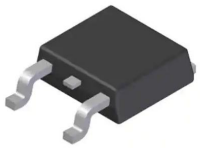
78MXX-XG

Three-terminal positive Voltage Regulator

General Description

The 78MXX-XG family is monolithic fixed voltage regulator integrated circuit. They are suitable for applications that required supply current up to 0.5 A.



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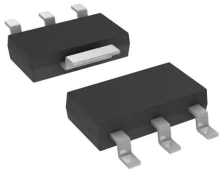


SOT223

Features

- Output Current Up To 0.5 A
- Fixed Output Voltage Of 3.3V, 5V, 6V, 8V, 9V, 12V,15V,18V and 24V Available
- Thermal Overload Shutdown Protection
- Short Circuit Current Limiting
- Output Transistor SOA Protection

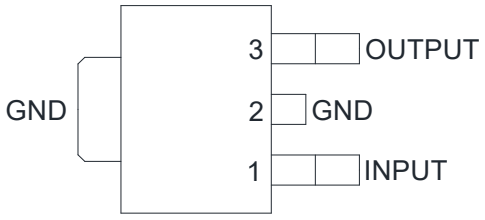
Package Information

Part NO.	Order NO.	Package Description	Package Marking	Package Option
78MXX-XG	78MXX-XG	TO252-2	CHMC 78MXX SXXXX	70/Tube 2500/Reel
78MXXS-XG	78MXXS-XG	SOT223	78MXXS SXXXX	2500/Reel

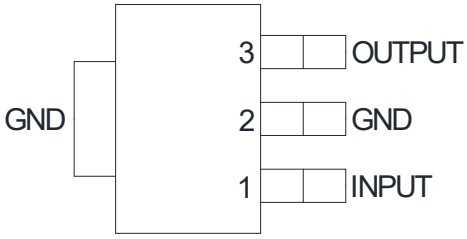
SXXXX:Lot NO. 78MXX/78MXXS:Part NO. (XX:Output Voltage)

XX(Output Voltage):33(3.3V)/ 05(5.0V)/06(6.0V)/08(8.0V)/09(9.0V)/12(12V)/15(15V)/18(18V)/24(24V)

Pin Connection

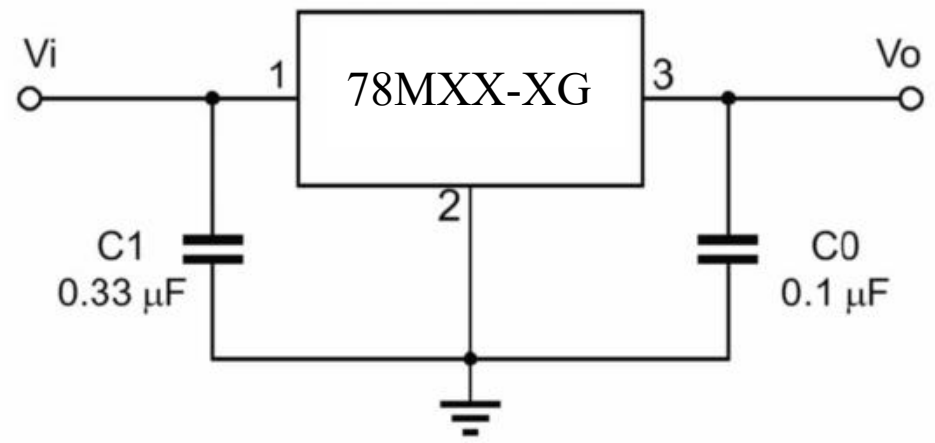


78MXX-XG(TO252-2)



78MXXS-XG(SOT223)

Typical Application Circuits



Absolute Maximum Ratings (T_J=25℃, unless otherwise specified)

Characteristic	Value	Value	Unit
Input Voltage	Vi	35	V
Thermal Resistance Junction-Case	$R_{\theta JC}$	10	°C/W
Thermal Resistance Junction-Air	$R_{\theta JA}$	93	°C/W
Operating Temperature Range	T_{OPR}	-40~+125	°C
Storage Temperature Range	T_{STG}	-55~+150	°C

Electrical Characteristics

For 78M33(S)(unless otherwise noted, Vi=9V,Io=350mA, Ci=0.33μF,Co=0.1μF)

Characteristics	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	Vo	T_J=+25°C, Io=5mA~0.5A	3.16	3.3	3.43	V
		5.3V≤Vi≤20V,Io=5mA～0.5A	3.13	3.3	3.46	
Line Regulation*	ΔVo	5.3V≤Vi≤25V T_J=25℃,Io=200mA		4.0	100	mV
		6.3V≤Vi≤20V,T_J=25℃,Io=200mA		2	80	
Load Regulation*	ΔVo	T_J=25℃,Io=5mA～0.5A		25	100	mV
		T_J=25℃,Io=5mA～200mA		10	50	
Quiescent Current	I_Q	T_J=+25℃,Io=0.5A		4	6	mA
Quiescent Current Change	ΔI_Q	6.3V≤Vi≤25V,Io=200mA			0.8	mA
		5mA≤Io≤0.35A			0.5	
Output Noise Voltage	V_N	10Hz≤ f ≤100kHz, T_J=25℃		40	200	μV
Ripple Rejection	RR	6.3V≤Vi≤18V,f=120Hz, Io=300mA, T_J=25℃	56	70		dB
Dropout Voltage	Vd	T_J=+25°C		1.7		V
Short Circuit Current Limit	I_{SC}	Vi=Vo+2V,T_J=+25°C		0.9		A

For 78M05(S)-XG(unless otherwise noted, Vi=10V,Io=350mA, Ci=0.33μF,Co=0.1μF)

Characteristics	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	Vo	T_J=+25°C, Io=5mA~0.5A	4.8	5.0	5.2	V
		7V≤Vi≤20V,Io=5mA～0.5A	4.75	5.0	5.25	
Line Regulation*	ΔVo	7V≤Vi≤25V T_J=25℃,Io=200mA		4.0	100	mV
		8V≤Vi≤20V,T_J=25℃,Io=200mA		2	80	
Load Regulation*	ΔVo	T_J=25℃,Io=5mA～0.5A		25	100	mV
		T_J=25℃,Io=5mA～200mA		10	50	
Quiescent Current	I_Q	T_J=+25℃,Io=0.5A		4	6	mA
Quiescent Current Change	Δ I_Q	8V≤Vi≤25V,Io=200mA			0.8	mA
		5mA≤Io≤0.35A			0.5	
Output Noise Voltage	V_N	10Hz≤ f ≤100kHz, T_J=25℃		40	200	μV
Ripple Rejection	RR	8V≤Vi≤18V,f=120Hz, Io=300mA, T_J=25℃	56	70		dB
Dropout Voltage	Vd	T_J=+25°C		1.7		V
Short Circuit Current Limit	I_{SC}	Vi=Vo+2V,T_J=+25°C		0.9		A

For 78M06(S)-XG (unless otherwise noted, Vi=11V,Io=350mA, Ci=0.33μF,Co=0.1μF)

Characteristics	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	Vo	T_J=+25°C	5.75	6.0	6.25	V
		8V≤Vi≤21V,Io=5mA～0.35A	5.7	6.0	6.3	
Line Regulation*	ΔVo	8V≤Vi≤25V Tj=25℃, Io=200mA		4	100	mV
		8V≤Vi≤21V,Io=0.2A,Tj=25℃		2	80	
Load Regulation*	ΔVo	Tj=25℃,Io=5mA～0.5A		25	120	mV
		Tj=25℃,Io=5mA～200mA		10	60	
Quiescent Current	I_Q	T_J=+25°C		4	6	mA
Quiescent Current Change	Δ I_Q	9V≤Vi≤25V, Io=200mA			0.8	mA
		5mA≤Io≤0.35A			0.5	
Output Noise Voltage	V_N	10Hz≤ f ≤100kHz, Tj=25℃		40	200	μV
Ripple Rejection	RR	9V≤Vi≤19V,f=120Hz, Io=300mA, Tj=25℃	56	70		dB
Dropout Voltage	Vd	T_J=+25°C		1.7		V
Short Circuit Current Limit	I_{SC}	Vi=Vo+2V,T_J=+25°C		0.9		A

For 78M08(S)-XG (unless otherwise noted,Vi=14V,Io=350mA, Ci=0.33μF,Co=0.1μF)

Characteristics	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	Vo	T_J=+25°C	7.68	8.0	8.32	V
		10V≤Vi≤23V,Io=5mA～0.35A	7.6	8.0	8.4	
Line Regulation*	ΔVo	10V≤Vi≤25V Tj=25℃, Io=200mA		6	100	mV
		11V≤Vi≤25V,Io=0.5A,Tj=25℃, Io=200mA		2	80	
Load Regulation*	ΔVo	Tj=25℃,Io=5mA～0.5A		26	160	mV
		Tj=25℃,Io=5mA～200mA		10	80	
Quiescent Current	I_Q	T_J=+25°C		4.0	6.0	mA
Quiescent Current Change	Δ I_Q	10V≤Vi≤25V, Io=200mA			0.8	mA
		5mA≤Io≤0.5A			0.5	
Output Noise Voltage	V_N	10Hz≤ f ≤100kHz		60	250	μV
Ripple Rejection	RR	11.5V≤Vi≤21.5V,f=120Hz, Io=300mA, Tj=25℃	56	70		dB
Dropout Voltage	Vd	T_J=+25°C		1.7		V
Short Circuit Current Limit	I_{SC}	Vi=Vo+2V,T_J=+25°C		0.9		A

For 78M09(S)-XG(unless otherwise noted, Vi=15V,Io=350mA,Ci=0.33μF,Co=0.1μF)

Characteristics	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	Vo	T_J=+25°C	8.64	9	9.36	V
		11V≤Vi≤26V,Io=5mA～0.35A	8.55	9	9.45	
Line Regulation*	ΔVo	11V≤Vi≤26V ,Io=0.2A,Tj=25℃		5	100	mV
		13V≤Vi≤26V,Io=0.2A,Tj=25℃		3	80	
Load Regulation*	ΔVo	Tj=25℃,Io=5mA～0.5A		25	180	mV
		Tj=25℃,Io=5mA～200mA		10	90	
Quiescent Current	I_Q	T_J=+25°C		4.0	6.0	mA
Quiescent Current Change	Δ I_Q	12V≤Vi≤26V,Io=0.2A			0.8	mA
		5mA≤Io≤0.35A			0.5	
Output Noise Voltage	V_N	10Hz≤ f ≤100kHz, Tj=25℃		60	250	μV
Ripple Rejection	RR	12V≤Vi≤22V,f=120Hz, Io=300mA, Tj=25℃	56	68		dB
Dropout Voltage	Vd	T_J=+25°C		1.7		V
Short Circuit Current Limit	I_{SC}	Vi=Vo+2V,T_J=+25°C		0.9		A

For 78M12(S)-XG (unless otherwise noted, Vi=19V,Io=350mA, Ci=0.33μF,Co=0.1μF)

Characteristics	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	Vo	T_J=+25°C	11.5	12	12.5	V
		14V≤Vi≤27V,Io=5mA～0.35A	11.4	12	12.6	
Line Regulation*	ΔVo	14V≤Vi≤30V,Io=0.2A, Tj=25℃		7	100	mV
		16V≤Vi≤30V,Io=0.2A,Tj=25℃		3	80	
Load Regulation*	ΔVo	Tj=25℃,Io=5mA～0.5A		27	240	mV
		Tj=25℃,Io=5mA～200mA		10	120	
Quiescent Current	I_Q	T_J=+25°C		4.0	6.0	mA
Quiescent Current Change	Δ I_Q	15V≤Vi≤30V,Io=0.2A			0.8	mA
		5mA≤Io≤0.5A			0.5	
Output Noise Voltage	V_N	10Hz≤ f ≤100kHz, Tj=25°C		70	300	μV
Ripple Rejection	RR	15V≤Vi≤25V,f=120Hz, Io=300mA, Tj=25℃	50	60		dB
Dropout Voltage	Vd	T_J=+25°C		1.7		V
Short Circuit Current Limit	I_{SC}	Vi=Vo+2V,T_J=+25°C		0.9		A

For 78M15(S)-XG (unless otherwise noted, Vi=23V,Io=350mA, Ci=0.33μF,Co=0.1μF)

Characteristics	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	Vo	T_J=+25°C	14.4	15	15.6	V
		17V≤Vi≤30V,Io=5mA～0.35A	14.25	15	15.75	
Line Regulation*	ΔVo	17V≤Vi≤30V,Io=0.2A, Tj=25℃		8	100	mV
		19V≤Vi≤30V,Io=0.2A,Tj=25℃		4	80	
Load Regulation*	ΔVo	Tj=25℃,Io=5mA～0.5A		27	300	mV
		Tj=25℃,Io=5mA～200mA		10	150	
Quiescent Current	I_Q	T_J=+25°C		4.0	6.0	mA
Quiescent Current Change	Δ I_Q	18V≤Vi≤30V,Io=200mA			0.8	mA
		5mA≤Io≤0.35A			0.5	
Output Noise Voltage	V_N	10Hz≤ f ≤100kHz, Tj=25°C		70	300	μV
Ripple Rejection	RR	18.5V≤Vi≤28.5V,f=120Hz, Io=300mA, Tj=25℃	48	57		dB
Dropout Voltage	Vd	T_J=+25°C		1.7		V
Short Circuit Current Limit	I_{SC}	Vi=Vo+2V,,T_J=+25°C		0.9		A

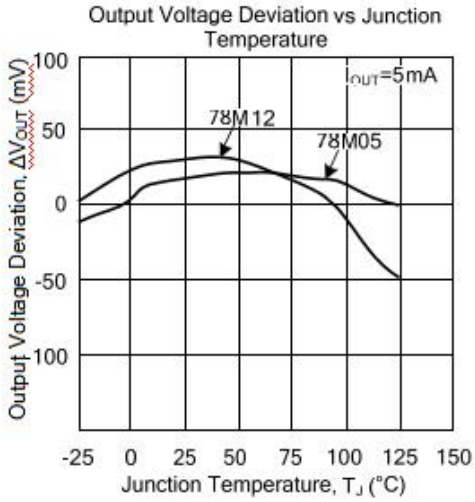
For 78M18(S)-XG (unless otherwise noted, Vi=25V,Io=350mA, Ci=0.33μF,Co=0.1μF)

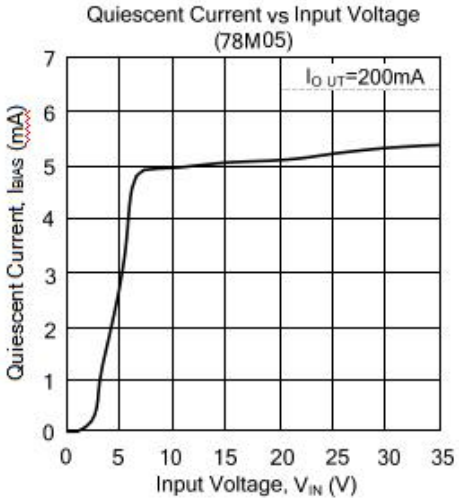
Characteristics	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	Vo	T_J=+25°C	17.28	18	18.72	V
		20V≤Vi≤30V,Io=5mA～0.35A	17.1	18	18.90	
Line Regulation*	ΔVo	20V≤Vi≤30V,Io=0.2A, Tj=25℃		8	100	mV
		22V≤Vi≤30V,Io=0.2A,Tj=25℃		4	80	
Load Regulation*	ΔVo	Tj=25℃,Io=5mA～0.5A		27	300	mV
		Tj=25℃,Io=5mA～200mA		10	150	
Quiescent Current	I_Q	T_J=+25°C		4.0	6.0	mA
Quiescent Current Change	Δ I_Q	21V≤Vi≤30V,Io=200mA			0.8	mA
		5mA≤Io≤0.35A			0.5	
Output Noise Voltage	V_N	10Hz≤ f ≤100kHz, Tj=25℃		70	300	μV
Ripple Rejection	RR	20V≤Vi≤30V,f=120Hz, Io=300mA, Tj=25℃	48	55		dB
Dropout Voltage	Vd	T_J=+25°C		1.7		V
Short Circuit Current Limit	I_{SC}	Vi=Vo+2V,,T_J=+25°C		0.9		A

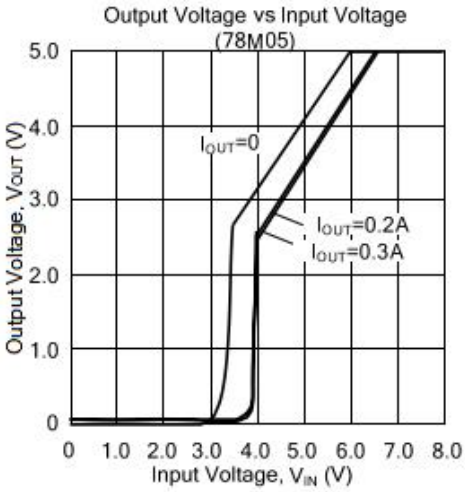
For 78M24(S)-XG (unless otherwise noted, Vi=33V,Io=350mA,Ci=0.33μF,Co=0.1μF)

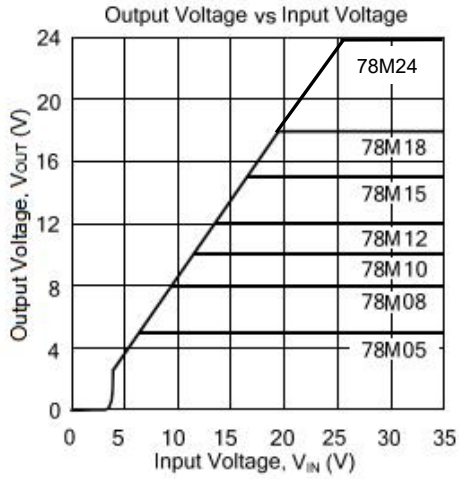
Characteristics	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	Vo	T_J=+25°C	23	24	25	V
		27V≤Vi≤38V,Io=5mA～0.35A	22.8	24	25.2	
Line Regulation*	ΔVo	27V≤Vi≤38V,Io=0.2A, Tj=25℃		12	100	mV
		28V≤Vi≤38V,Io=0.2A,Tj=25℃		7	50	
Load Regulation*	ΔVo	Tj=25℃,Io=5mA～0.5A		30	480	mV
		Tj=25℃,Io=5mA～200mA		10	240	
Quiescent Current	I_Q	T_J=+25°C		5.0	8.0	mA
Quiescent Current Change	Δ I_Q	27.5V≤Vi≤38.5V,Io=200mA			0.8	mA
		5mA≤Io≤0.35A			0.5	
Output Noise Voltage	V_N	10Hz≤ f ≤100kHz, Tj=25℃		115	650	μV
Ripple Rejection	RR	28V≤Vi≤38V,f=120Hz, Io=300mA, Tj=25℃	46	53		dB
Dropout Voltage	Vd	T_J=+25°C		1.7		V
Short Circuit Current Limit	I_{SC}	Vi=Vo+2V,,T_J=+25°C		0.9		A

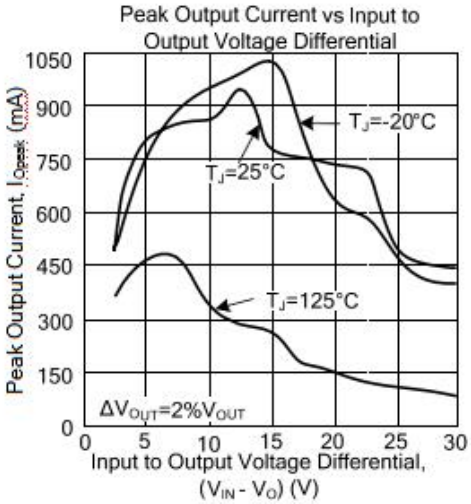
Typical Characteristics

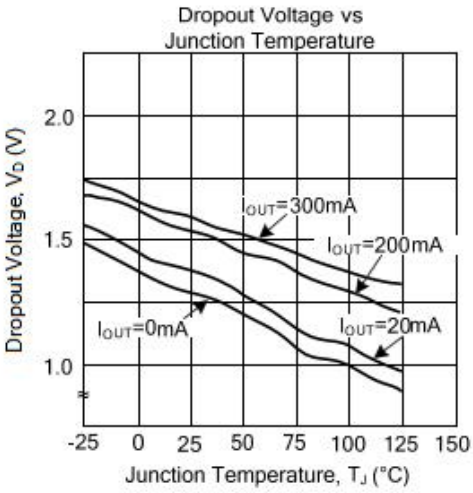












Outline Dimensions

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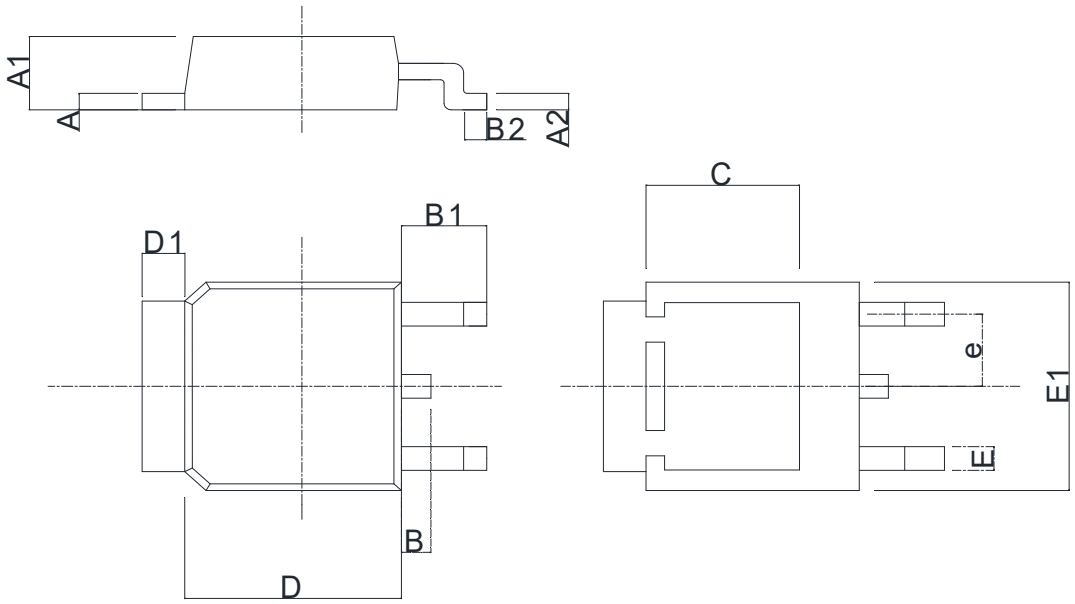

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.470	0.570	0.018	0.023
A1	2.220	2.380	0.087	0.094
A2	0.470	0.570	0.018	0.023
B	0.820	0.840	0.032	0.033
B1	2.380	2.480	0.093	0.098
B2	0.500	0.520	0.019	0.021
C	4.250	4.450	0.167	0.176
D	6.000	6.200	0.236	0.245
D1	1.150	1.250	0.045	0.050
E	0.650	0.850	0.025	0.034
E1	6.450	6.750	0.253	0.266
e	2.285（BSC）		0.090（BSC）	

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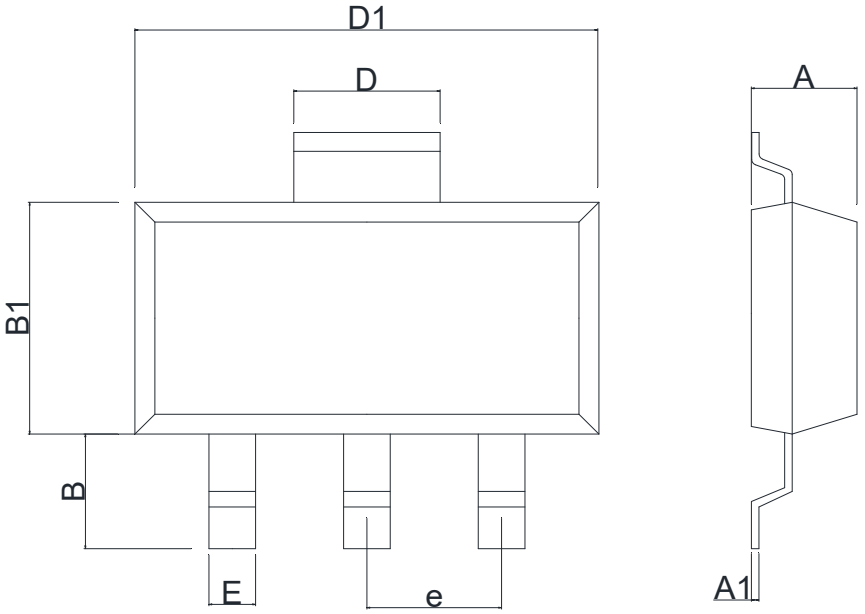

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.550	1.650	0.061	0.064
A1	0.280	0.320	0.011	0.012
B	1.750	1.950	0.068	0.076
B1	3.350	3.550	0.131	0.140
E	0.660	0.760	0.025	0.030
D1	6.450	6.550	0.253	0.257
D	2.900	3.000	0.114	0.118
e	2.300（BSC）		0.090（BSC）	

Statements

- Silicore Technology reserves the right to make changes without further notice to any products or specifications herein. Before customers place an order, customers need to confirm whether datasheet obtained is the latest version, and to verify the integrity of the relevant information.

- Failure or malfunction of any semiconductor products may occur under particular conditions, customers shall have obligation to comply with safety standards when customers use Silicore Technology products to do their system design and machine manufacturing, and take corresponding safety measures in order to avoid potential risk of failure that may cause personal injury or property damage.

- The product upgrades without end, Silicore Technology will wholeheartedly provide customers integrated circuits that have better performance and better quality.