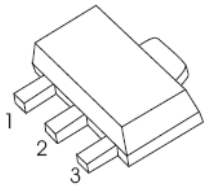
1A LOW DROPOUT LINEAR REGULATOR

SCJA1117B-XXX-A

SOT-89-3L

1. ADJ/GND
2. OUTPUT
3.IN



FEATURES

- Low Dropout Voltage: 1.3V at 0.8A Output Current
- Trimmed Current Limit
- On-Chip Thermal Shutdown
- Three-Terminal Adjustable or Fixed 1.2V,1.8V, 2.5V, 3.3V, 5V
- Operation Junction Temperature: -20 ℃ to 125℃

GENERAL DESCRIPTION

The SCJA1117B-XXX-A is a series of low dropout three-terminal regulators with a dropout of 1.3V(typ.) at 1A output current.

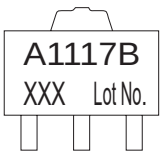
The SCJA1117B-XXX-A series provides current limiting and thermal shutdown. Its circuit includes a trimmed bandage reference to assure output voltage accuracy to be within 2%. Current limit is trimmed to ensure specified. Output current and controlled short-circuit current. On-chip thermal shutdown provides protection against any combination of ambient temperature that would create excessive junction temperature.

The SCJA1117B-XXX-A has an adjustable version, that can provide the output voltage from 1.25V to 12V with only 2 external resistors.

APPLICATIONS

- PC Motherboard
- LCD Monitor
- Graphic Card
- DVD-Video Player
- NIC/Switch
- Telecom Modem
- ADSL Modem
- Printer and other peripheral Equipment

Marking:



A1117B = Device code

XXX: output voltage

MAXIMUM RATINGS

ORDERING INFORMATION

Package	Operating Junction Temperature Range	Part NO.
SOT-89-3L	-20 to 125℃	SCJA1117B-ADJ-A
		SCJA1117B-1.2-A
		SCJA1117B-1.8-A
		SCJA1117B-2.5-A
		SCJA1117B-3.3-A
		SCJA1117B-5.0-A

ABOSLUTE MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Input Voltage	V_i	20	V
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	250	℃/W
Operating Ambient Temperature	T_A	-40~+85	℃
Operating Junction Temperature	T_j	-40~+150	℃
Storage Temperature	T_{stg}	-40~+150	℃
Lead Temperature (Soldering, 10s)	T_L	260	℃
ESD Rating	**Human Body Model, HBM**	8	kV

Note: Stresses greater than those listed under ”Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional 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	Value	Unit
Input Voltage	V_i	15	V
Operating Junction Temperature	T_j	-20~+125	℃

ELECTRICAL CHARACTERISTICS

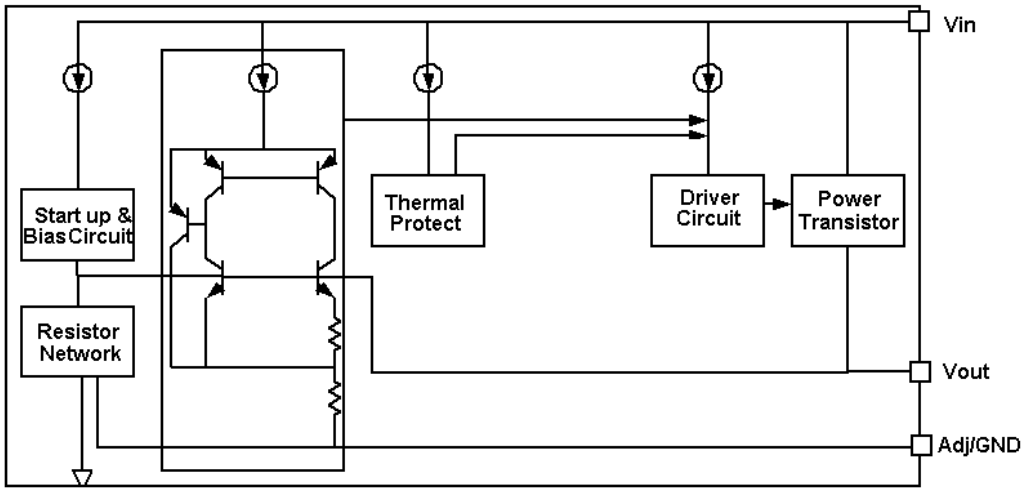
T_J=25℃ unless otherwise specified.

Parameter	Symbol	Part NO.	Test conditions	Min	Typ	Max	Unit
Reference Voltage	V_{IROC}	**SCJA1117B-ADJ-A**	I_{OUT}=10mA, V_{IN} =3.25V	1.225	1.25	1.275	V
			10mA≤I_{OUT}≤1A, 2.75V≤V_{IN} -V_{OUT} ≤12V	1.219	1.25	1.281	
Output Voltage	V_O	**SCJA1117B-1.2-A**	I_{OUT}=10mA, V_{IN}=3.2V	1.176	1.2	1.224	V
			10mA≤I_{OUT}≤1A, 2.7V≤V_{IN} ≤12V	1.170	1.2	1.230	
		SCJA1117B-1.5-A	I_{OUT}=10mA, V_{IN}=3.5V	1.470	1.5	1.530	
			10mA≤I_{OUT}≤1A, 3V≤V_{IN} ≤12V	1.463	1.5	1.537	
		SCJA1117B-1.8-A	I_{OUT}=10mA, V_{IN}=3.8V	1.764	1.8	1.836	
			10mA≤I_{OUT}≤1A, 3.3V≤V_{IN} ≤12V	1.755	1.8	1.845	
		SCJA1117B-2.5-A	I_{OUT}=10mA, V_{IN}=4.5V	2.450	2.5	2.550	
			10mA≤I_{OUT}≤1A, 4V≤V_{IN} ≤12V	2.438	2.5	2.562	
		SCJA1117B-3.3-A	I_{OUT}=10mA, V_{IN}=5.3V	3.234	3.3	3.366	
			10mA≤I_{OUT}≤1A, 4.8V≤V_{IN} ≤12V	3.218	3.3	3.382	
		SCJA1117B-5.0-A	I_{OUT}=10mA, V_{IN}=7.0V	4.900	5.0	5.100	
			10mA≤I_{OUT}≤1A, 6.5V≤V_{IN} ≤12V	4.875	5.0	5.125	
Line Regulation	LNR	**SCJA1117B-ADJ-A**	I_{OUT}=10mA, 1.5V≤V_{IN} -V_{OUT} ≤10.75V		0.03	0.2	%
		SCJA1117B-1.2-A	I_{OUT}=10mA, 1.5V≤V_{IN} -V_{OUT} ≤8.8V		0.03	0.2	%/V
		SCJA1117B-1.5-A	I_{OUT}=10mA, 1.5V≤V_{IN} -V_{OUT} ≤8.5V		0.03	0.2	
		SCJA1117B-1.8-A	I_{OUT}=10mA, 1.5V≤V_{IN} -V_{OUT} ≤10.2V		0.03	0.2	
		SCJA1117B-2.5-A	I_{OUT}=10mA, 1.5V≤V_{IN} -V_{OUT} ≤9.5V		0.03	0.2	
		SCJA1117B-3.3-A	I_{OUT} =10mA, 1.5V≤V_{IN} -V_{OUT} ≤8.7V		0.03	0.2	
		SCJA1117B-5.0-A	I_{OUT}=10mA, 1.5V ≤V_{IN} -V_{OUT} ≤7V		0.03	0.2	
Load Regulation	LDR	**SCJA1117B-ADJ-A**	V_{IN}-V_{OUT}=1.5V, 10mA≤I_{OUT} ≤1A		2	8	mV
		SCJA1117B-1.2-A			2	8	mV
		SCJA1117B-1.5-A			2	8	
		SCJA1117B-1.8-A			3	12	
		SCJA1117B-2.5-A			4	16	
		SCJA1117B-3.3-A			6	24	
		SCJA1117B-5.0-A			9	36	
Dropout Voltage	**V_D**		I_{OUT}=1A		1.3	1.5	V
Adjust Pin Current	I_{Adj}	**SCJA1117B-ADJ-A**	V_{IN}= 5V, I_{OUT}=10mA		55	120	μA
			V_{IN}= 5V, I_{OUT}=1A		55	120	μA
I_{Adj} change	I_{change}	**SCJA1117B-ADJ-A**	V_{IN}= 5V 10mA≤I_{OUT}≤1A		0.2	10	μA
Minimum Load Current	I_L	**SCJA1117B-ADJ-A**			2	10	mA
Quiescent Current	I_q	**SCJA1117B-1.2-A**	V_{IN}= 10V		2	5	mA
		SCJA1117B-1.5-A	V_{IN}= 10V		2	5	mA
		SCJA1117B-1.8-A	V_{IN}= 12V		2	5	mA
		SCJA1117B-2.5-A	V_{IN}= 12V		2	5	mA
		SCJA1117B-3.3-A	V_{IN}= 12V		2	5	mA
		SCJA1117B-5.0-A	V_{IN}= 12V		2	5	mA
Ripple Rejection	RR		f=1kHz,C_{IN}=10μF/25V, C_{OUT}=10μF/25V , V_{IN}-V_{OUT}=2V, I_{OUT}=10mA		60		dB

* With package soldering to copper area over backside ground plane or internal power plane $R_{\theta JA}$ can vary from 46 ℃/W to >90℃/W depending on mounting technique and the size of the copper area

FUNCTIONAL BLOCK and TYPICAL APPLICATION

FUNCTIONAL BLOCK DIAGRAM



DETAILED DESCRIPTION

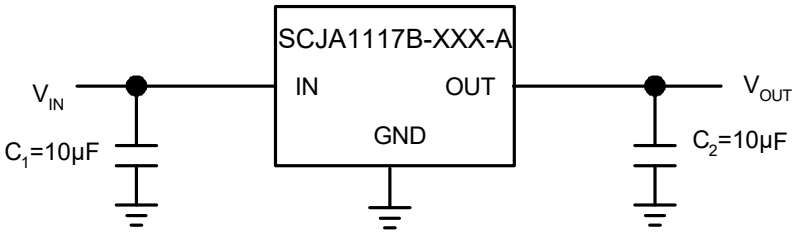
SCJA1117B-XXX-A is a series of low dropout voltage, three terminal regulators. Its application circuit is very simple: the fixed version only needs two capacitors and the adjustable version only needs two resistors and two capacitors to work. It is composed of some modules including start-up circuit, bias circuit, bandgap, thermal shutdown, power transistors and its driver circuit and so on.

The thermal shut down modules can assure chip and its application system working safety when the junction temperature is larger than 140°C.

The bandgap module provides stable reference voltage, whose temperature coefficient is compensated by careful design considerations. The temperature coefficient is under 100 ppm/°C. And the accuracy of output voltage is guaranteed by trimming technique.

TYPICAL APPLICATION

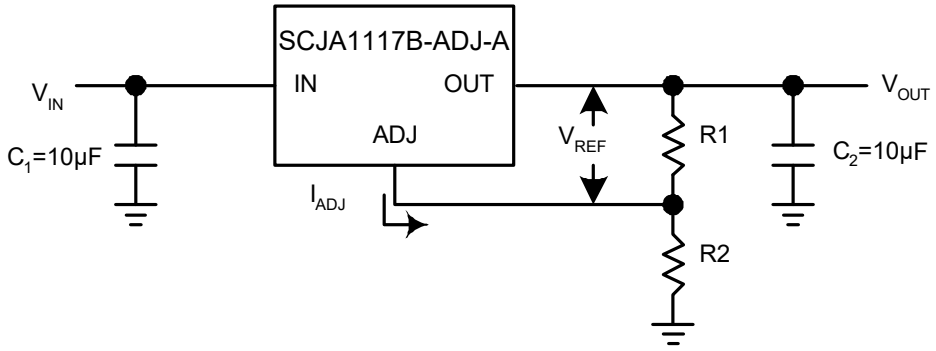
Fixed Output Voltage Version



1) Recommend using 10uF tan capacitor as bypass capacitor (C1) for all application circuit.
2) Recommend using 10uF tan capacitor to assure circuit stability.

TYPICAL APPLICATION

Adjustable Output Voltage Version



$$V_{OUT} = V_{REF} \times (1 + R2/R1) + I_{ADJ} \times R2$$

The output voltage of adjustable version follows the equation: Vout=1.25×(1+R2/R1)+IAdj×R2. We can ignore IAdj because IAdj (about 50uA) is much less than the current of R1 (about 2~10mA).

1) To meet the minimum load current (>10mA) requirement, R1 is recommended to be 125ohm or lower. As SCJA1117B-ADJ-A can keep itself stable at load current about 2mA, R1 is not allowed to be higher than 625ohm.

2) Using a bypass capacitor (C_{ADJ}) between the ADJ pin and ground can improve ripple rejection. This bypass capacitor prevents ripple from being amplified as the output voltage is increased. The impedance of C_{ADJ} should be less than R1 to prevent ripple from being amplified. As R1 is normally in the range of 100Ω~500Ω, the value of C_{ADJ} should satisfy this equation: $1/(2\pi \times f_{ripple} \times C_{ADJ}) < R1$.

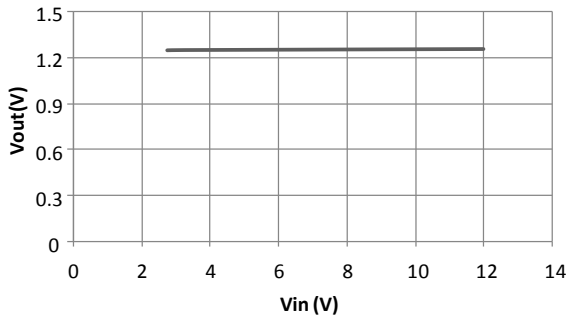
THERMAL CONSIDERATION

We have to take heat dissipation into great consideration when output current or differential voltage of input and output voltage is large. Because in such cases, the power dissipation consumed by SCJA1117B-ADJ-A is very large. SCJA1117B-ADJ-A series uses SOT-223 package type and its thermal resistance is about 20°C/W. And the copper area of application board can affect the total thermal resistance. If copper area is 5cm*5cm (two sides), the resistance is about 30°C/W. So the total thermal resistance is about 20°C/W+30°C/W. We can decrease total thermal resistance by increasing copper area in application board. When there is no good heat dissipation copper are in PCB, the total thermal resistance will be as high as 120°C/W, then the power dissipation of SCJA1117B-ADJ-A could allow on itself is less than 1W. And furthermore, SCJA1117B-ADJ-A will work at junction temperature higher than 125°C under such condition and no lifetime is guaranteed.

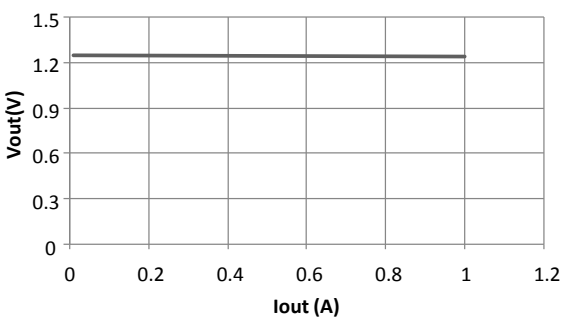
TYPICAL PERFORMANCE CHARACTERISTICS

T_A=25℃, unless otherwise noted.

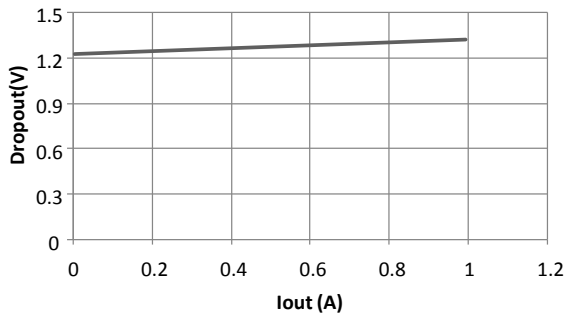
Line regulation



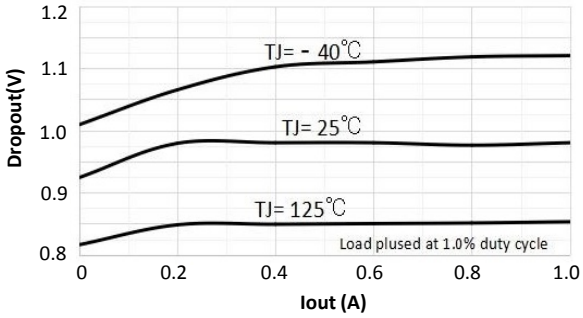
Load regulation



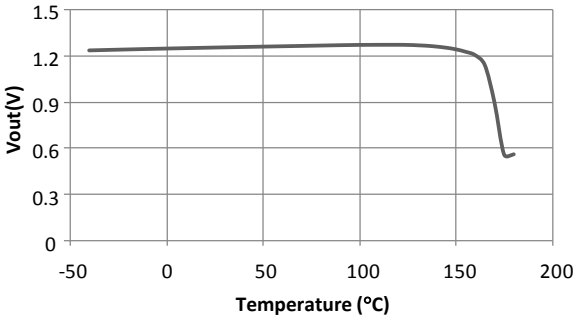
Dropout Voltage (ADJ Except)



Dropout Voltage (ADJ Only)



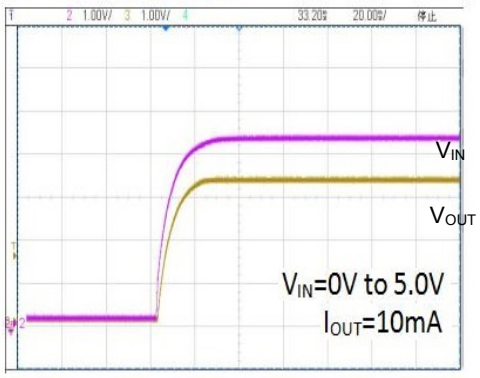
Thermal performance with OTP



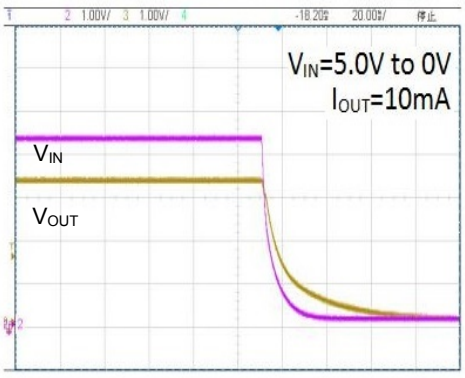
TYPICAL PERFORMANCE CHARACTERISTICS

T_A=25℃, unless otherwise noted.

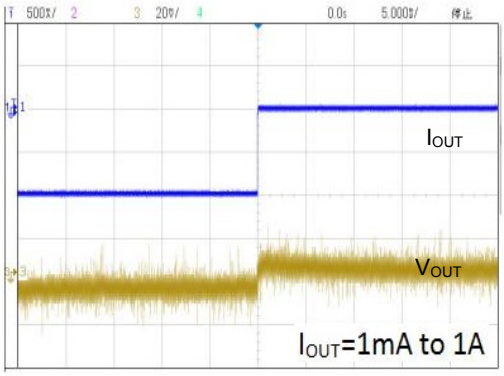
Power ON / OFF



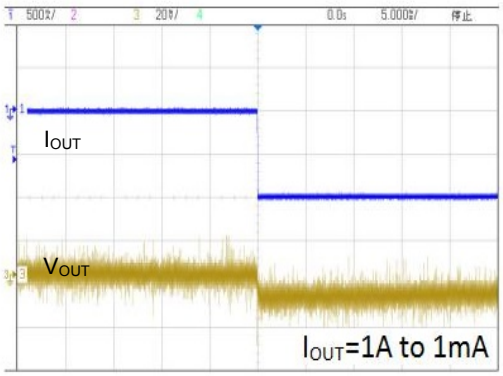
Power ON / OFF



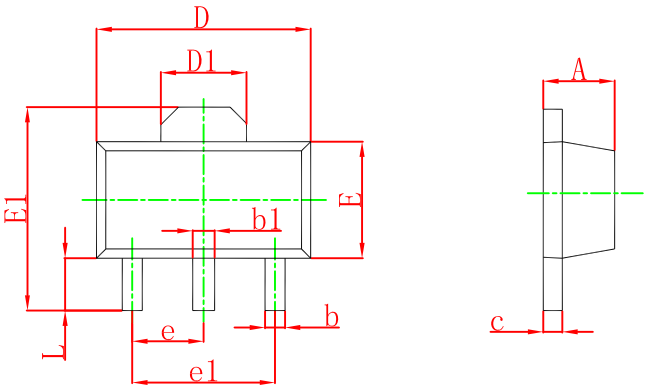
Load Transient Response



Load Transient Response

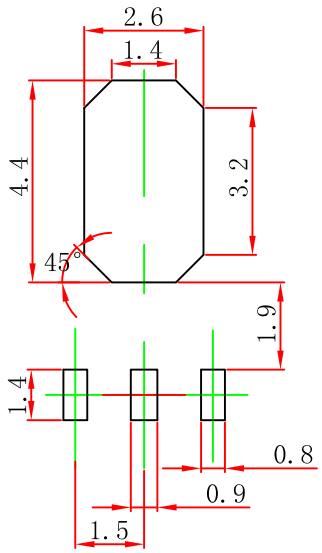


SOT-89-3L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047

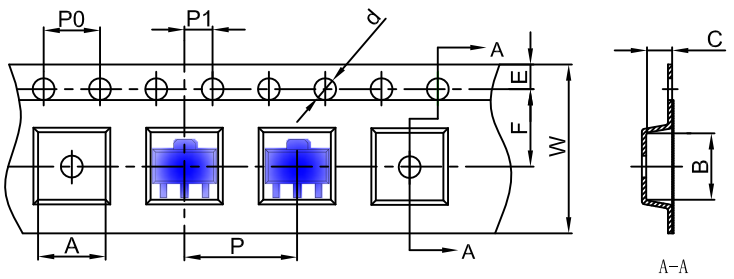
SOT-89-3L Suggested Pad Layout



Note:
1.Controlling dimemsion"in"milimeters.
2.General tolerance: ±0.05mm.
3.The pad layout is for reference purpose only.

SOT-89-3L Tape and Reel

SOT-89-3L Embossed Carrier Tape

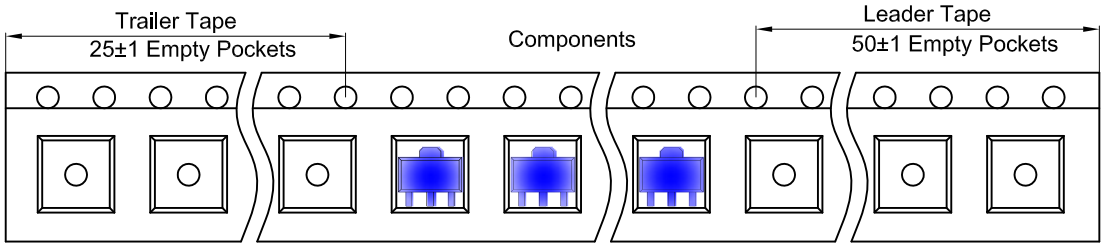


Packaging Description:

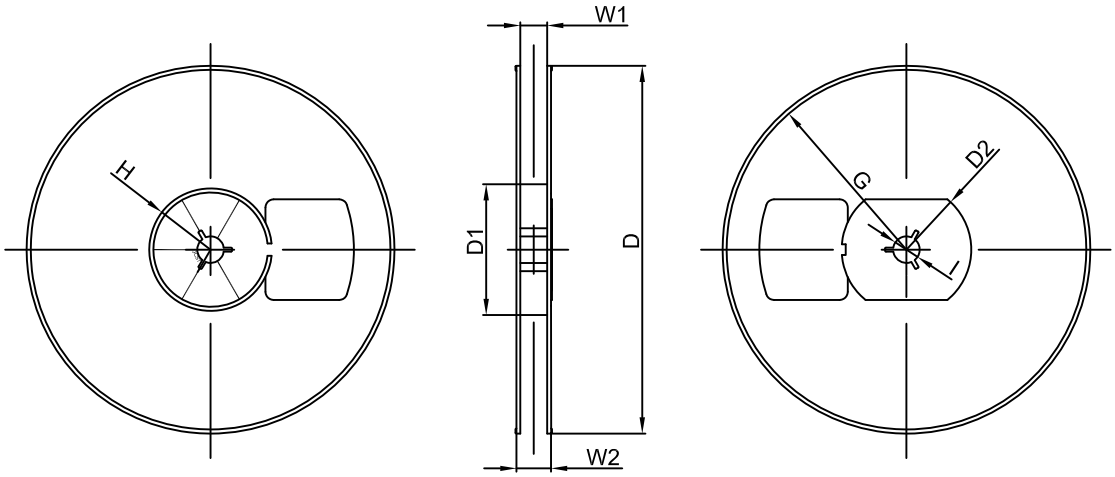
SOT-89-3L parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 1,000 units per 7" or 18.0 cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
SOT-89-3L	4.85	4.45	1.85	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00

SOT-89-3L Tape Leader and Trailer



SOT-89-3L Reel



Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
7"Dia	Ø180.00	60.00	R32.00	R86.50	R30.00	Ø13.00	13.20	16.50

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
1000 pcs	7 inch	10,000 pcs	203×203×195	40,000 pcs	438×438×220	

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Linear Voltage Regulators ***category:***

Click to view products by Changjing Electronics Technology ***manufacturer:***

Other Similar products are found below :

LV56831P-E LV5684PVD-XH MCDTSA6-2R L7815ACV-DG PQ3DZ53U LV56801P-E TLE42794G L78L05CZ/1SX L78LR05DL-MA-E 636416C 714954EB ZMR500QFTA LV5680P-E L78M15CV-DG L79M05T-E TLS202A1MBVHTSA1 L78LR05D-MA-E NCV317MBTG NTE7227 MP2018GZD-33-P MP2018GZD-5-P LV5680NPVC-XH LT1054CN8 MP2018GZD-5-Z MP2018GZD-33-Z AT55EL50ESE APL5934DKAI-TRG 78L05U 78L05 CL9193A15L5M CL9036A30F4M CL9036A18F4M CL9036A25F4M CL9036A28F4M CL9036A33F4M CL9906A18F4N CL9906A30F4N CL9908A30F4M CL9908A33F4M CL9908A18F4M CL9908A28F4M TL431ACM/TR TL431AIM/TR LM78L05ACM/TR HT7812ARMZ HT7805ARMZ HT317LRHZ HXY6206I-3.0 HXY6206I-3.3 XC6206P252MR XC6206P282MR