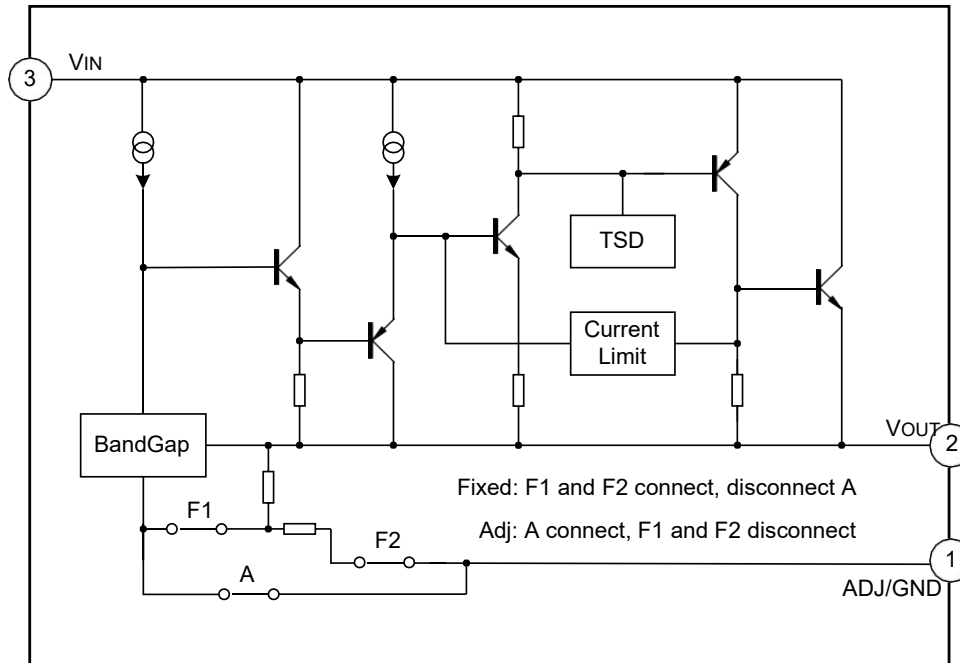




## BLOCK DIAGRAM

## 1A LDO Voltage Regulator



## ABSOLUTE MAXIMUM RATINGS

Characteristics		Symbol	Rating	Unit
Input Supply Voltage		$V_{IN}$	18	V
Lead Temperature (Soldering, 5 seconds)		$T_{Lead}$	260	°C
Operating Junction Temperature Range		$T_J$	150	°C
Storage Temperature Range		$T_{stg}$	-65 ~ +150	V
Power Dissipation		$P_D$	Internally Limited (Note1)	mW
Thermal Resistance from Junction to Ambient	SOT-223-3L	$R_{ja}$	88	°C/W
	TO-252-2L		86	
	SOT-89-3L		102	
ESD Tolerance (Minimum)		ESD	2000	V

**Note1:** The maximum allowable power dissipation is a function of maximum operating junction temperature,  $T_J$  (max), the junction to ambient thermal resistance,  $R_{ja}$ , and the ambient temperature  $T_{amb}$ . The maximum allowable power dissipation at any ambient temperature is given:  $P_{D(max)} = (T_J(max) - T_{amb}) / R_{ja}$ , exceeding the maximum allowable power limit will result in excessive die temperature; thus, the regulator will go into thermal shutdown. The junction to ambient thermal resistance,  $\theta_{JA}$  of some packages may be different, The value of  $\theta_{JA}$  depends on mounting technique.

## RECOMMENDED OPERATING CONDITIONS

Characteristics	Symbol	Rating	Unit
Input voltage	$V_{IN}$	12	V
Operating Junction Temperature Range	$T_J$	-40 ~ +125	°C

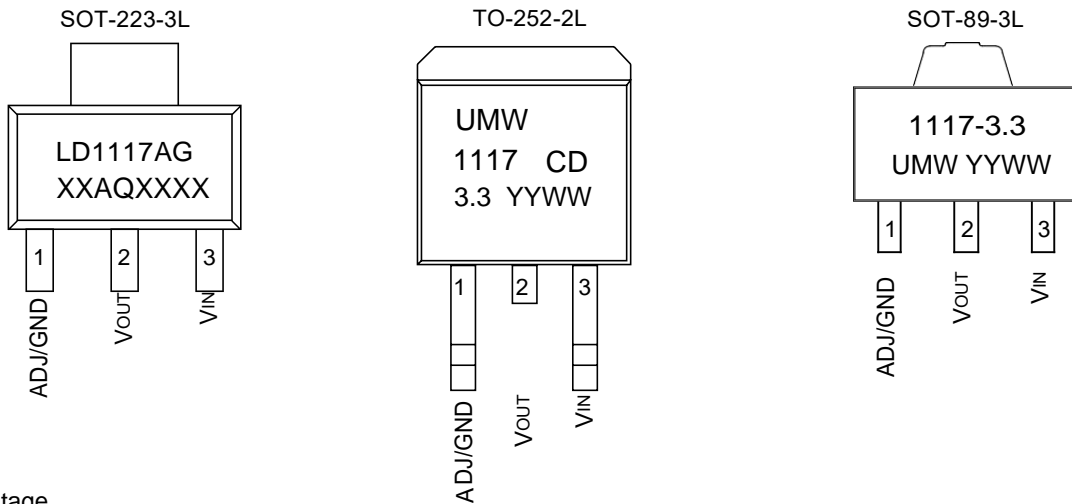
**ELECTRICAL CHARACTERISTICS**

Characteristics	Symbol	Conditions	Min.	Typ.	Max.	Unit
Reference Voltage	$V_{REF}$	LD1117-ADJ, $I_{OUT}=10mA, V_{IN}-V_{OUT}=2V, T_J=25^{\circ}C$	1.231	1.250	1.269	V
Output Voltage	$V_{OUT}$	LD1117-1.2, $I_{OUT}=10mA, V_{IN}=3.2V, T_J=25^{\circ}C$	1.176	1.2	1.224	V
		LD1117-1.5, $I_{OUT}=10mA, V_{IN}=3.5V, T_J=25^{\circ}C$	1.470	1.500	1.530	V
		LD1117-1.8, $I_{OUT}=10mA, V_{IN}=3.8V, T_J=25^{\circ}C$	1.764	1.800	1.836	V
		LD1117-2.5, $I_{OUT}=10mA, V_{IN}=4.5V, T_J=25^{\circ}C$	2.450	2.500	2.550	V
		LD1117-3.3, $I_{OUT}=10mA, V_{IN}=5V, T_J=25^{\circ}C$	3.234	3.300	3.366	V
		LD1117-5.0, $I_{OUT}=10mA, V_{IN}=7V, T_J=25^{\circ}C$	4.900	5.000	5.100	V
Output Voltage Temperature Stability	$TS_{OUT}$		--	0.3	--	%
Line Regulation	$R_{line}$	$V_{INMIN} \leq V_{IN} \leq 12V,$ $V_{OUT}=\text{Fixed/Adj}, I_{OUT}=10mA$	--	9	18	mV
Load Regulation	$R_{load}$	$10mA \leq I_{OUT} \leq 1A, V_{OUT}=\text{Fixed/Adj}$	--	10	18	mV
Dropout Voltage	$V_{drop}$	$I_{OUT}=100mA$	--	1.00	1.20	V
		$I_{OUT}=500mA$	--	1.05	1.25	
		$I_{OUT}=1A$	--	1.20	1.30	
Quiescent Current	$I_q$	$4.25V \leq V_{IN} \leq 6.5V$	--	5	10	mA
Ripple Rejection	$P_{SRR}$	$f_{RIPPLE}=120Hz, (V_{IN}-V_{OUT})=3V,$ $V_{RIPPLE}=1V_{PP}$	60	75	--	dB
Adjust pin Current	$I_{adj}$		--	60	120	$\mu A$
Adjust pin Current Change		$0 \leq I_{OUT} \leq 1A, 1.4V \leq V_{IN}-V_{OUT} \leq 10V$	--	0.2	5	$\mu A$
Thermal shutdown	TSD		--	150	--	$^{\circ}C$
Current limiting	$I_{limit}$		2.1	--	2.5	A
Temperature Stability			--	0.5	--	%
Long Term Stability		$T_A=125^{\circ}C, 1000Hrs$	--	0.3	--	%

## 1A LDO Voltage Regulator

Characteristics	Symbol	Conditions	Min.	Typ.	Max.	Unit
RMS Output Noise		% of $V_{OUT}$ , $10\text{Hz} \leq f \leq 10\text{kHz}$	--	0.003	--	%

### PIN CONFIGURATION



"XX" : Voltage  
 "XXXX" : LOT NO.  
 "YY" : Year Code  
 "WW" : Week Code

### PIN DESCRIPTION

Pin No.	Pin name	I/O	Functions
1	GND/ADJ	--/O	Ground/ADJ
2	V <sub>OUT</sub>	O	Output voltage
3	V <sub>IN</sub>	I	Input supply voltage

### FUNCTION DESCRIPTION

The LD1117 is a LDO regulator, its pass transistor is made up of a single NPN transistor being driven by a PNP.

The dropout voltage is defined as:  $V_{DROP} = V_{BE} + V_{SAT}$ .

The LD1117 series of fixed and adjustable regulators are easy to use. Output voltages are 1.2V, 1.5V, 1.8V, 2.5V, 3.3V, and 5.0V. On-chip thermal shut down provides protection against any combination of overload and ambient temperature that would create excessive junction temperature.

The LD1117 requires an output capacitor for device stability. Its value of 22 $\mu$ F tantalum covers all cases of bypassing the adjustment terminal. Without bypassing the adjustment terminal smaller capacitors can be used with equally good results which depend upon the application circuit. In general, linear regulator stability decreases with higher output currents.

TYPICAL APPLICATION CIRCUIT

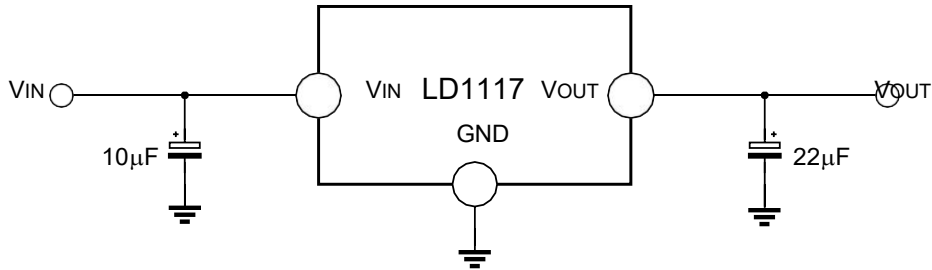


Figure 1. Typical Fixed Output Voltage

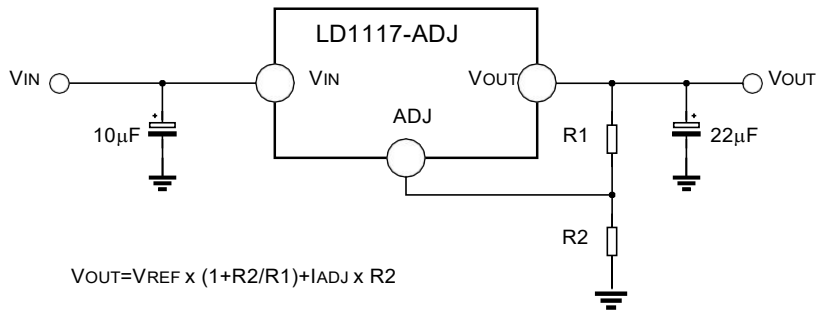
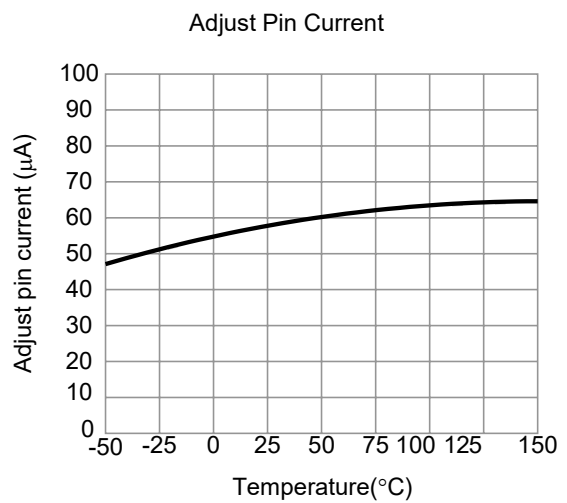
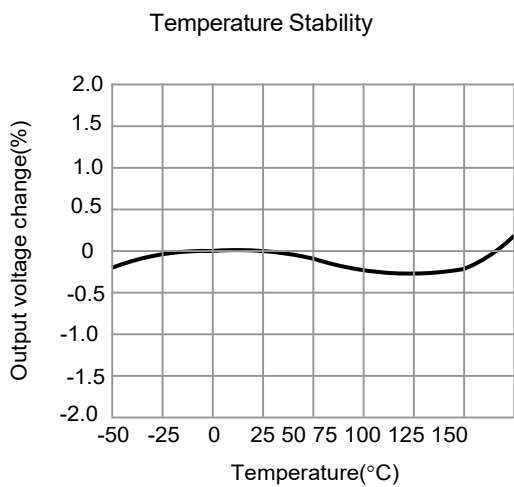


Figure 2. Typical Adjustable Output Voltage

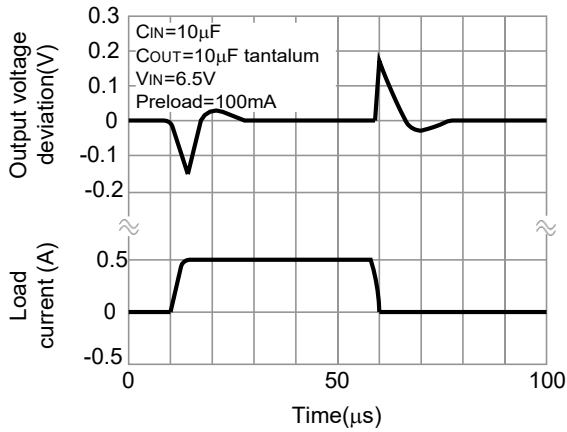
**Note:** The circuit and parameters are reference only, please set the parameters of the real application circuit based on the real test.

TYPICAL CHARACTERISTICS

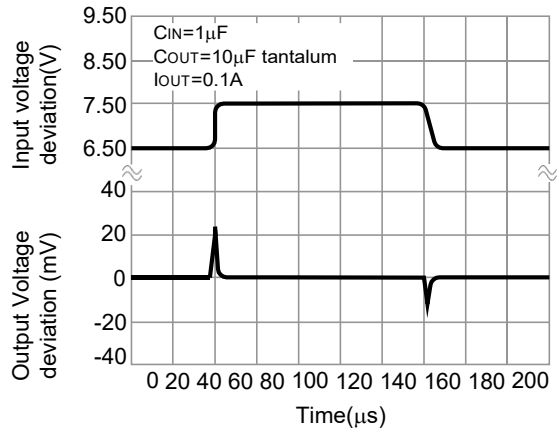


TYPICAL CHARACTERISTICS CURVES

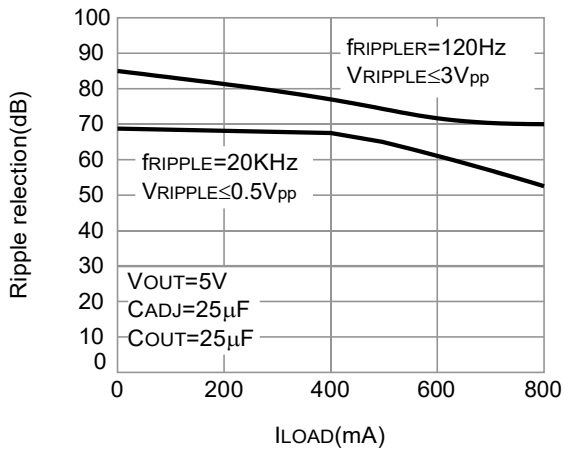
V<sub>OUT</sub>=5 V Load Transient Response



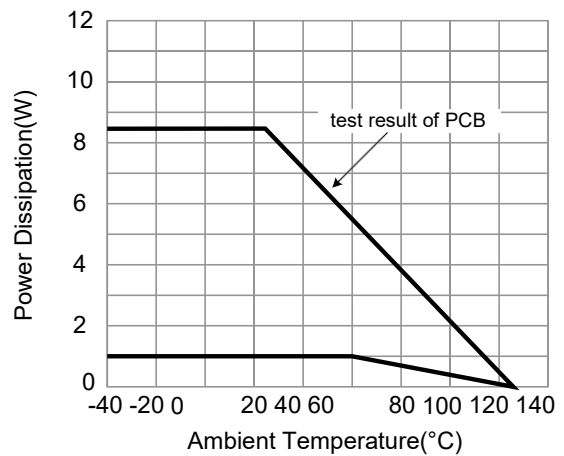
V<sub>OUT</sub>=5 V Line Transient Response



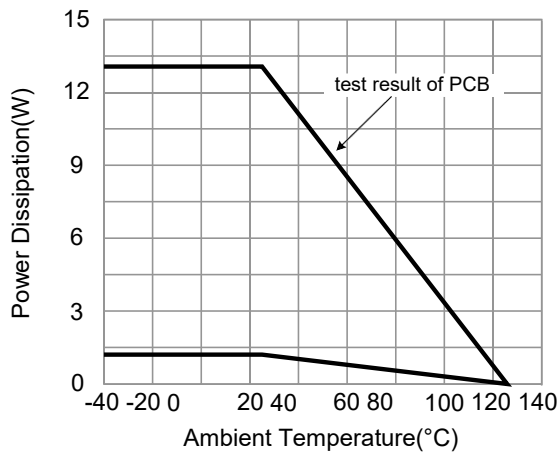
Ripple Rejection VS Current



Power Dissipation VS Ambient Temperature(SOT-223)



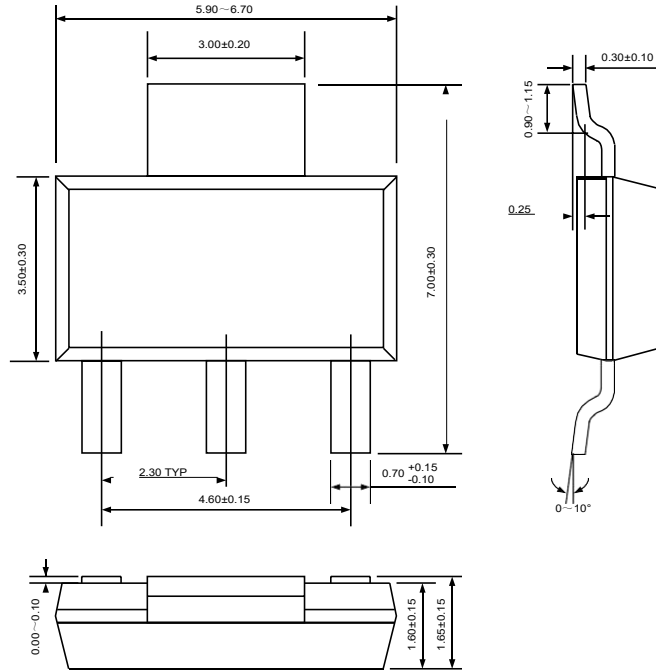
Power Dissipation VS Ambient Temperature(TO-252)



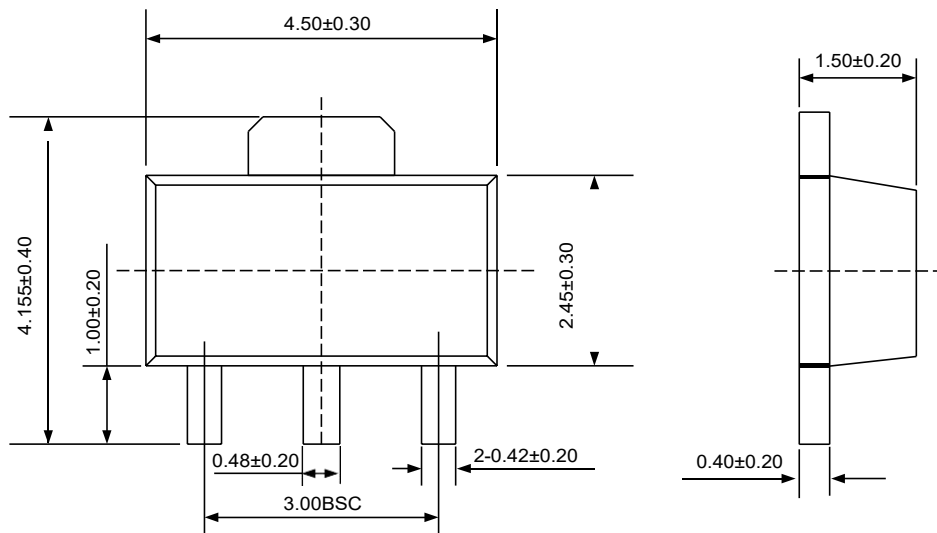
PACKAGE OUTLINE

1A LDO Voltage Regulator

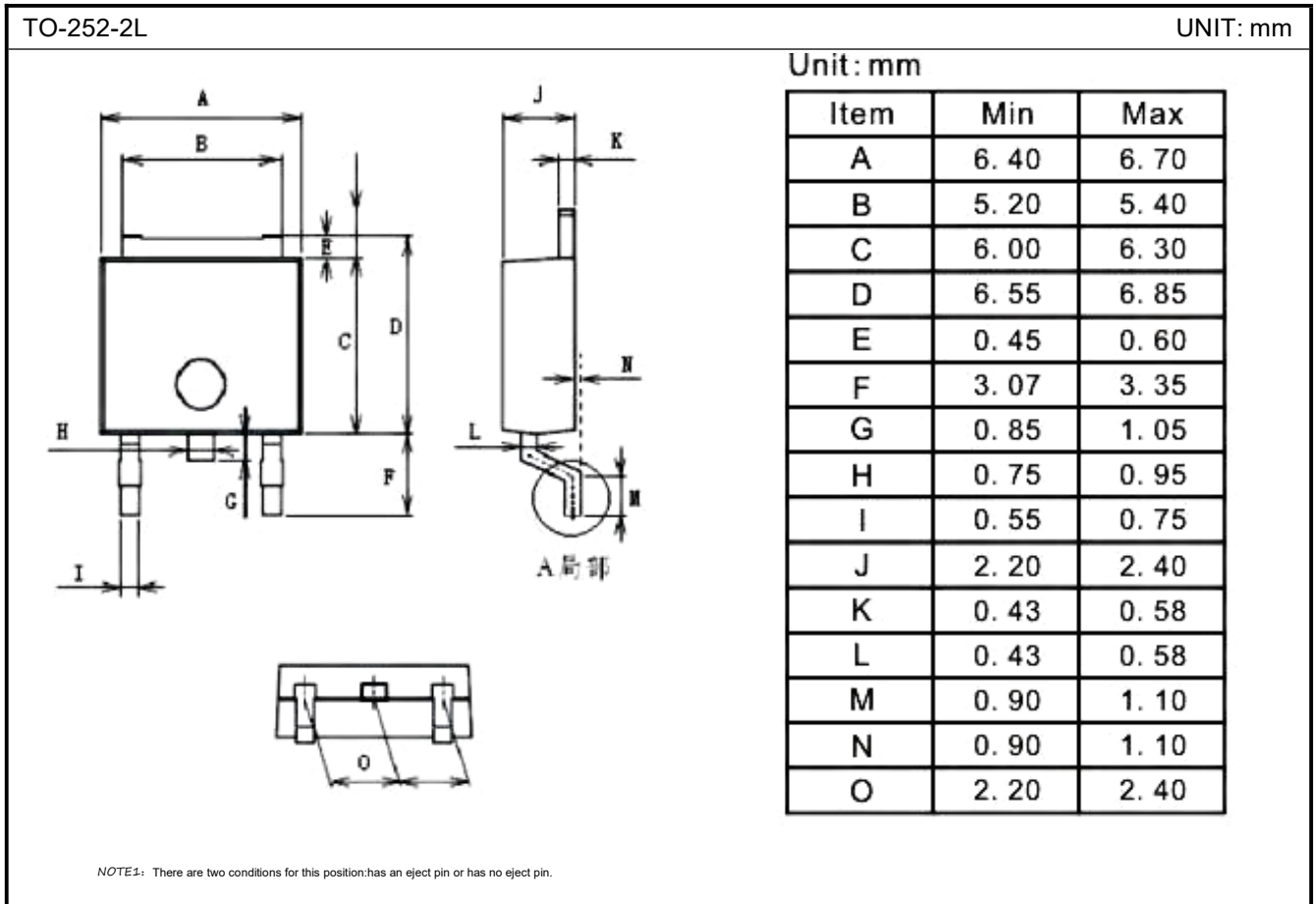
SOT-223-3L UNIT: mm



SOT-89-3L UNIT: mm



PACKAGE OUTLINE (continued)



Ordering information

Order code	Package	Baseqty	Deliverymode	Marking
UMW LD1117-xx	SOT-223	2500	Tape and reel	LD1117AG xx
UMW LD1117-xxS	SOT-89	1000	Tape and reel	1117-xx
UMW LD1117CD-xx	TO-252	2500	Tape and reel	1117-CD xx