

General Description

The SE78XX series are three terminal positive voltage regulators designed for a wide variety of applications including local, on-card regulation.

The SE78XX is complete with internal current limiting, thermal shutdown protection, and safe-area compensation which make them virtually immune from output overload. If adequate heat sinking is provided, these regulators can deliver output currents up to 1A.

The SE78XX are available in TO220 and TO252 packages.

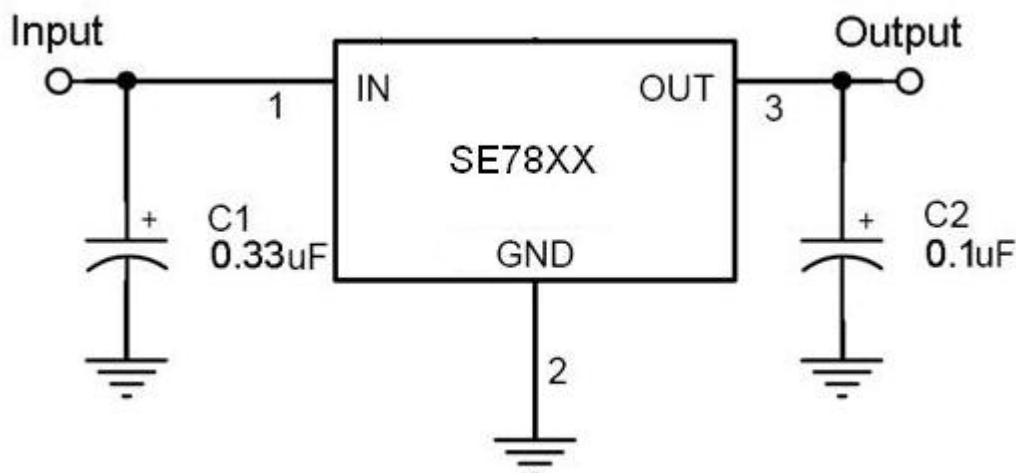
Features

- Output Current up to 1A
- Fixed Output Voltages of 5V, 9V and 12V
- Output Voltage Accuracy of $\pm 4\%$ over the Full Temperature Range
- Internal Short Circuit Current Limiting
- Internal Thermal Overload Protection
- Output Transistor Safe-area Protection
- Low Load Regulation
- Stable Performance in High Temperature

Applications

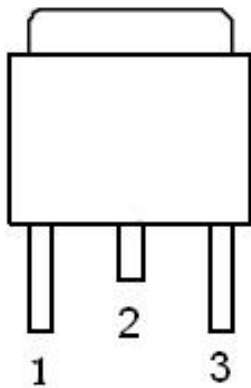
- Intelligent Ammeter
- Power Management for Computer Mother Board
- LCD Monitor and LCD TV
- Post Regulators for Switching Supplies

Typical Application

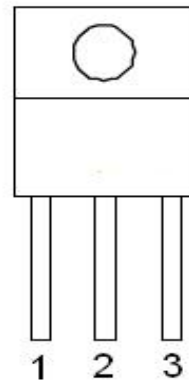




Pin Configuration



TO252
1.IN 2.GND 3.OUT

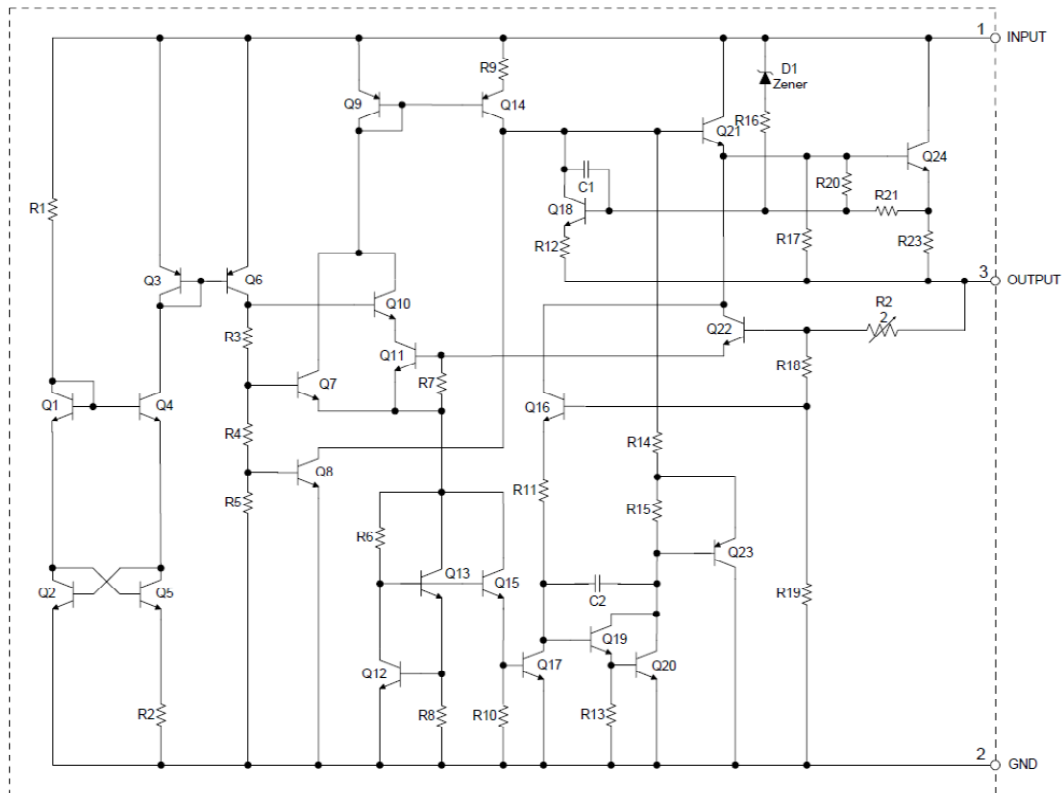


TO220
1.IN 2.GND 3.OUT

Pin Description

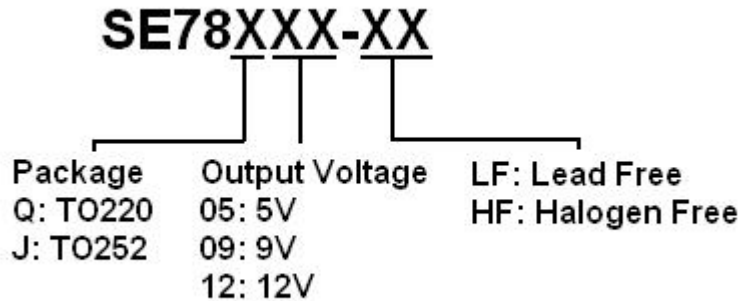
NO.	Pin Name	Pin Function Description
1	IN	Voltage Input
2	GND	Ground
3	OUT	Voltage Output

Functional Block Diagram





Ordering Information



Part Number	Marking Information	Package	Remarks
SE78QXX-LF	SE78XX YYWW-LF	TO220	XX means Output Voltage YYWW means Production batch LF means Lead Free
SE78JXX-LF	SE78XX YYWW-LF	TO252	
SE78QXX-HF	SE78XX YYWW-HF	TO220	XX means Output Voltage YYWW means Production batch HF means Halogen Free
SE78JXX-HF	SE78XX YYWW-HF	TO252	

Absolute Maximum Ratings

Symbol	Parameter	Maximum	Units	
V _{IN}	Input Voltage	36	V	
T _{LEAD}	Lead Temperature (Soldering, 10sec)	260	°C	
P _D	Power Dissipation	Internal Limited	W	
T _J	Operating Junction Temperature	150	°C	
T _{STG}	Storage Temperature Range	-65~+150	°C	
θ _{JC}	Thermal Resistance -Junction to Case	TO220	5	°C/W
		TO252	10	
θ _{JA}	Thermal Resistance -Junction to Ambient	TO220	45	°C/W
		TO252	55	

Note: Absolute maximum ratings are those values beyond which damage to the device may occur.
Functional operation under these conditions is not implied.



Electrical Characteristics

SE7805 Electrical Characteristics

($V_{CC}=10V$; $I_{OUT}=1A$; $T_J=25^{\circ}C$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	4.9	5	5.1	V
		$I_{OUT}=5mA$ to $1A$, $V_{IN}=7.5V$ to $20V$, $P_D \leq 15W$	4.8		5.2	
Line Regulation	V_{RLINE}	$V_{IN}=7.5V$ to $20V$, $I_{OUT}=500mA$, $T_J=25^{\circ}C$		25	50	mV
Load Regulation	V_{RLOAD}	$V_{IN}=10V$, $I_{OUT}=5mA$ to $1A$, $T_J=25^{\circ}C$		20	50	
Quiescent Current	I_q	$V_{IN}=10V$, $I_{OUT}=0$		3.2	6	mA
Quiescent Current Change	ΔI_q	$V_{IN}=8V$ to $25V$, $I_{OUT}=500mA$, $T_J=25^{\circ}C$		0.3	0.8	mA
		$I_{OUT}=5mA$ to $1A$, $T_J=25^{\circ}C$		0.08	0.5	mA
Ripple Rejection	PSRR	$V_{IN}=8V$ to $18V$, $f=120Hz$, $I_{OUT}=500mA$		70		dB
Dropout Voltage	V_{DROP}	$\Delta V_{OUT}=1\%$, $I_{OUT}=1A$, $T_J=25^{\circ}C$		2		V
Output Noise Voltage	N_{OUT}	$f=10Hz$ to $100kHz$, $T_A=25^{\circ}C$		10		$\mu V/V_o$
Output Resistance	R_{OUT}	$f=1KHz$		10		m Ω
Short Circuit Current	I_{SC}	$V_{IN}=35V$, $T_A=25^{\circ}C$		0.05		A
Peak Output Current	I_{PK}	$V_{IN}=10V$, $T_J=25^{\circ}C$		2.2		A
Temperature Coefficient of Output Voltage	$\Delta V_{OUT}/\Delta T$			0.4		mV/ $^{\circ}C$
	$(\Delta V_{OUT}/V_{OUT})/\Delta T$			80		ppm/ $^{\circ}C$

Note1: Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible, and thermal effects must be taken into account separately.

Note2: This specification applies only for DC power dissipation permitted by absolute maximum ratings.



Electrical Characteristics(Continue)

SE7809 Electrical Characteristics

(V_{CC}=15V ;I_{OUT}=1A ; T_J=25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V _{OUT}	T _J =25°C	8.82	9	9.18	V
		I _{OUT} =5mA to 1A, V _{IN} =11.5V to 23V,P _D ≤15W	8.65		9.35	
Line Regulation	V _{RLINE}	V _{IN} =11.5V to 23V, I _{OUT} =500mA, T _J =25°C		25	90	mV
Load Regulation	V _{RLOAD}	V _{IN} =14V, I _{OUT} =5mA to 1A, T _J =25°C		25	100	
Quiescent Current	I _q	V _{IN} =15V, I _{OUT} =0		3.2	6	mA
Quiescent Current Change	ΔI _q	V _{IN} =11.5V to 23V, I _{OUT} =500mA, T _J =25°C		0.3	0.8	mA
		I _{OUT} =5mA to 1A, T _J =25°C		0.08	0.5	mA
Ripple Rejection	PSRR	V _{IN} =11.5V to 21.5V, f=120Hz, I _{OUT} =500mA		61		dB
Dropout Voltage	V _{DROP}	ΔV _{OUT} =1%, I _{OUT} =1A, T _J =25°C		2		V
Output Noise Voltage	N _{OUT}	f=10Hz to 100kHz, T _A =25°C		10		uV/V _o
Output Resistance	R _{OUT}	f=1KHz		10		mΩ
Short Circuit Current	I _{SC}	V _{IN} =35V, T _A =25°C		0.2		A
Peak Output Current	I _{PK}	V _{IN} =15V, T _J =25°C		2.2		A
Temperature Coefficient of Output Voltage	ΔV _{OUT} / ΔT			0.72		mV/°C
	(ΔV _{OUT} /V _{OUT})/ΔT			80		ppm/°C

Note1:Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible, and thermal effects must be taken into account separately.

Note2: This specification applies only for DC power dissipation permitted by absolute maximum ratings.



Electrical Characteristics(Continue)

SE7812 Electrical Characteristics

(V_{CC}=19V ;I_{OUT}=1A ; T_J=25°C unless otherwise specified)

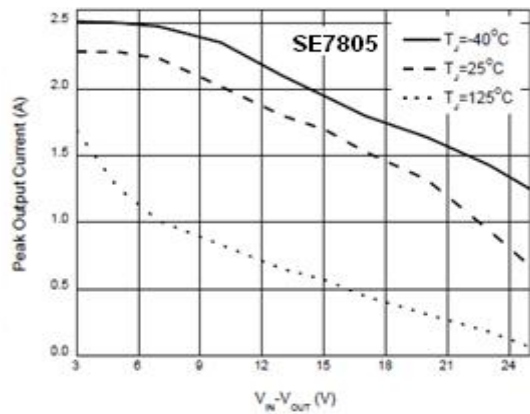
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V _{OUT}	T _J =25°C	11.75	12	12.25	V
		I _{OUT} =5mA to 1A, V _{IN} =14.8V to 27V,P _D ≤15W	11.5		12.5	
Line Regulation	V _{RLINE}	V _{IN} =14.8V to 27V, I _{OUT} =500mA, T _J =25°C		25	120	mV
Load Regulation	V _{RLOAD}	V _{IN} =19V, I _{OUT} =5mA to 1A, T _J =25°C		40	120	
Quiescent Current	I _q	V _{IN} =19V, I _{OUT} =0		3.4	6	mA
Quiescent Current Change	ΔI _q	V _{IN} =14.8V to 30V, I _{OUT} =500mA, T _J =25°C		0.3	0.8	mA
		I _{OUT} =5mA to 1A, T _J =25°C		0.08	0.5	mA
Ripple Rejection	PSRR	V _{IN} =15V to 25V, f=120Hz, I _{OUT} =500mA		60		dB
Dropout Voltage	V _{DROP}	ΔV _{OUT} =1%, I _{OUT} =1A, T _J =25°C		2		V
Output Noise Voltage	N _{OUT}	f=10Hz to 100kHz, T _A =25°C		10		uV/Vo
Output Resistance	R _{OUT}	f=1KHz		11		mΩ
Short Circuit Current	I _{SC}	V _{IN} =35V, T _A =25°C		0.2		A
Peak Output Current	I _{PK}	V _{IN} =18V, T _J =25°C		2.2		A
Temperature Coefficient of Output Voltage	ΔV _{OUT} / ΔT			0.96		mV/°C
	(ΔV _{OUT} /V _{OUT})/ΔT			80		ppm/°C

Note1: Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible, and thermal effects must be taken into account separately.

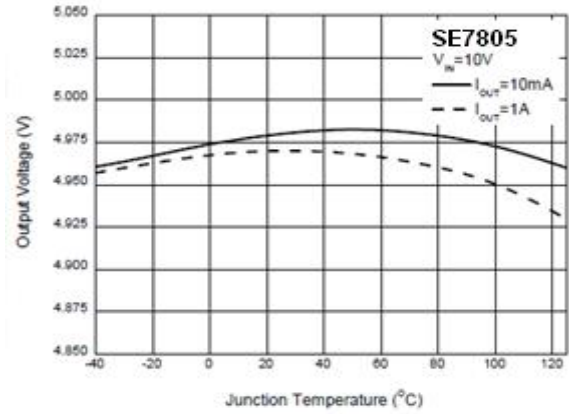
Note2: This specification applies only for DC power dissipation permitted by absolute maximum ratings



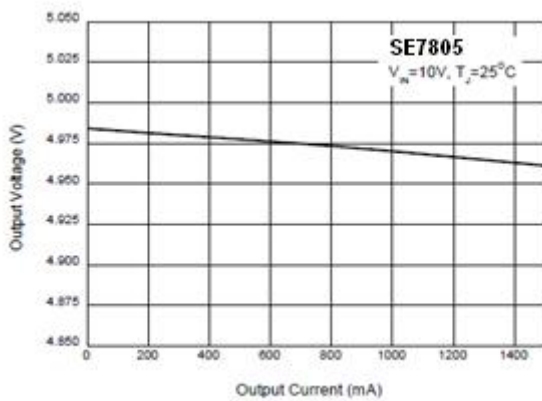
Typical Performance Characteristics



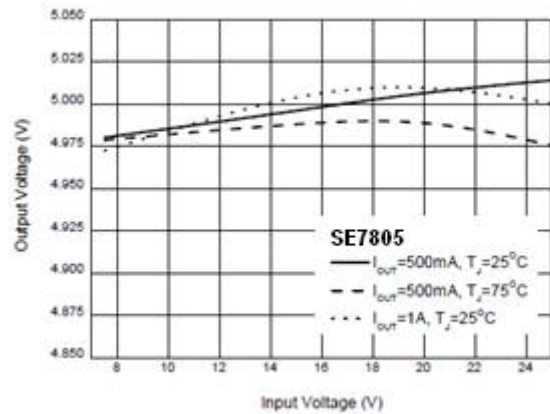
Peak Output Current vs Input/Output Differential Voltage



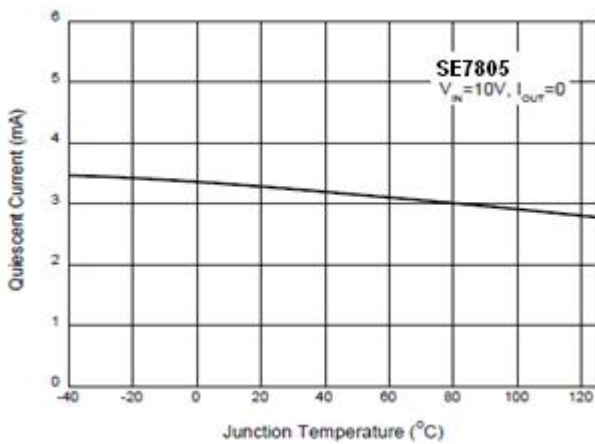
Output Voltage vs Junction Temperature



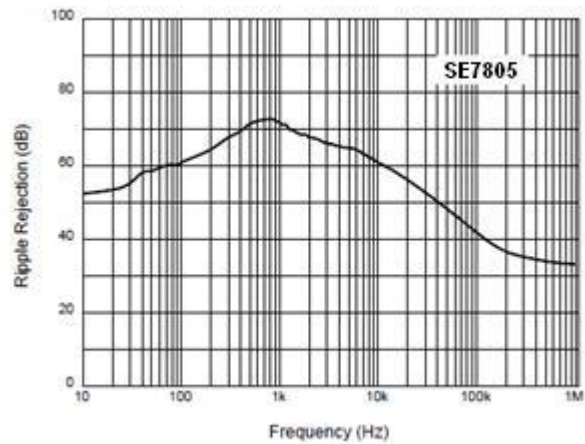
Output Voltage vs Output Current



Output Voltage vs Input Voltage



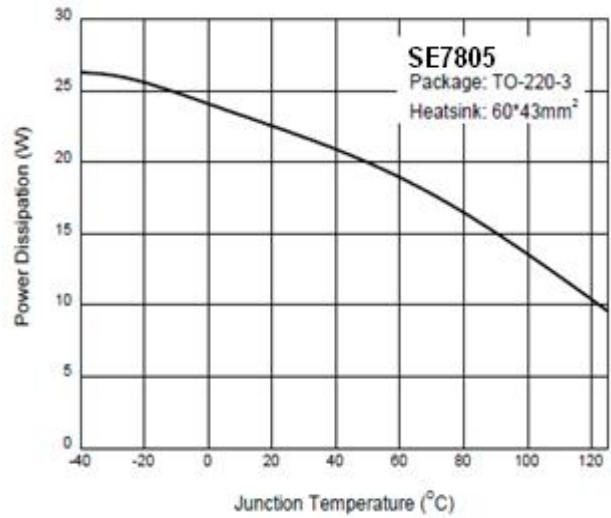
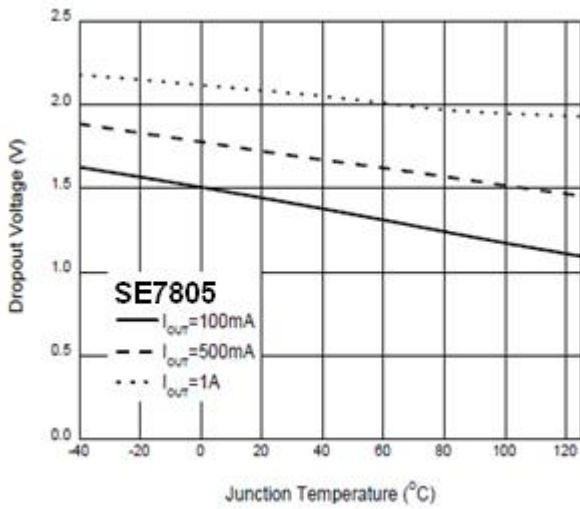
Quiescent Current vs Junction Temperature



Ripple Rejection vs Frequency

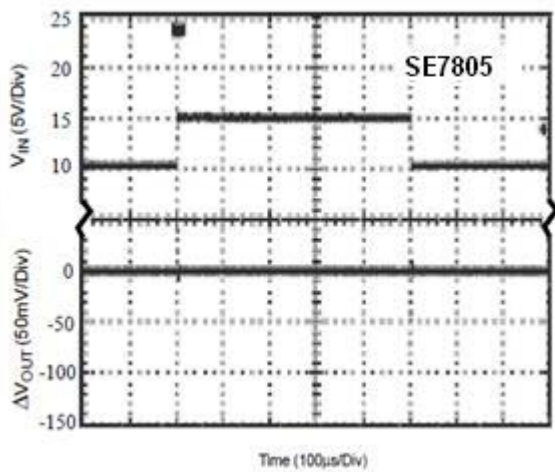


Typical Performance Characteristics(Continue)



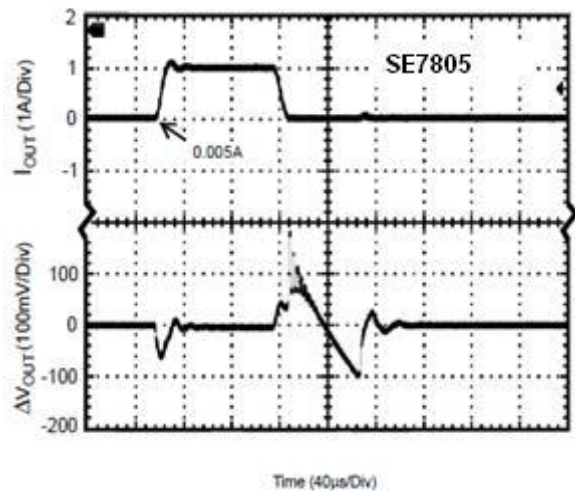
Dropout Voltage vs Junction Temperature

Power Dissipation vs Junction Temperature



Line Transient

(Conditions: $I_{OUT}=500mA$, $C_{OUT}=0.1µF$)



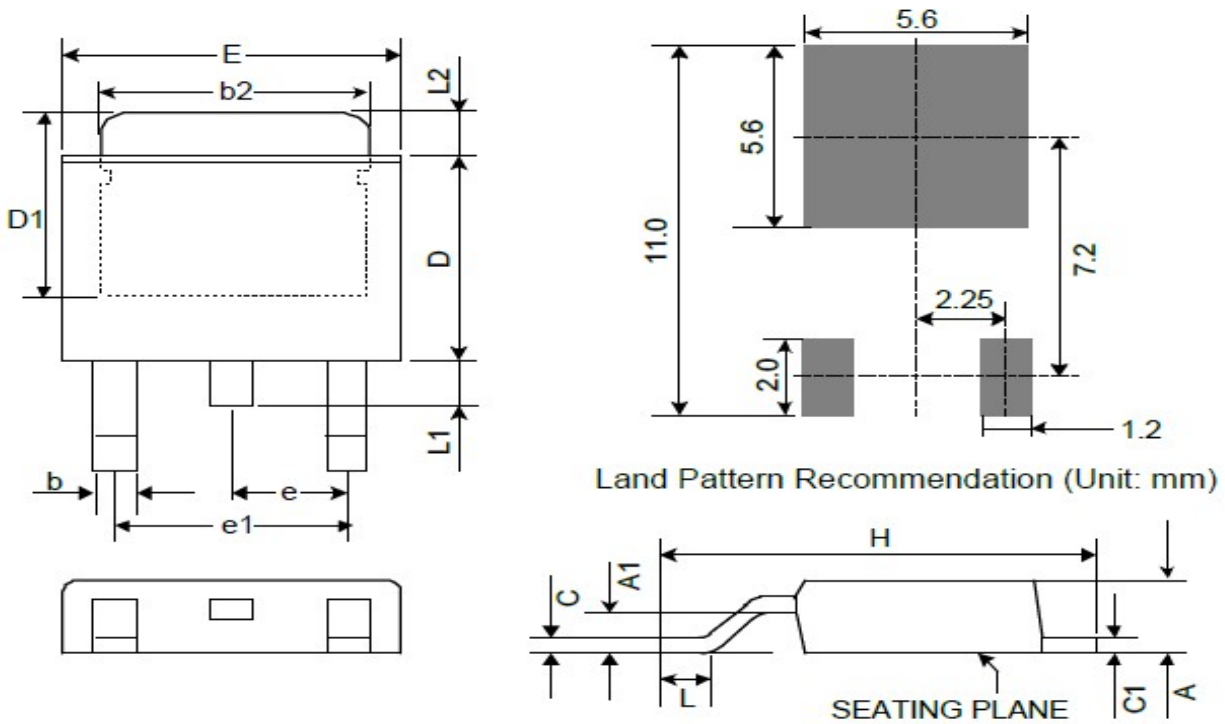
Load Transient

(Conditions: $C_{IN}=0.33µF$, $C_{OUT}=0.1µF$)



Outline Drawing For SE78XX

(1)TO252

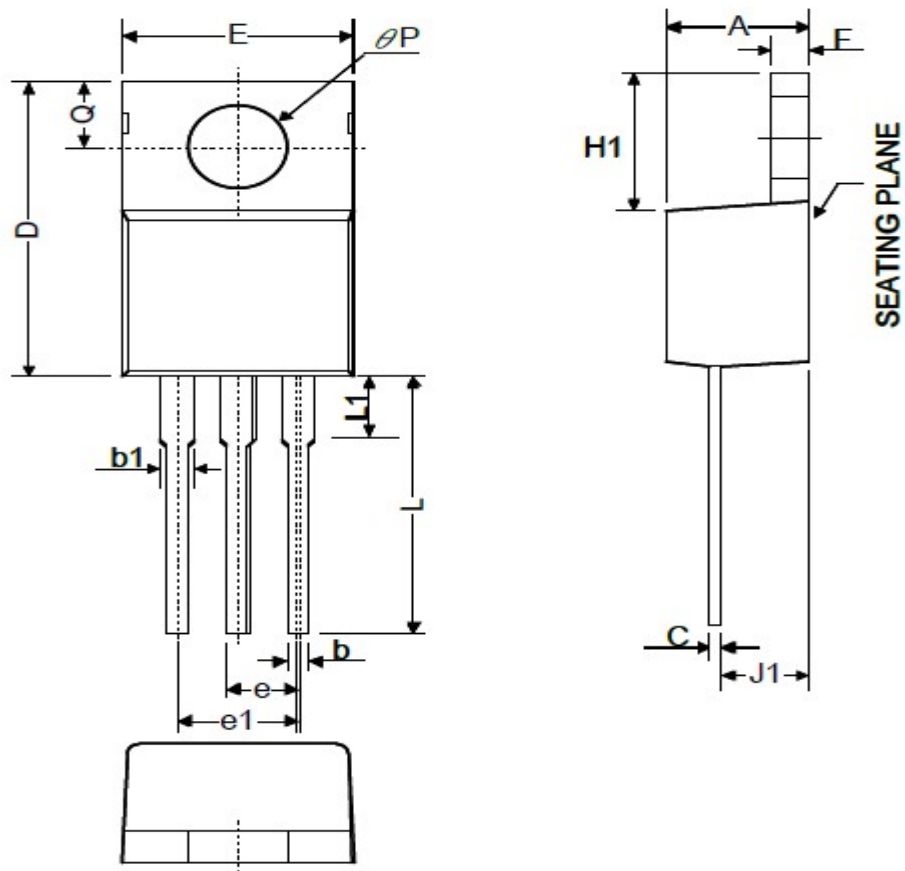


Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	2.18	2.29	2.39	0.086	0.09	0.094
A1	-	-	0.13	-	-	0.005
b	0.51	0.71	0.89	0.02	0.028	0.035
b2	4.95	5.21	5.46	0.195	0.205	0.215
C	0.46	0.53	0.61	0.018	0.021	0.024
C1	0.46	0.53	0.58	0.018	0.021	0.023
D	5.33	5.46	6.22	0.21	0.215	0.245
D1	4.57	-	-	0.18	-	-
E	6.35	6.55	6.73	0.25	0.258	0.265
e	2.29 BSC			0.090 BSC.		
e1	4.58 BSC			0.180 BSC.		
H	9.4	9.7	10.4	0.37	0.382	0.41
L	1.4	1.6	1.78	0.055	0.063	0.07
L1	-	-	1.02	-	-	0.04
L2	1.52	1.78	2.03	0.06	0.07	0.08

Mold flash shall not exceed 0.005inch per side
JEDEC outline: TO-252



(2)TO220



Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	3.55	4.19	4.83	0.14	0.165	0.19
b1	1.14	1.45	1.78	0.045	0.057	0.07
b	0.38	0.69	1.02	0.015	0.027	0.04
C	0.36	0.48	0.61	0.014	0.019	0.024
D	14.2	15.4	16.5	0.56	0.605	0.65
E	9.7	10.2	10.7	0.38	0.4	0.42
e	2.54BSC			0.1BSC		
e1	5.08BSC			0.2BSC		
F	0.51	0.95	1.397	0.02	0.038	0.055
H1	5.84	6.35	6.86	0.23	0.25	0.27
J1	2.03	2.48	2.92	0.08	0.098	0.115
L	12.7	13.7	14.73	0.5	0.54	0.58
L1			6.35			0.25
θP	3.53	3.81	4.09	0.139	0.15	0.161
Q	2.54	2.98	3.43	0.1	0.118	0.135

Mold flash shall not exceed 0.005inch per side
JEDEC outline: TO-220 AB



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