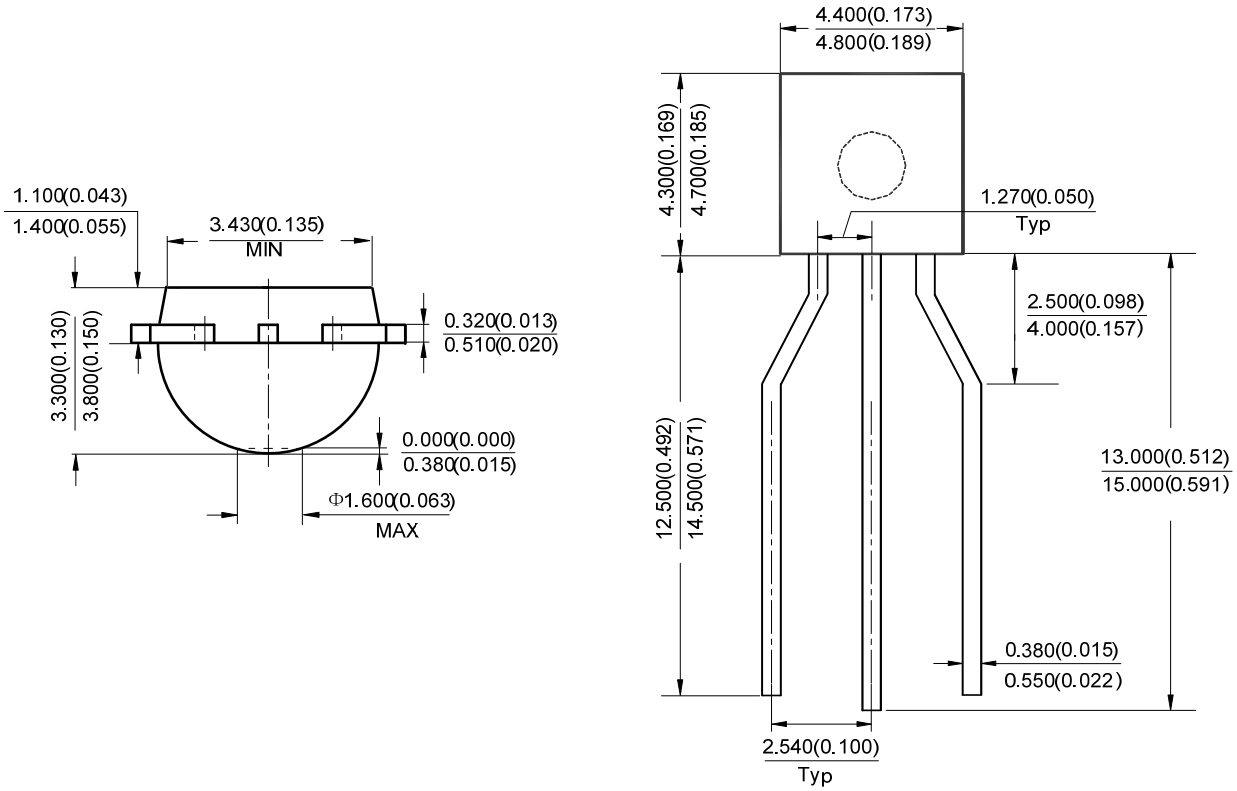
TO-92 (Bulk Packing)



DATA SHEET

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

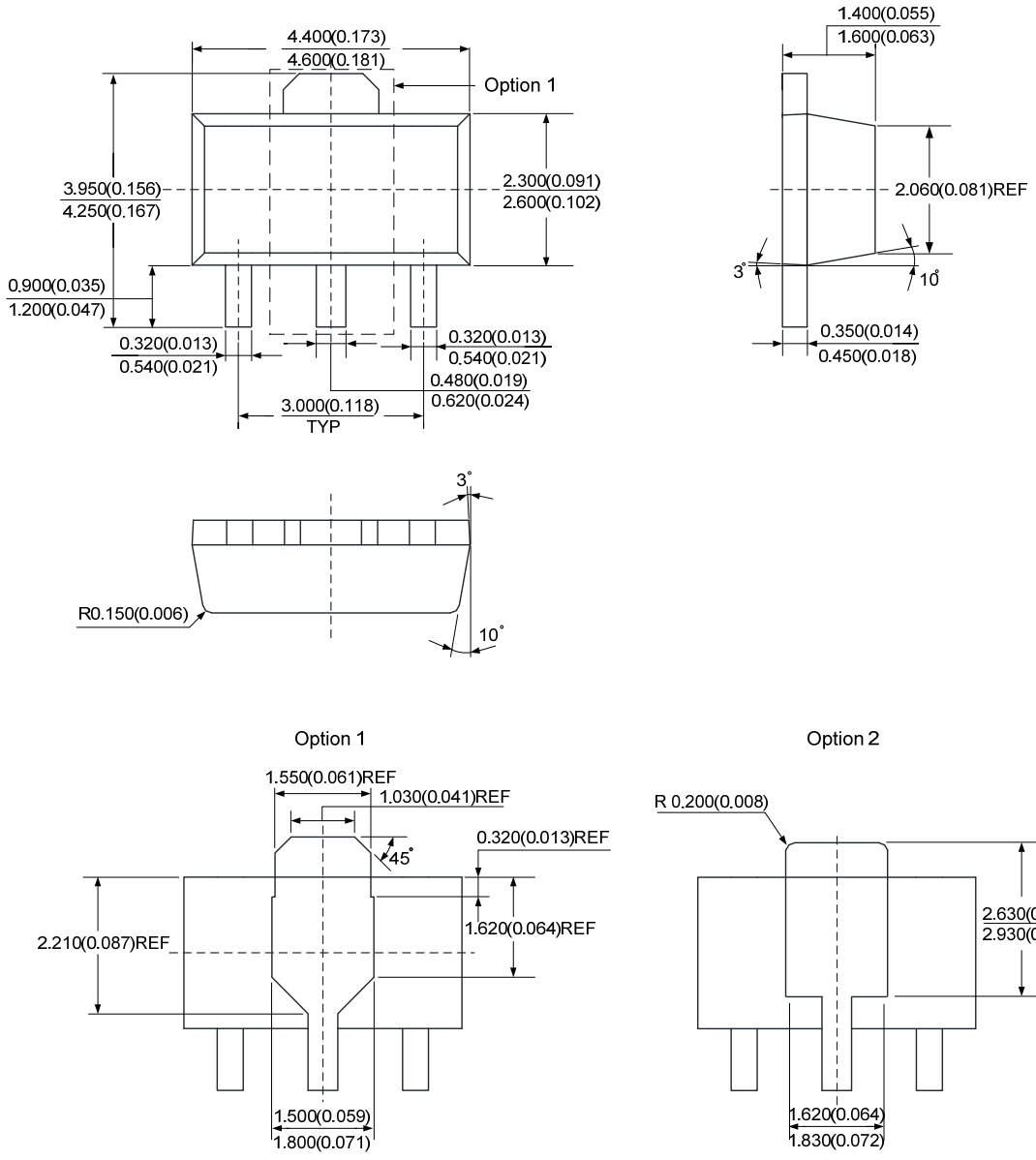
TO-92 (Ammo Packing)



DATA SHEET

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

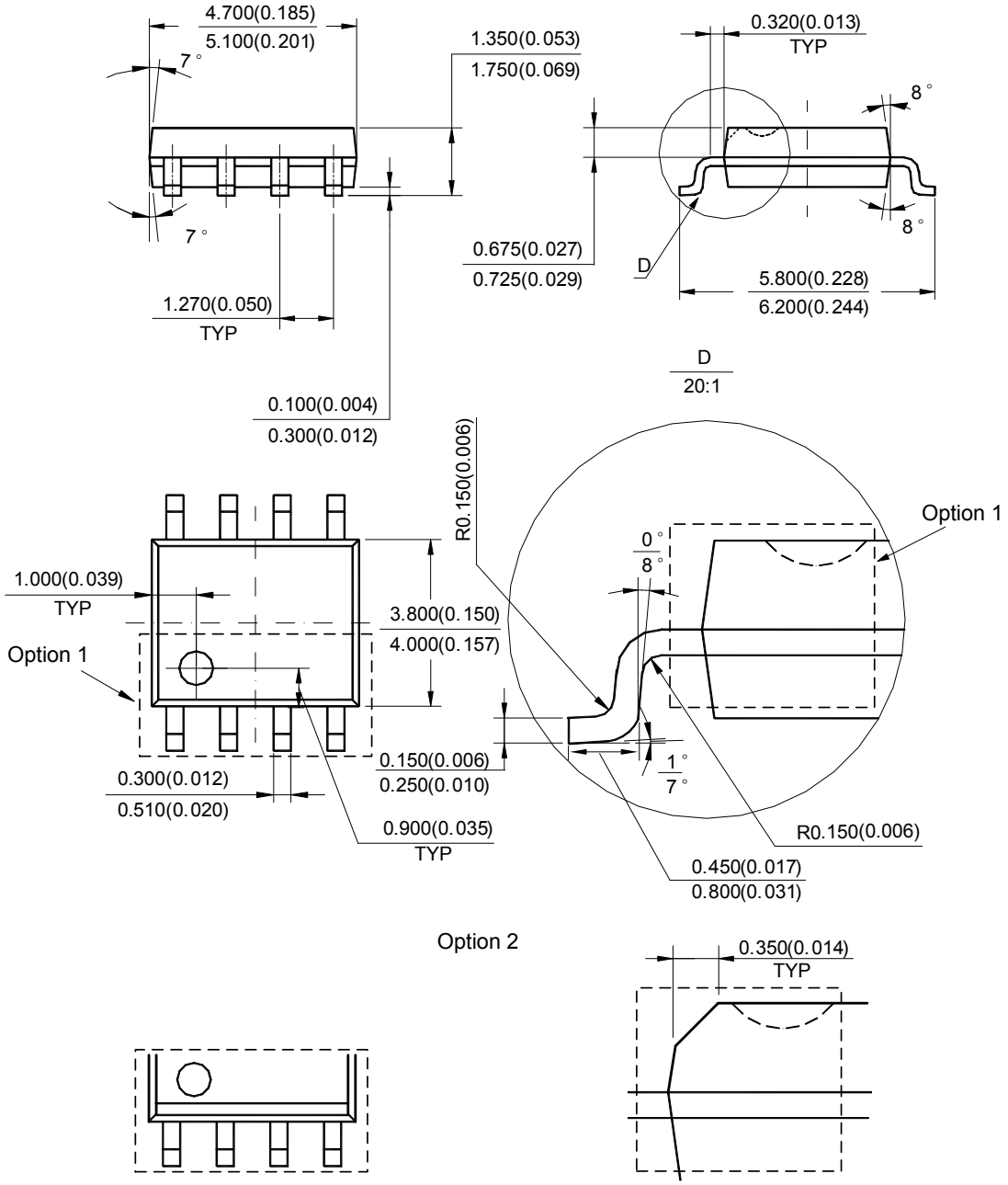
SOT-89



DATA SHEET

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

SOIC-8

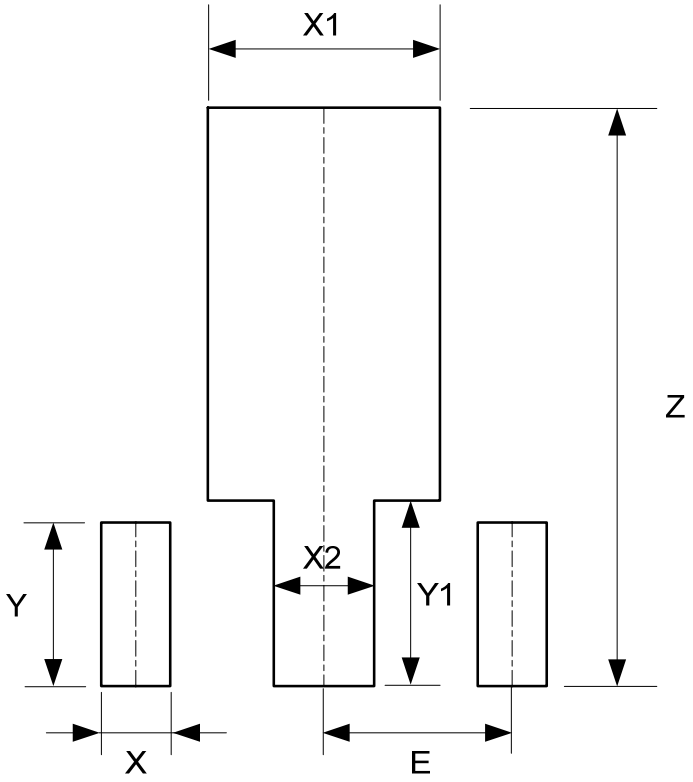


Note: Eject hole, oriented hole and mold mark is optional.

DATA SHEET

Suggested Pad Layout

SOT-89

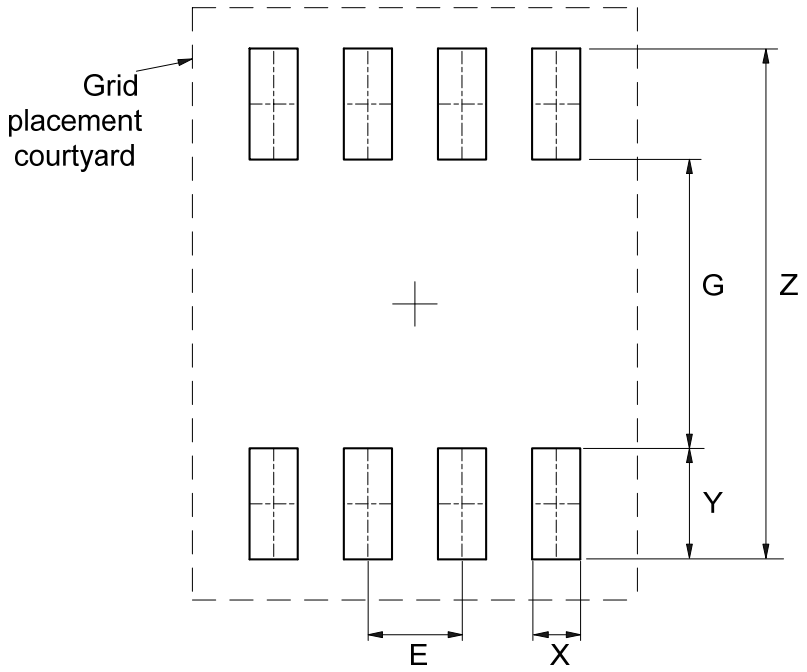


Dimensions	Z (mm)/(inch)	X (mm)/(inch)	X1 (mm)/(inch)	X2 (mm)/(inch)	Y (mm)/(inch)	Y1 (mm)/(inch)	E (mm)/(inch)
Value	4.600/0.181	0.550/0.022	1.850/0.073	0.800/0.031	1.300/0.051	1.475/0.058	1.500/0.059

DATA SHEET

Suggested Pad Layout (Cont.)

SOIC-8



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

DATA SHEET

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A. Life support devices or systems are devices or systems which:

1. are intended to implant into the body, or

2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

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