100mA POSITIVE VOLTAGE REGULATOR AS78LXX

General 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

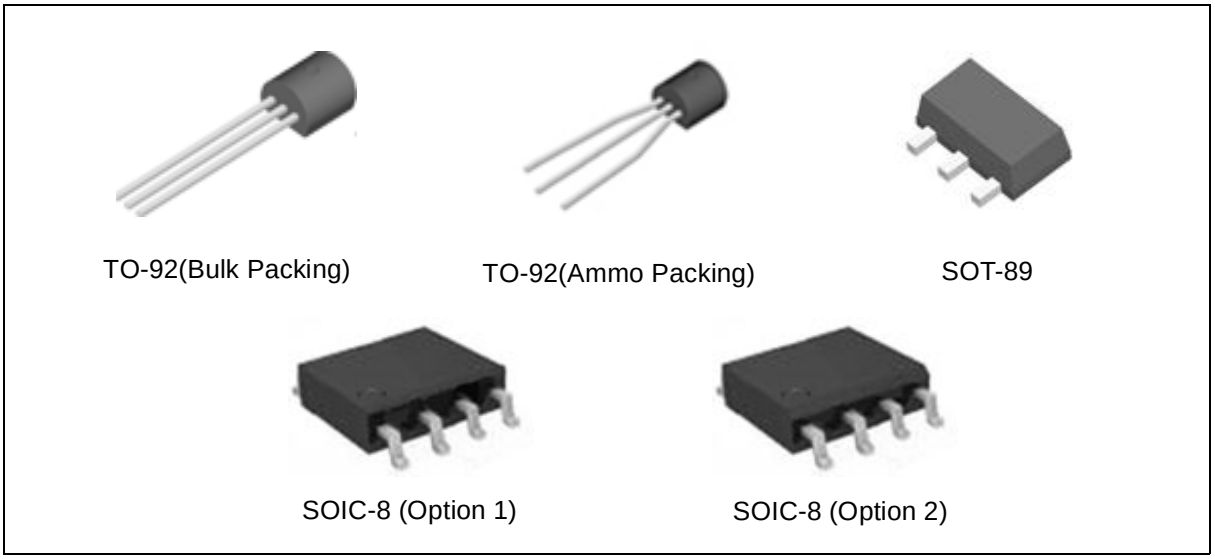
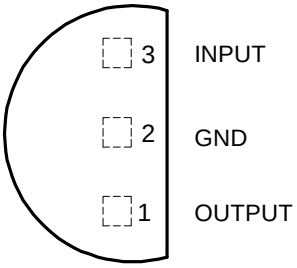


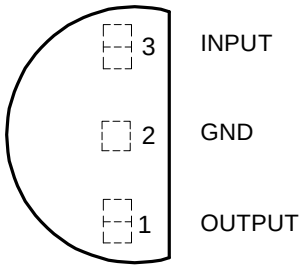
Figure 1. Package Types of AS78LXX

Pin Configuration

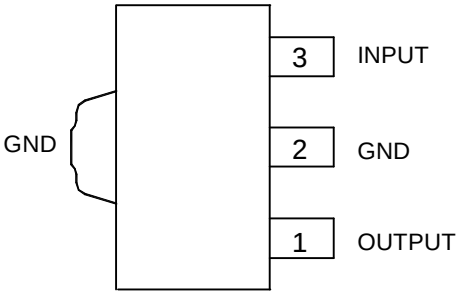
Z Package
(TO-92(Bulk Packing))



Z Package
(TO-92(Ammo Packing))



R Package
(SOT-89)



M Package
(SOIC-8)

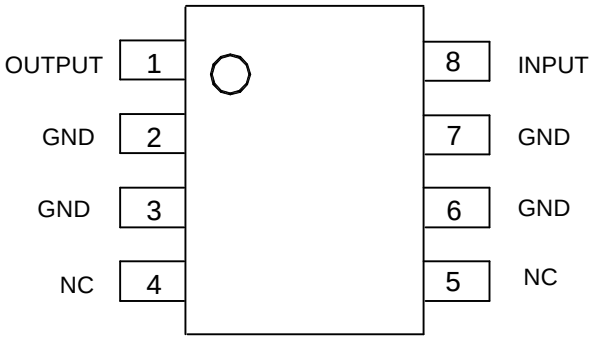
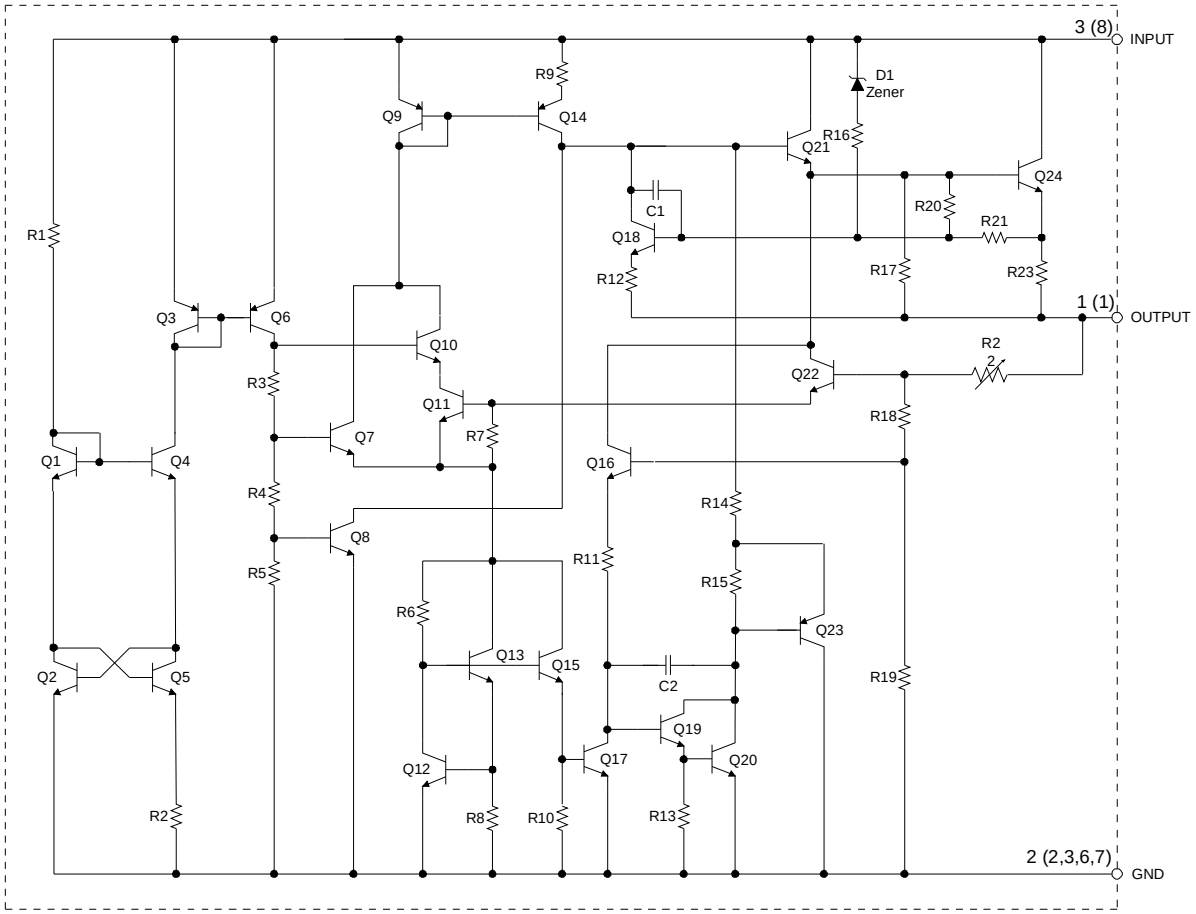


Figure 2. Pin Configuration of AS78LXX (Top View)

Functional Block Diagram



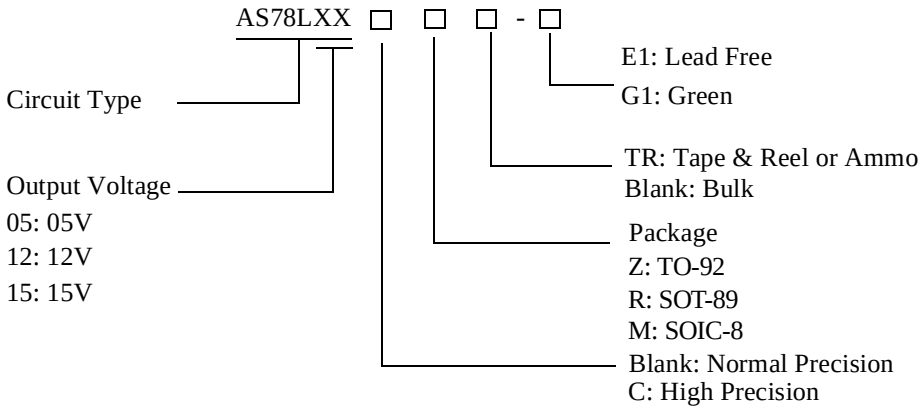
A (B)

A for 3-pin B for 8-pin

Figure 3. Functional Block Diagram of AS78LXX

100mA POSITIVE VOLTAGE REGULATOR AS78LXX

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.

Absolute Maximum Ratings (Note 1)

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

Parameter		Symbol	Min	Max	Unit
Input Voltage	AS78L05	V_{IN}		30	V
	AS78L12			36	
	AS78L15			36	
Operating Junction Temperature Range		T_J	-40	125	°C

Electrical Characteristics

AS78L05 (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.)

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

Electrical Characteristics (Continued)

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.)

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

Electrical Characteristics (Continued)

AS78L12 (V_{IN}=19V, 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.)

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

Electrical Characteristics (Continued)

AS78L15 (V_{IN}=23V, 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.)

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

Typical Performance Characteristics

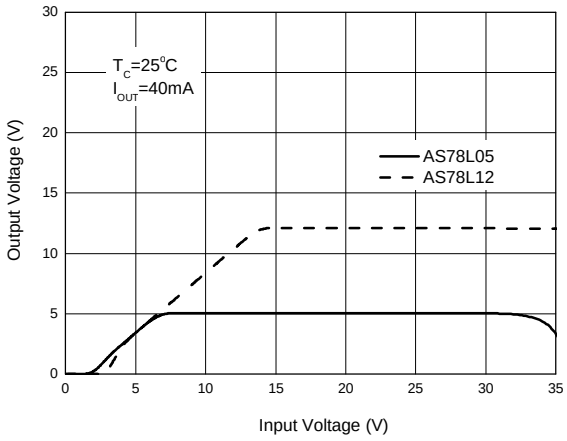


Figure 4. Output Voltage vs. Input Voltage

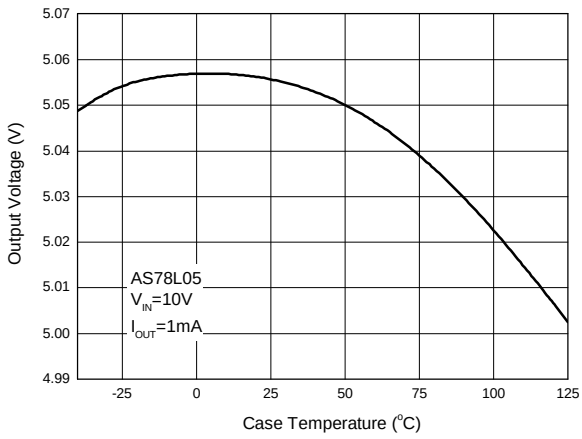


Figure 5. Output Voltage vs. Case Temperature

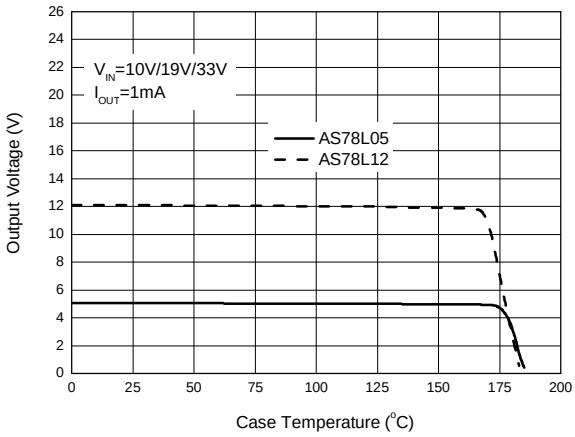


Figure 6. Over Temperature Protection

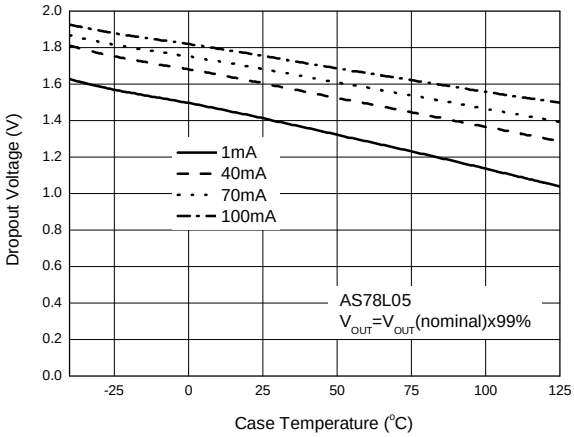


Figure 7. Dropout Voltage vs. Case Temperature

Typical Performance Characteristics (Continued)

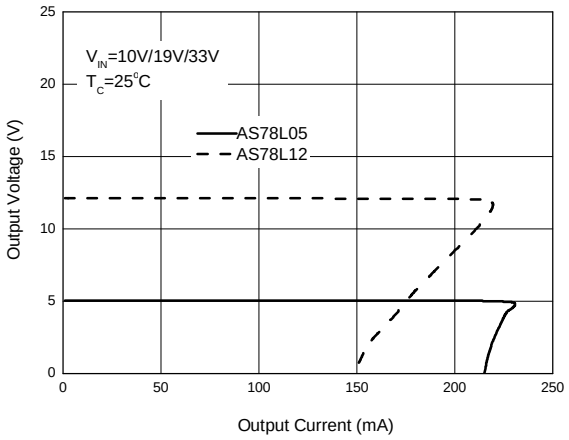


Figure 8. Output Voltage vs. Output Current

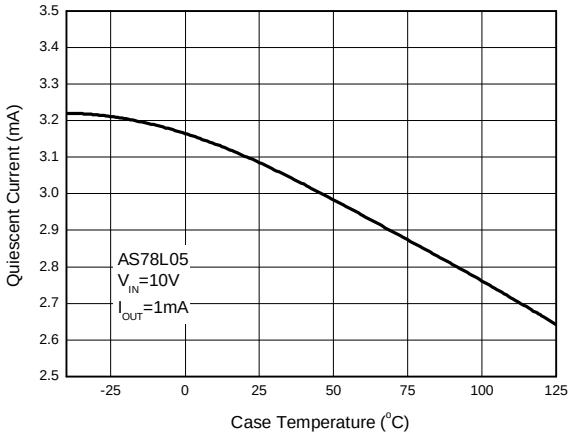


Figure 9. Quiescent Current vs. Case Temperature

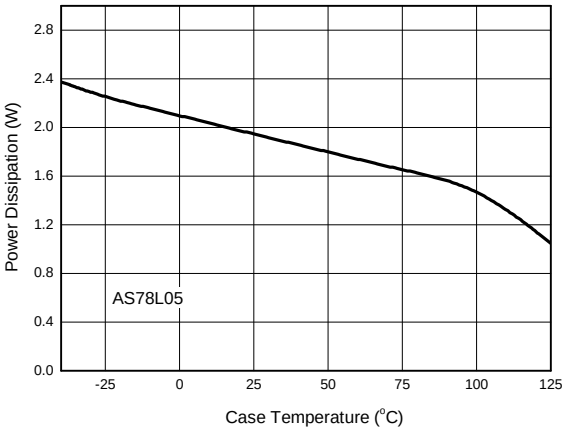


Figure 10. Power Dissipation vs. Case Temperature

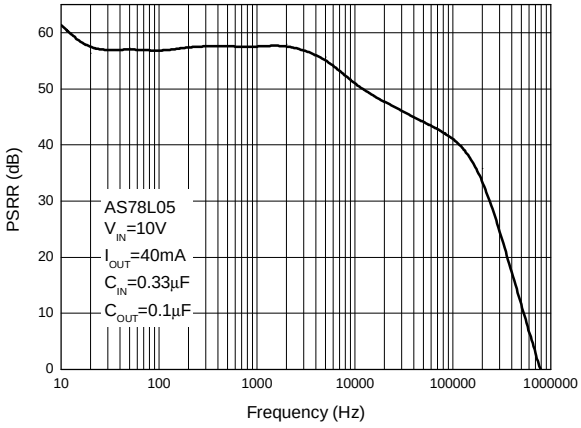


Figure 11. PSRR vs. Frequency

Typical Performance Characteristics (Continued)

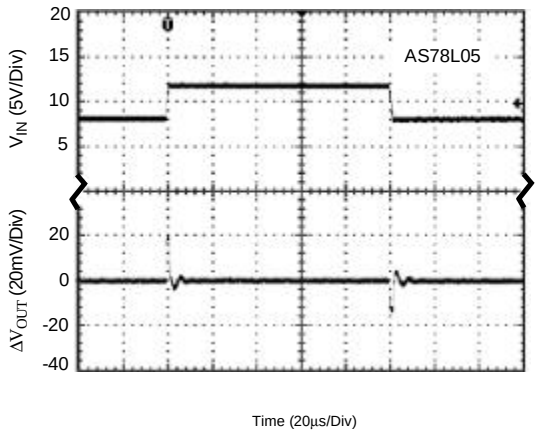


Figure 12. Line Transient
(Conditions: I_{OUT}=40mA, C_{IN}=0.33μF, C_{OUT}=0.1μF)

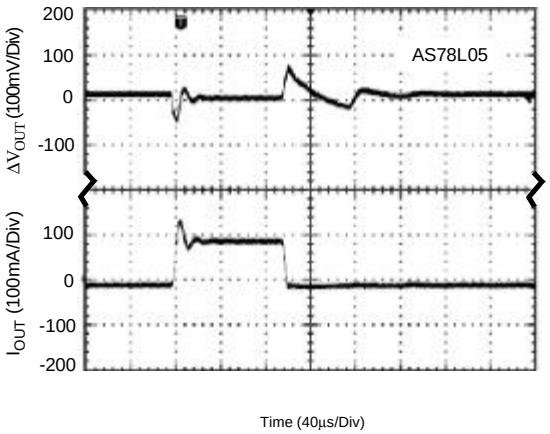


Figure 13. Load Transient
(Conditions: V_{IN}=10V, C_{IN}=0.33μF, C_{OUT}=0.1μF)

Typical Application

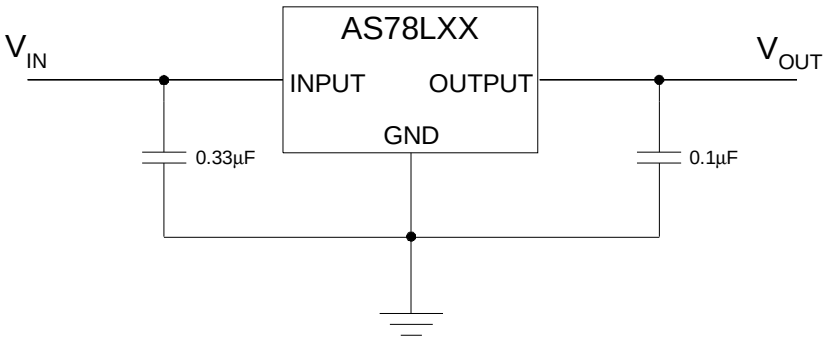
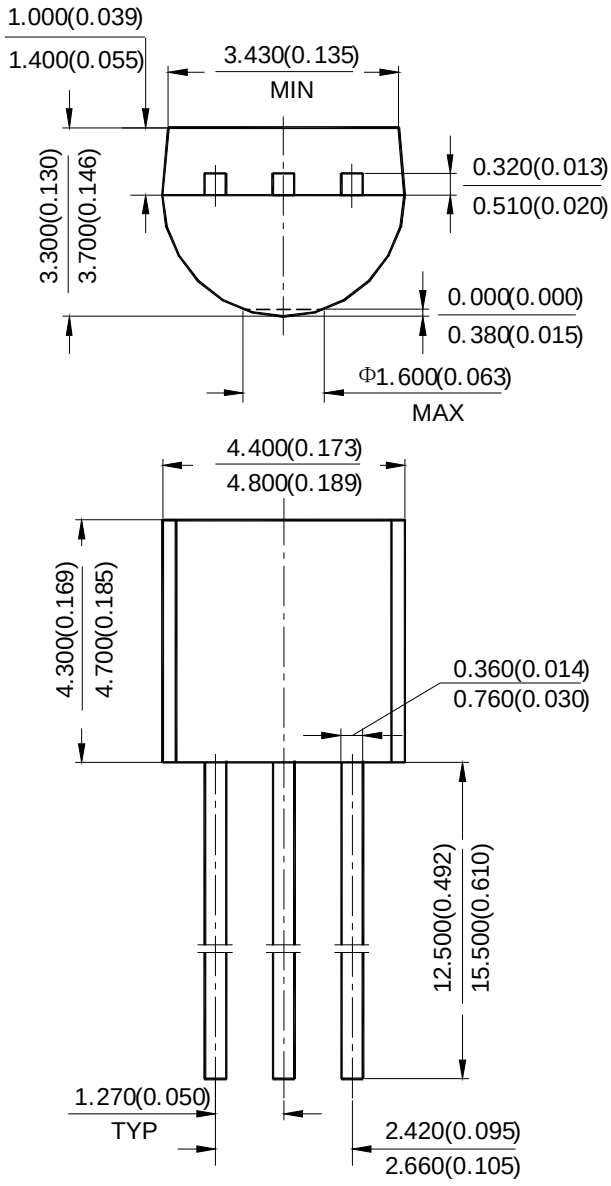


Figure 14. Typical Application of AS78LXX

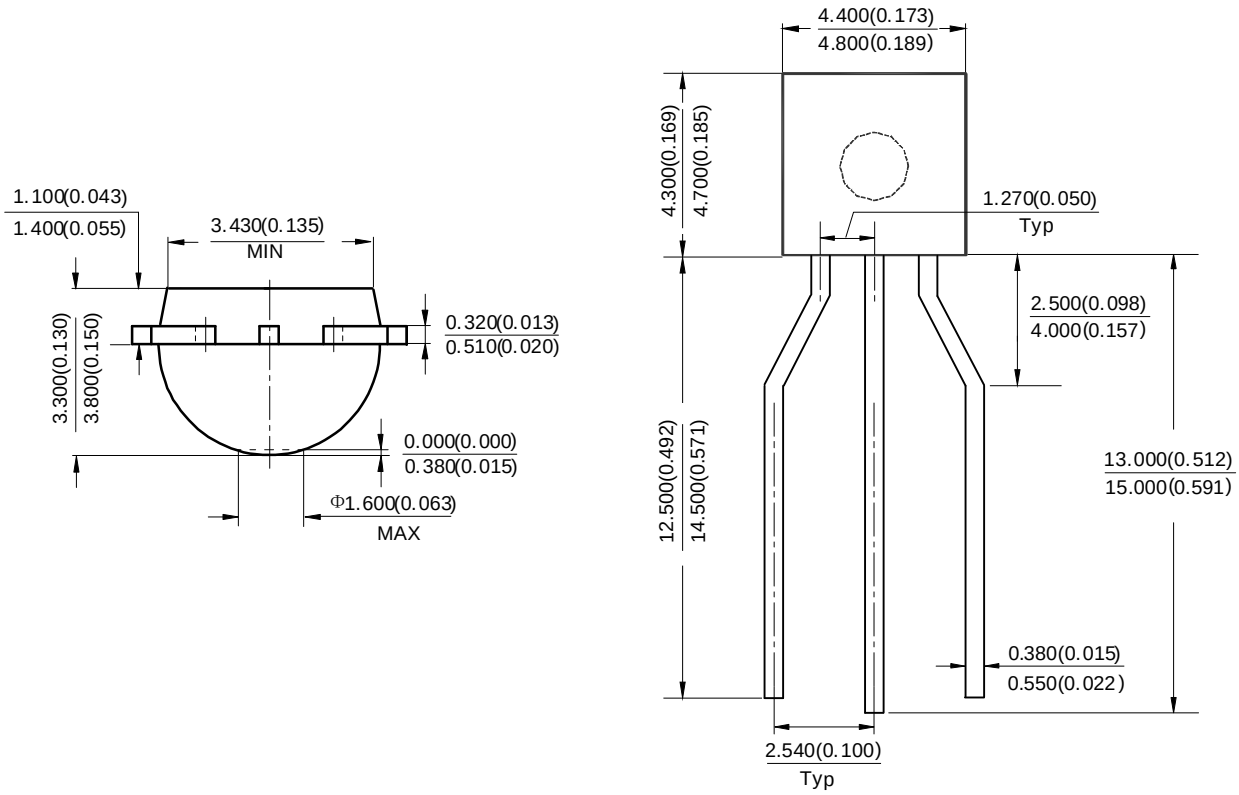
Mechanical Dimensions

TO-92(Bulk Packing) **Unit: mm(inch)**



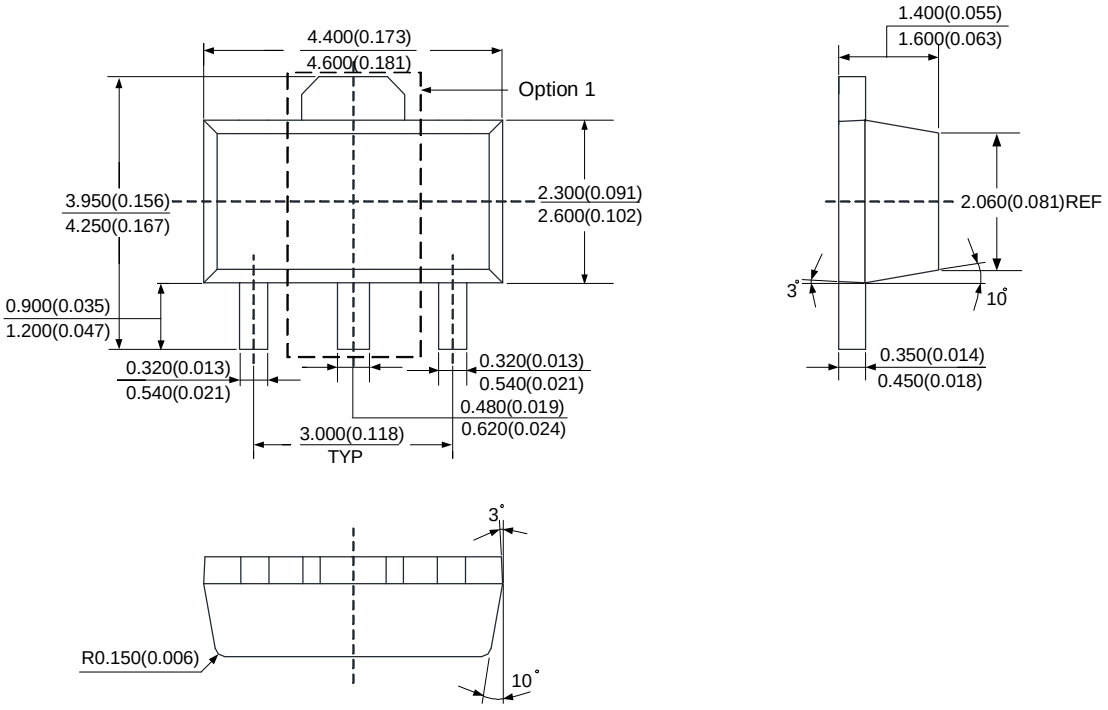
Mechanical Dimensions (Continued)

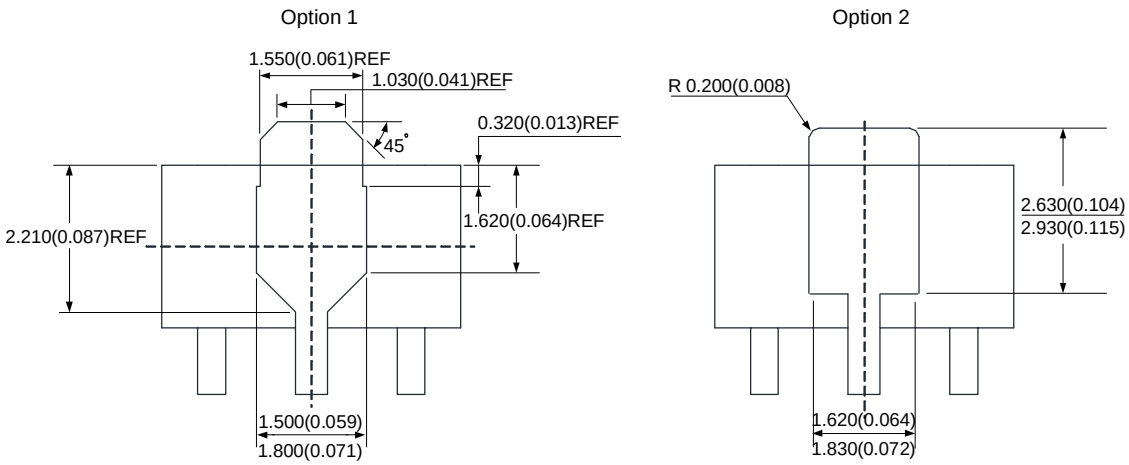
TO-92(Ammo Packing) **Unit: mm(inch)**



Mechanical Dimensions (Continued)

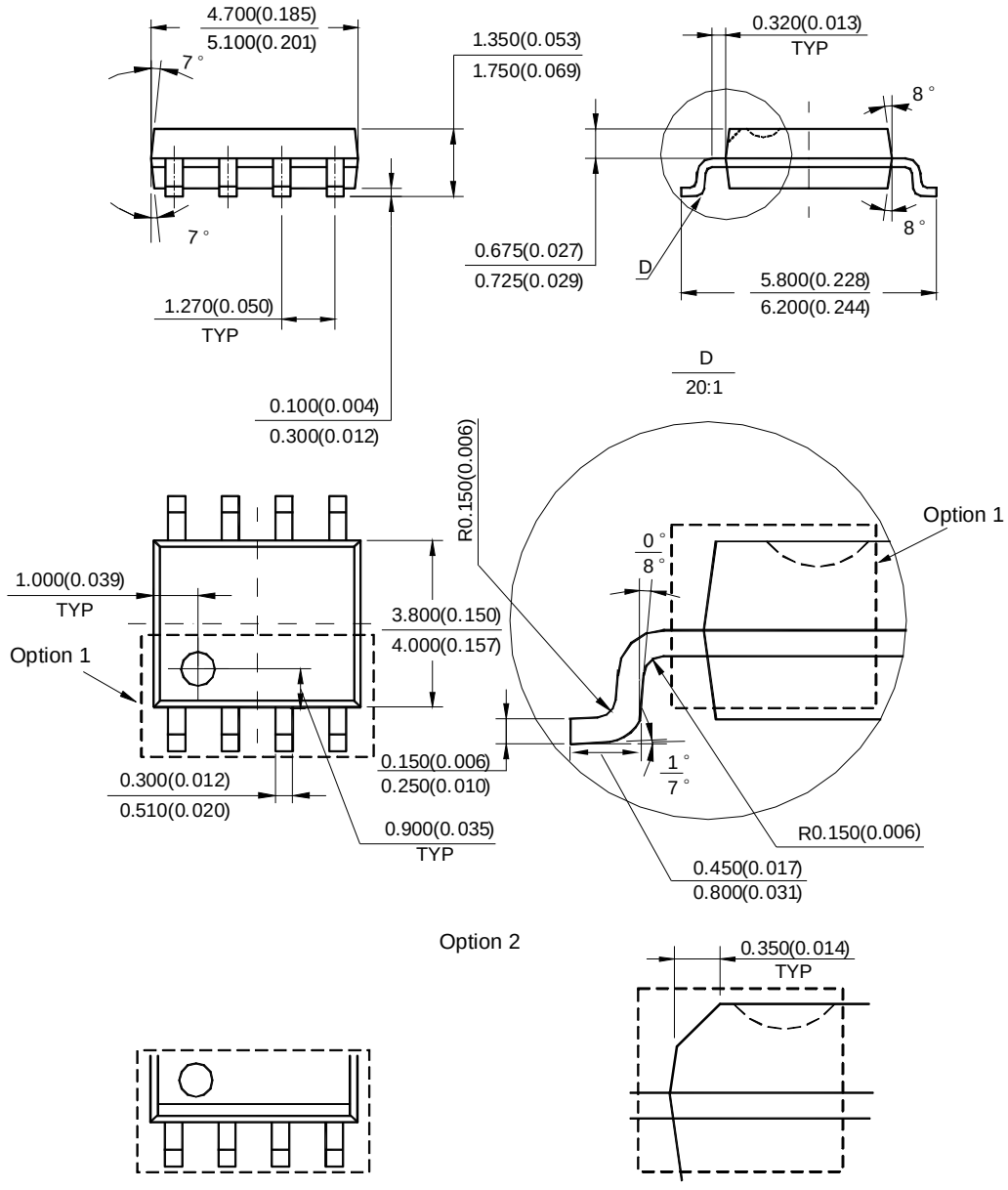
SOT-89 **Unit: mm(inch)**





Mechanical Dimensions (Continued)

SOIC-8 **Unit: mm(inch)**



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

BCD Semiconductor Manufacturing Limited

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OCEAN CHIPS
Океан Электроники
Поставка электронных компонентов

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «**JONHON**», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «**FORSTAR**».

AVIC JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).

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