SE78LxxV
Positive Voltage Regulator(Preliminary)

General Description

This 78Lxx series are fixed-voltage monolithic integrated-circuit voltage regulators are designed for a wide range of applications. These applications include on-card regulation for elimination of noise and distribution problems associated with single-point regulation. In addition, they can be used with power-pass elements to make high-current voltage regulators. Each of these regulators can deliver up to 100 mA of output current.

The internal limiting and termal shutdown features of these regulators make them essentially immune to overload.

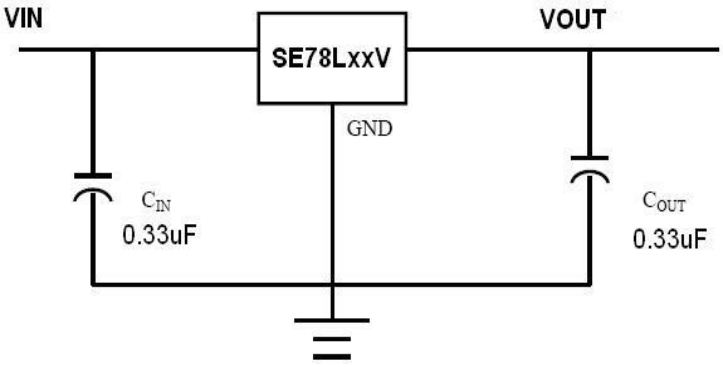
Features

- 3-Terminal Regulators
- Output Current Up to 100 mA
- Internal Thermal Overload Protection
- Internal Short-Circuit Limiting

Application

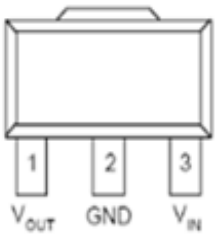
- Linear Regulator
- Graphic Card
- Adapter
- Charger
- Consumer Electronics

Typical Application

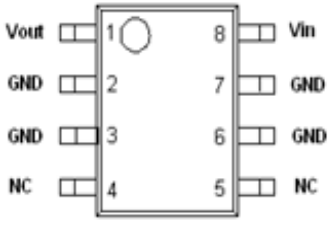


Pin Configuration

TO-92 (Top View)



SOT-89 (Front View)

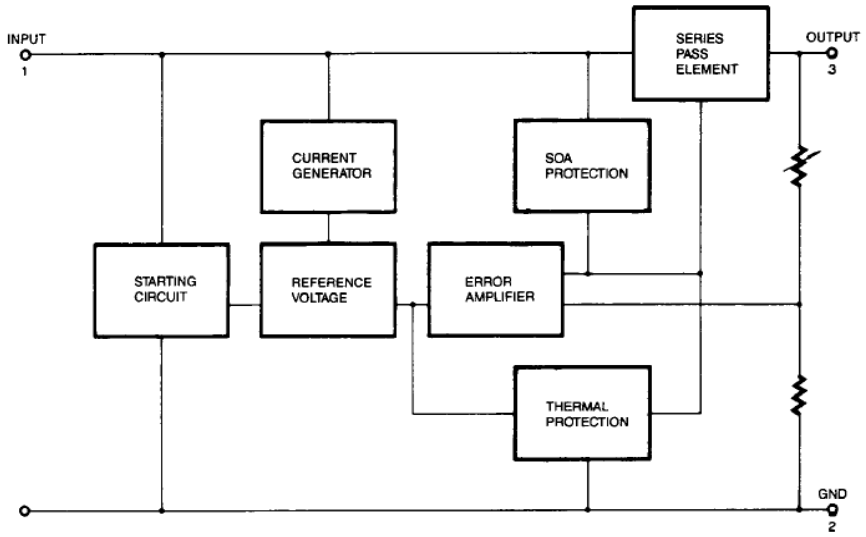


SOP-8 (Top View)

Pin Description

Pin Name	Pin Function Description
V_{IN}	Input voltage
GND	Ground
V_{OUT}	Output voltage

Functional Block Diagram



Ordering Information

Part Number	Marking Information	Package	Remarks
SE78LxxVT	SE78LxxV YYWW-LF	TO-92	XX means Output Voltage, YYWW means Production batch LF means Lead-free
SE78LxxVK		SOT-89	
SE78LxxVF		SOP-8	

Absolute Maximum Ratings

Symbol	Parameter	Value			Units
		78L05V~78L10V	78L12V~78L18V	78L24V	
V_{IN}	Input voltage	30	35	40	V
I_{OUT}	Output current	100			mA
T_A	Operating anbient temperature	-40~125			°C
T_J	Operating junction temperature	150 (TO-92)			°C/W
T_{STG}	Storage Temperature	-65~150			°C
T_{LEAD}	Lead Temperature 1.6mm from case for 10 seconds	260			°C

Recommended Operating Conditions

Symbol	Parameter		Min	Max	Unit
Vin	Input Voltage	78L05V	7	20	V
		78L06V	8	20	
		78L08V	10.5	23	
		78L09V	11.5	24	
		78L10V	12.5	25	
		78L12V	14.5	27	
		78L15V	17.5	30	
		78L18V	20.5	33	
		78L24V	26.5	39	
I_{OUT}	Output Current			100	mA
T_J	Operating virtual junction temperature		0	125	°C

■ 78L05V Electrical Characteristics

Vin=10V, Iout=40mA ， T_A = 25°C (unless otherwise noted)

	Symbol	Test Conditions	Min	Typ	Max	Unit
Vout	Output voltage		4.8	5	5.2	V
		Iout= 1 mA to 40 mA, Vin = 7V to 20V	4.75	5	5.25	
		Iout= 1 mA to 70mA	4.75	5	5.25	
REG_{line}	Input regulation	Vin = 7V to 20V		32	150	mV
		Vin = 8V to 20V		26	100	
REG_{load}	Output regulation	Iout= 1 mA to 40mA		8	30	mV
		Iout = 1 mA to100mA		15	60	
PSRR	Ripple rejection	Vin = 8V to 18V, f= 120Hz	41	49		dB
V_n	Output noise voltage	f = 10Hz to 100 KHz		42		uV
$V_{DROPOUT}$	Dropout voltage			1.7		V
I_Q	Bias current			3.8	6	mA
$\triangle I_Q$	Bias current change	Vin = 8V to 20V		1.5		
		Iout= 1 mA to 40mA			0.1	

■ 78L06V Electrical Characteristics

Vin=11V, Iout=40mA ， T_A = 25°C (unless otherwise noted)

	Symbol	Test Conditions	Min	Typ	Max	Unit
Vout	Output voltage		5.75	6	6.25	V
		Iout= 1 mA to 40 mA, Vin = 8V to 20V	5.7	6	6.3	
		Iout= 1 mA to 70mA	5.7	6	6.3	
REG_{line}	Input regulation	Vin =8V to 20V		35	175	mV
		Vin = 9V to 20V		29	125	
REG_{load}	Output regulation	Iout= 1 mA to 40mA		9	40	mV
		Iout = 1 mA to 100mA		16	80	
PSRR	Ripple rejection	Vin = 9V to 19V, f= 120Hz	40	48		dB
V_n	Output noise voltage	f = 10Hz to 100 KHz		46		uV
$V_{DROPOUT}$	Dropout voltage			1.7		V
I_Q	Bias current			3.9	6	mA
$\triangle I_Q$	Bias current change	Vin = 9V to 20V		1.5		
		Iout= 1 mA to 40mA			0.1	

■ 78L08V Electrical Characteristics

Vin=14V, Iout=40mA ， T_A = 25°C (unless otherwise noted)

	Symbol	Test Conditions	Min	Typ	Max	Unit
Vout	Output voltage		7.7	8	8.3	V
		Iout= 1 mA to 40 mA, Vin = 7V to 20V	7.6	8	8.4	
		Iout= 1 mA to 70mA	7.6	8	8.4	
REG_{line}	Input regulation	Vin = 10.5V to 23V		42	175	mV
		Vin =11V to 23V		36	125	
REG_{load}	Output regulation	Iout= 1 mA to 40mA		10	40	mV
		Iout = 1 mA to 100mA		18	80	
PSRR	Ripple rejection	Vin = 13V to 23V, f= 120Hz	37	46		dB
V_n	Output noise voltage	f = 10Hz to 100 KHz		54		uV
$V_{DROPOUT}$	Dropout voltage			1.7		V
I_Q	Bias current			4	6	mA
$\triangle I_Q$	Bias current change	Vin = 11V to 23V		1.5		
		Iout= 1 mA to 40mA			0.1	

■ 78L09V Electrical Characteristics

Vin=16V, Iout=40mA ， T_A = 25°C (unless otherwise noted)

	Symbol	Test Conditions	Min	Typ	Max	Unit
Vout	Output voltage		8.6	9	9.4	V
		Iout= 1 mA to 40 mA, Vin =12V to 24V	8.55	9	9.45	
		Iout= 1 mA to 70mA	8.55	9	9.45	
REG_{line}	Input regulation	Vin = 12V to 24V		45	175	mV
		Vin = 13V to 24V		40	125	
REG_{load}	Output regulation	Iout= 1 mA to 40mA		11	40	mV
		Iout = 1 mA to 100mA		8	30	
PSRR	Ripple rejection	Vin = 15V to 25V, f= 120Hz	38	45		dB
V_n	Output noise voltage	f = 10Hz to 100 KHz		58		uV
$V_{DROPOUT}$	Dropout voltage			1.7		V
I_Q	Bias current			4.1	6	mA
$\triangle I_Q$	Bias current change	Vin = 13V to 24V		1.5		
		Iout= 1 mA to 40mA			0.1	

■ 78L10V Electrical Characteristics

Vin=17V, Iout=40mA ， T_A = 25°C (unless otherwise noted)

	Symbol	Test Conditions	Min	Typ	Max	Unit
Vout	Output voltage		9.6	10	10.4	V
		Iout= 1 mA to 40 mA, Vin = 13V to 25V	9.5	10	10.5	
		Iout= 1 mA to 70mA	9.5	10	10.5	
REG_{line}	Input regulation	Vin = 13V to 25V		51	175	mV
		Vin = 14V to 25V		42	125	
REG_{load}	Output regulation	Iout= 1 mA to 40mA		11	40	mV
		Iout = 1 mA to 100mA		20	90	
PSRR	Ripple rejection	Vin = 15V to 25V, f= 120Hz	37	44		dB
V_n	Output noise voltage	f = 10Hz to 100 KHz		62		uV
$V_{DROPOUT}$	Dropout voltage			1.7		V
I_Q	Bias current			3.8	6	mA
$\triangle I_Q$	Bias current change	Vin = 14V to 25V		1.5		
		Iout= 1 mA to 40mA			0.1	

■ 78L12V Electrical Characteristics

Vin=19V, Iout=40mA ， T_A = 25°C (unless otherwise noted)

	Symbol	Test Conditions	Min	Typ	Max	Unit
Vout	Output voltage		11.5	12	12.5	V
		Iout= 1 mA to 40 mA, Vin = 14V to 27V	11.4	12	12.6	
		Iout= 1 mA to 70mA	11.4	12	12.6	
REG_{line}	Input regulation	Vin = 14V to 27V		55	250	mV
		Vin = 16V to 27V		49	200	
REG_{load}	Output regulation	Iout= 1 mA to 40mA		13	50	mV
		Iout = 1 mA to 100mA		22	100	
PSRR	Ripple rejection	Vin = 15V to 25V, f= 120Hz	37	42		dB
V_n	Output noise voltage	f = 10Hz to 100 KHz		70		uV
$V_{DROPOUT}$	Dropout voltage			1.7		V
I_Q	Bias current			4.3	6.5	mA
$\triangle I_Q$	Bias current change	Vin = 16V to 27V		1.5		
		Iout= 1 mA to 40mA			0.1	

■ 78L15V Electrical Characteristics

Vin=23V, Iout=40mA ， T_A = 25°C (unless otherwise noted)

	Symbol	Test Conditions	Min	Typ	Max	Unit
Vout	Output voltage		14.4	15	15.6	V
		Iout= 1 mA to 40 mA, Vin = 17.5V to 30V	14.25	15	15.75	
		Iout= 1 mA to 70mA	14.25	15	15.75	
REG_{line}	Input regulation	Vin = 17.5V to 30V		65	300	mV
		Vin = 19V to 30V		58	250	
REG_{load}	Output regulation	Iout= 1 mA to 40mA		15	75	mV
		Iout = 1 mA to 100mA		25	150	
PSRR	Ripple rejection	Vin = 18.5V to 28V, f= 120Hz	34	39		dB
V_n	Output noise voltage	f = 10Hz to 100 KHz		82		uV
$V_{DROPOUT}$	Dropout voltage			1.7		V
I_Q	Bias current			4.6	6.5	mA
$\triangle I_Q$	Bias current change	Vin = 19V to 30V		1.5		
		Iout= 1 mA to 40mA			0.1	

■ 78L18V Electrical Characteristics

Vin=26V, Iout=40mA ， T_A = 25°C (unless otherwise noted)

	Symbol	Test Conditions	Min	Typ	Max	Unit
Vout	Output voltage		17.3	18	18.7	V
		Iout= 1 mA to 40 mA, Vin = 20.5V to 33V	17.1	18	18.9	
		Iout= 1 mA to 70mA	17.1	18	18.9	
REG_{line}	Input regulation	Vin = 20.5V to 33V		70	360	mV
		Vin = 22V to 33V		64	300	
REG_{load}	Output regulation	Iout= 1 mA to 40mA		19	90	mV
		Iout = 1 mA to 100mA		27	180	
PSRR	Ripple rejection	Vin = 21.5V to 31.5V, f= 120Hz	32	36		dB
V_n	Output noise voltage	f = 10Hz to 100 KHz		89		uV
$V_{DROPOUT}$	Dropout voltage			1.7		V
I_Q	Bias current			4.7	6.5	mA
$\triangle I_Q$	Bias current change	Vin = 22V to 33V		1.5		
		Iout= 1 mA to 40mA			0.1	

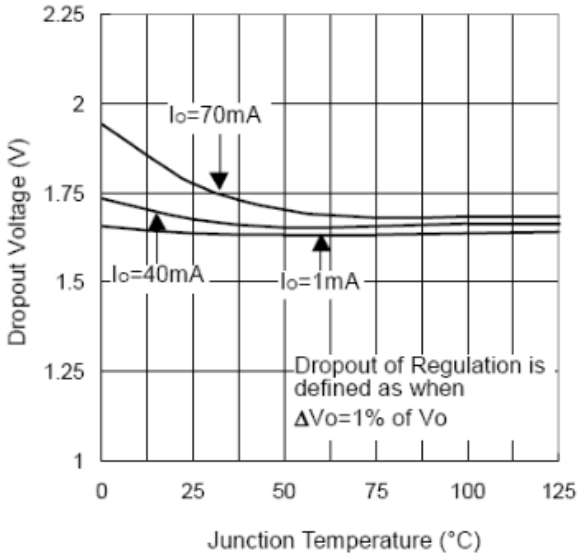
■ 78L24V Electrical Characteristics

Vin=32V, Iout=40mA ， T_A = 25°C (unless otherwise noted)

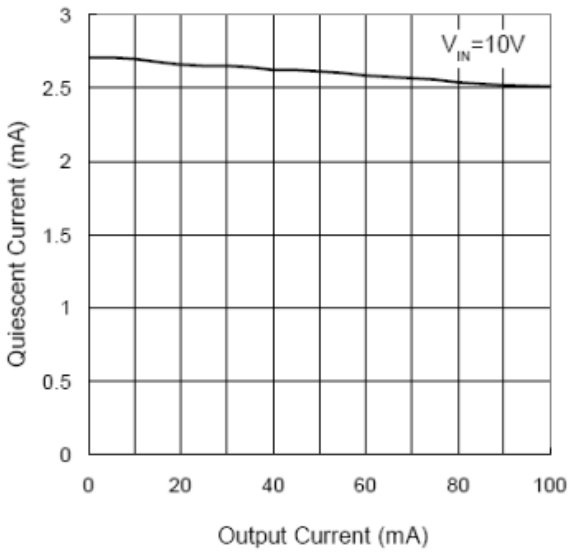
	Symbol	Test Conditions	Min	Typ	Max	Unit
Vout	Output voltage		23	24	25	V
		Iout= 1 mA to 40 mA, Vin = 26.5V to 39V	22.8	24	25.2	
		Iout= 1 mA to 70mA	22.8	24	25.2	
REG_{line}	Input regulation	Vin = 26.5V to 39V		95	480	mV
		Vin = 29V to 39V		78	400	
REG_{load}	Output regulation	Iout= 1 mA to 40mA		28	120	mV
		Iout = 1 mA to 100mA		41	240	
PSRR	Ripple rejection	Vin = 27.5V to 37.5V, f= 120Hz	30	33		dB
V_n	Output noise voltage	f = 10Hz to 100 KHz		97		uV
$V_{DROPOUT}$	Dropout voltage			1.7		V
I_Q	Bias current			4.8	6.5	mA
$\triangle I_Q$	Bias current change	Vin = 28V to 39V		1.5		
		Iout= 1 mA to 40mA			0.1	

Typical Performance Characteristics(78L05V)

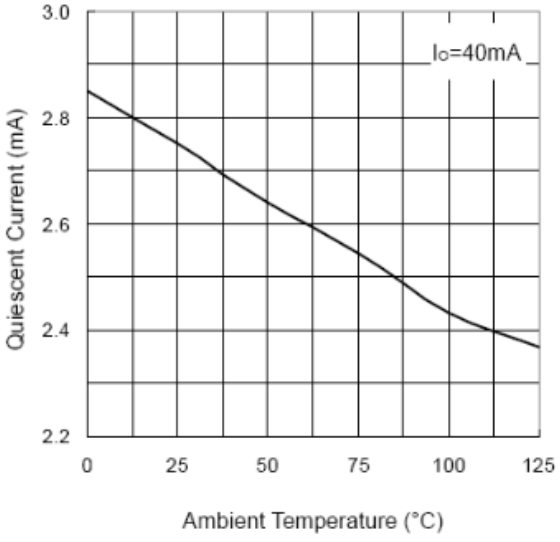
Dropout Voltage vs. Junction Temperature



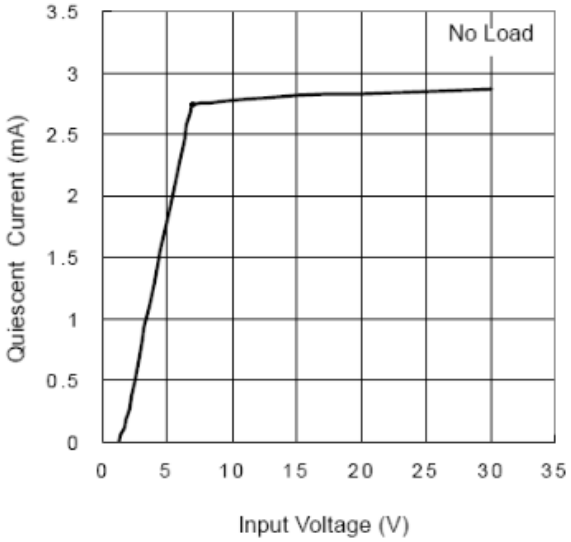
Quiescent Current vs. Output Current



Quiescent Current vs. Ambient Temperature

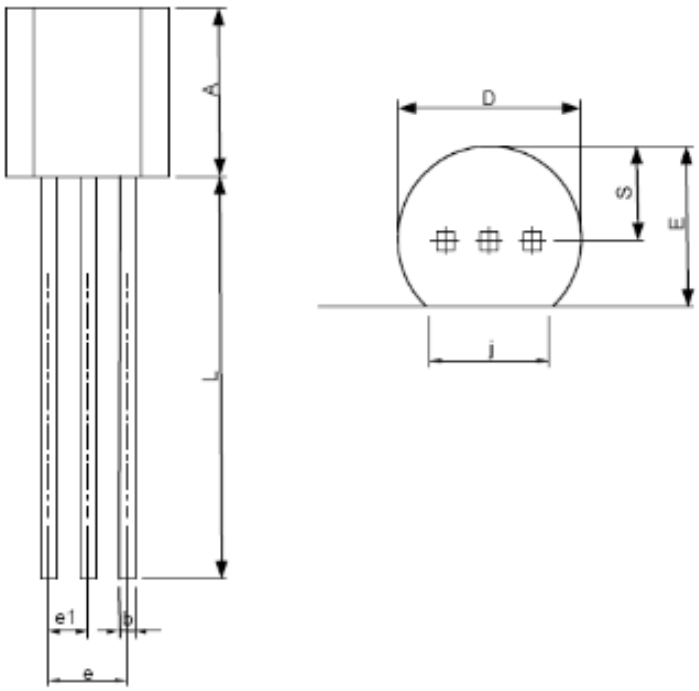


Quiescent Current vs. Input Voltage



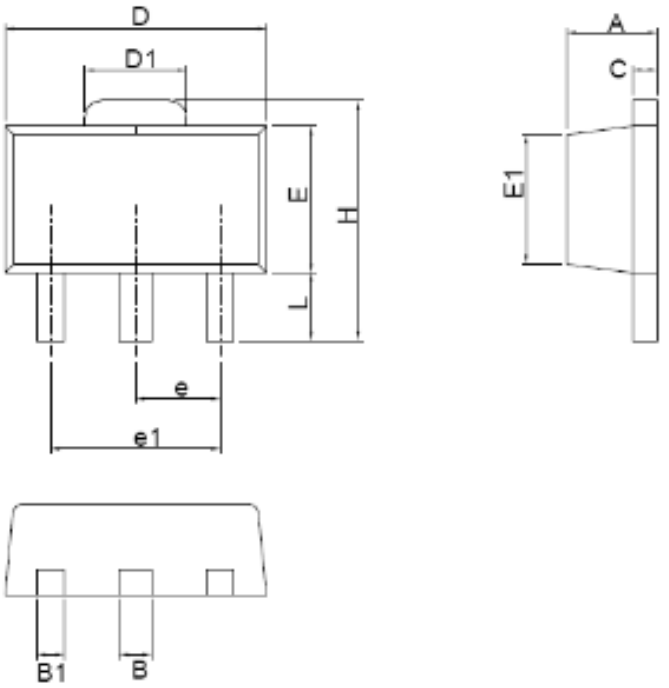
Outline Drawing

TO-92



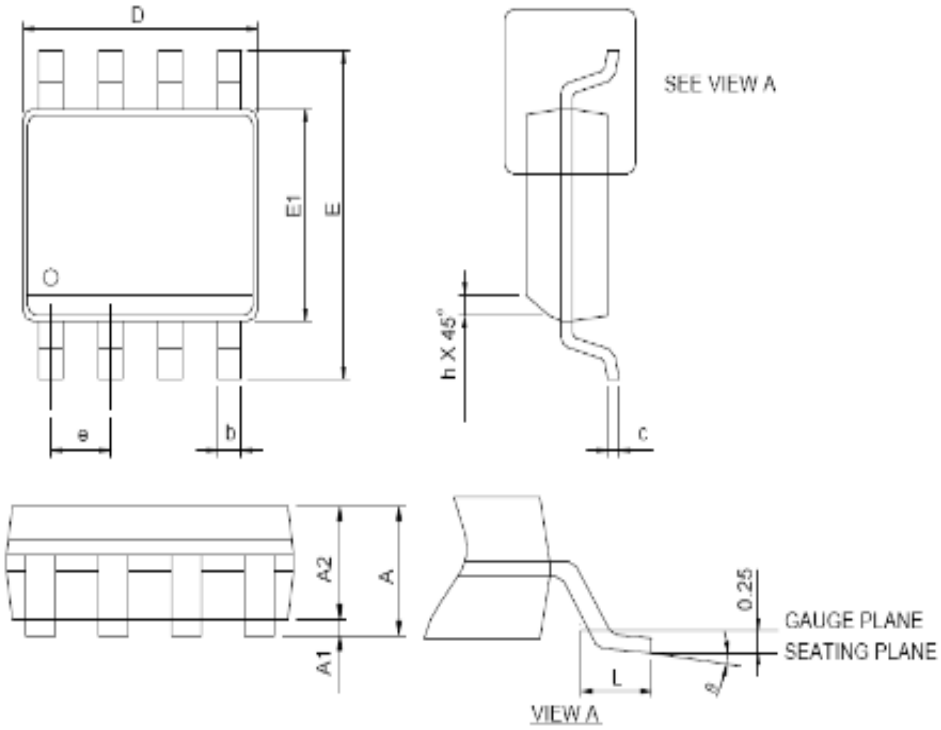
SYMBOL	TO-92			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.32	5.33	0.170	0.210
b	0.41	0.53	0.016	0.021
D	4.45	5.20	0.175	0.205
E	3.18	4.19	0.125	0.165
e	2.42	2.66	0.095	0.105
e1	1.15	1.39	0.045	0.055
j	3.43	4.00	0.135	0.157
L	12.70	15.00	0.500	0.591
S	2.03	2.66	0.080	0.105

SOT-89



SYMBOL	SOT-89			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	1.40	1.60	0.055	0.063
B	0.44	0.56	0.017	0.022
B1	0.36	0.48	0.014	0.019
C	0.35	0.44	0.014	0.017
D	4.40	4.60	0.173	0.181
D1	1.62	1.83	0.064	0.072
E	2.29	2.60	0.090	0.102
E1	2.13	2.29	0.084	0.090
e	1.50 BSC		0.059 BSC	
e1	3.00 BSC		0.118 BSC	
H	3.94	4.25	0.155	0.167
L	0.89	1.20	0.035	0.047

SOP-8



SYMBOL	SOP-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A		1.75		0.069
A1	0.10	0.25	0.004	0.010
A2	1.25		0.049	
b	0.31	0.51	0.012	0.020
c	0.17	0.25	0.007	0.010
D	4.80	5.00	0.189	0.197
E	5.80	6.20	0.228	0.244
E1	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
h	0.25	0.50	0.010	0.020
L	0.40	1.27	0.016	0.050
θ	0°	8°	0°	8°

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