



1A LOW DROPOUT LINEAR REGULATOR

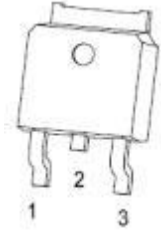
ZSU1117B-XXX

FEATURES

- 👁️ Low Dropout Voltage: 1.3V at 1A Output Current
- 👁️ Trimmed Current Limit
- 👁️ On-Chip Thermal Shutdown
- 👁️ Three-Terminal Adjustable or Fixed 1.8V, 2.5V, 3.3V, 5V
- 👁️ Operation Junction Temperature: -40 to 125°C

TO-252-2L

1. GND / ADJ
2. OUTPUT
3. IN



GENERAL DESCRIPTION

The ZSU1117B-XXX is a series of low dropout three-terminal regulators with a dropout of 1.3V at 1A output current.

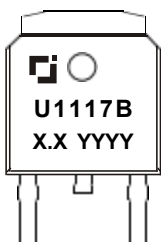
The ZSU1117B-XXX series provides current limiting and thermal shutdown. Its circuit includes a trimmed bandgap reference to assure output voltage accuracy to be within 1.5%. Current limit is trimmed to ensure specified output current and controlled short-circuit current. On-chip thermal shutdown provides protection against any combination of overload and ambient temperature that would create excessive junction temperature.

The ZSU1117B-XXX 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



"U1117B": Device serial number.

"X.X": Output voltage, for example, if $V_{OUT} = 3.0V$, "X.X" = 3.0.

"YYYY": Code composed of four uppercase letters, indicates weekly record information of production.

MAXIMUM RATINGS

ORDERING INFORMATION

Package	Operating Junction Temperature Range	Part NO.
TO-252-2L	-40 to 125°C	ZSU1117B-ADJ
		ZSU1117B-1.8
		ZSU1117B-2.5
		ZSU1117B-3.3
		ZSU1117B-5.0

ABOSLUTE MAXIMUM RATINGS

($T_A = 25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Value	Unit
Input Voltage	V_i	20	V
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	80	$^\circ\text{C}/\text{W}$
Maximum Junction Temperature	$T_{J \text{ Max}}$	-40~+150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40~+150	$^\circ\text{C}$
Lead Temperature (Soldering, 10sec.)	T_L	260°C, 10s	
ESD Voltage (Machine Model)	V_{ESD}	250	V

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	-40~+125	$^\circ\text{C}$
Operating Ambient Temperature	T_A	-40~+85	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS

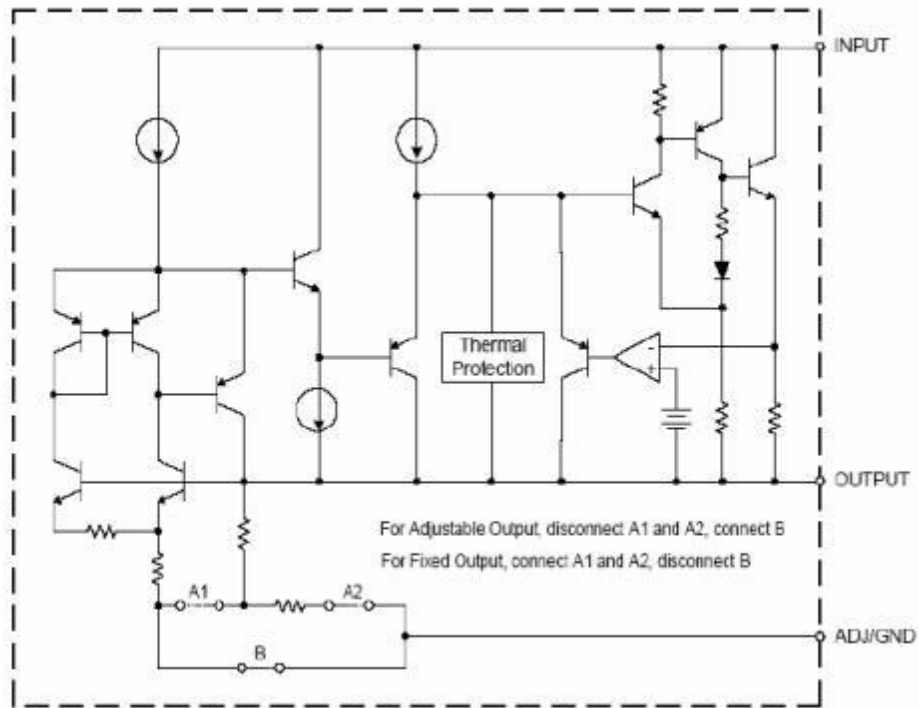
$V_{IN} \leq 10V$, $T_J = 25^\circ C$ unless otherwise specified.

Parameter	Symbol	Part No.	Test Conditions	Min	Typ	Max	Unit		
Reference Voltage	V_{IROC}	ZSU1117B-ADJ	$I_{OUT} = 10mA$, $V_{IN} = 3.23V$	1.231	1.250	1.269	V		
			$10mA \leq I_{OUT} \leq 1A$, $2.75V \leq V_{IN} - V_{OUT} \leq 13.25V$	1.225	1.250	1.275			
Output Voltage	V_O	ZSU1117B-1.8	$I_{OUT} = 10mA$, $V_{IN} = 3.8V$	1.773	1.8	1.827	V		
			$10mA \leq I_{OUT} \leq 1A$, $3.3V \leq V_{IN} \leq 12V$	1.764	1.8	1.836			
		ZSU1117B-2.5	$I_{OUT} = 10mA$, $V_{IN} = 4.5V$	2.463	2.5	2.538	V		
			$10mA \leq I_{OUT} \leq 1A$, $4V \leq V_{IN} \leq 12V$	2.450	2.5	2.550			
		ZSU1117B-3.3	$I_{OUT} = 10mA$, $V_{IN} = 5.3V$	3.251	3.3	3.350	V		
			$10mA \leq I_{OUT} \leq 1A$, $4.8V \leq V_{IN} \leq 12V$	3.234	3.3	3.366			
		ZSU1117B-5.0	$I_{OUT} = 10mA$, $V_{IN} = 7.0V$	4.925	5.0	5.075	V		
			$10mA \leq I_{OUT} \leq 1A$, $6.5V \leq V_{IN} \leq 12V$	4.9	5.0	5.1			
		Line Regulation	LNR	ZSU1117B-ADJ	$I_{OUT} = 10mA$, $1.5V \leq V_{IN} - V_{OUT} \leq 12V$			0.2	mV
				ZSU1117B-1.8	$I_{OUT} = 10mA$, $1.5V \leq V_{IN} - V_{OUT} \leq 10.2V$			7	
ZSU1117B-2.5	$I_{OUT} = 10mA$, $1.5V \leq V_{IN} - V_{OUT} \leq 9.5V$					7			
ZSU1117B-3.3	$I_{OUT} = 10mA$, $1.5V \leq V_{IN} - V_{OUT} \leq 8.7V$					7			
ZSU1117B-5.0	$I_{OUT} = 10mA$, $1.5V \leq V_{IN} - V_{OUT} \leq 7V$					10			
Load Regulation	LDR	ZSU1117B-ADJ	$V_{IN} - V_{OUT} = 1.5V$, $10mA \leq I_{OUT} \leq 1A$			0.4	mV		
		ZSU1117B-1.8				7.2			
		ZSU1117B-2.5				10			
		ZSU1117B-3.3				13.2			
		ZSU1117B-5.0				20			
Dropout Voltage	V_D		$\Delta V_{REF} = 1\%$, $I_{OUT} = 1.0A$			1.3	V		
Adjust Pin Current	I_{ADJ}	ZSU1117B-ADJ	$V_{IN} = 5V$, $10mA \leq I_{OUT} \leq 0.8A$		60	120	μA		
Adjust Pin Current Change	ΔI_{ADJ}	ZSU1117B-ADJ	$2.75V \leq V_{IN} - V_{OUT} \leq 12V$ (ADJ only)		1.7	5	μA		
Minimum Load Current	I_L	ZSU1117B-ADJ	$V_{IN} = 5V$, $V_{ADJ} = 0V$		5	7	mA		
Quiescent Current	I_Q		$V_{IN} = 12V$ (ADJ except)		5	10	mA		
Ripple Rejection	PSRR		$f = 10kHz$, $C_{OUT} = 22\mu F$ Tantalum, $V_{IN} - V_{OUT} = 3V$, $I_{OUT} = 1A$	60	70		dB		
Temperature Stability					0.5		%		
Long-Term Stability			$T_A = 125^\circ C$, 1000hrs		0.3		%		
RMS Output Noise (% of VOUT)			$T_A = 25^\circ C$, $10Hz \leq f \leq 10kHz$		0.003		%		
Thermal Shutdown Hysteresis					25		$^\circ C$		

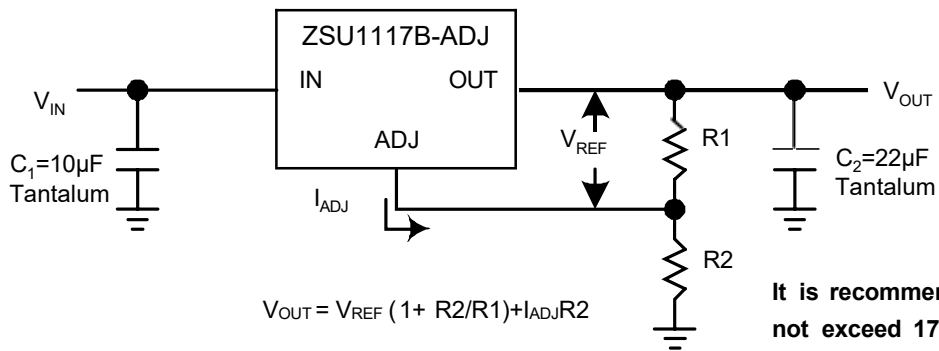
* With package soldering to copper area over backside ground plane or internal power plane $R_{\theta JA}$ can vary from $46^\circ C/W$ to $>90^\circ C/W$ depending on mounting technique and the size of the copper area

FUNCTIONAL BLOCK and TYPICAL APPLICATION

FUNCTIONAL BLOCK DIAGRAM

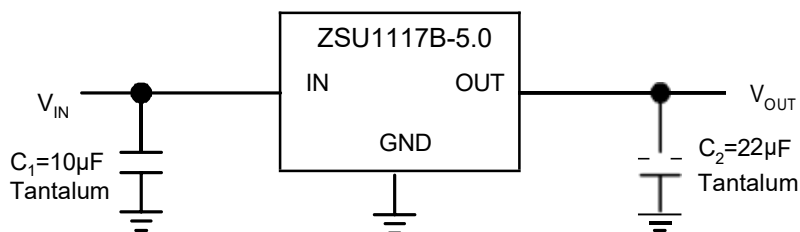


TYPICAL APPLICATION CIRCUIT



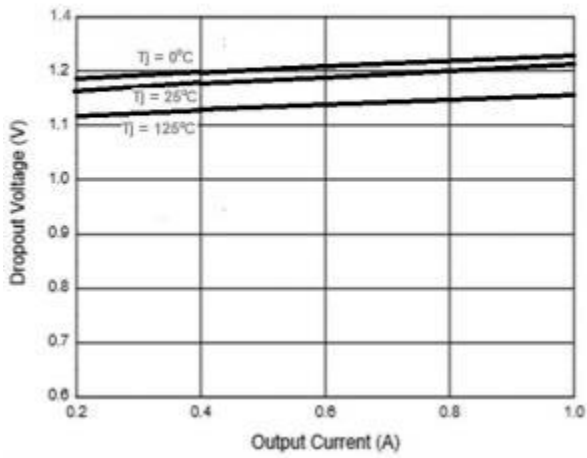
$$V_{OUT} = V_{REF} (1 + R_2/R_1) + I_{ADJ}R_2$$

It is recommended that R_1 should not exceed 170Ω for ADJ version in order to meet the minimum operating current.

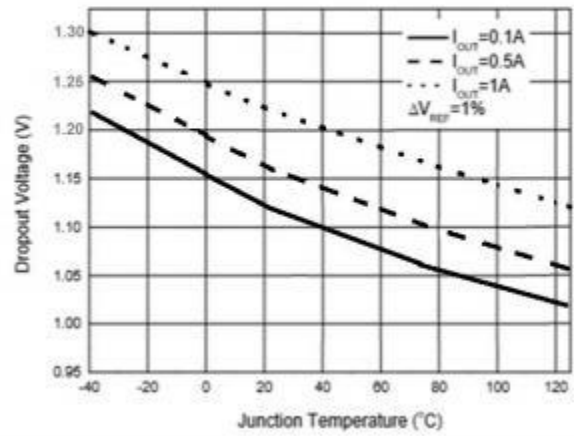


TYPICAL PERFORMANCE CHARACTERISTICS

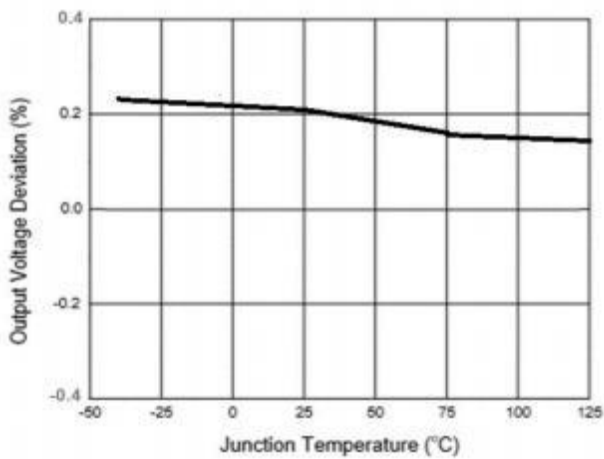
Dropout Voltage vs. Output Current



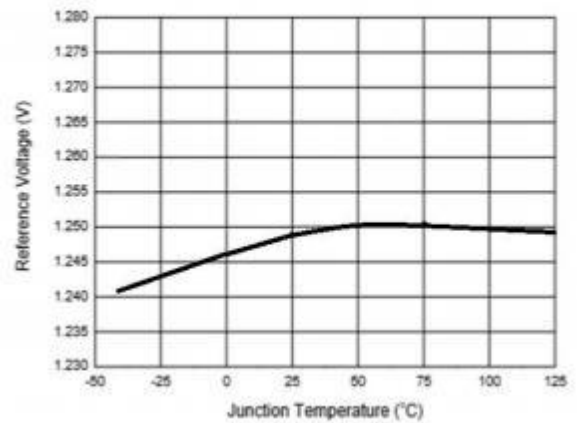
Dropout Voltage vs. Junction Temperature



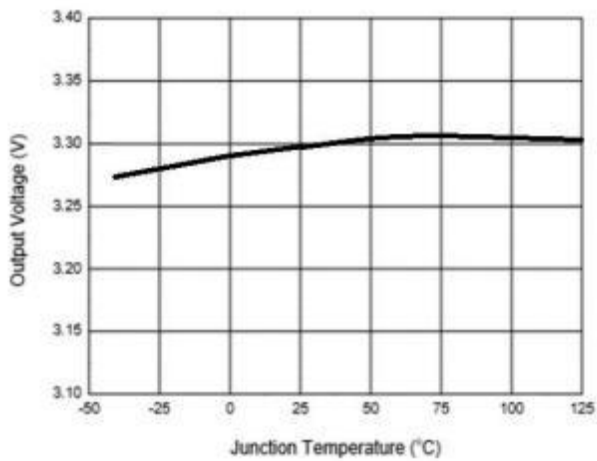
Load Regulation vs. Junction Temperature



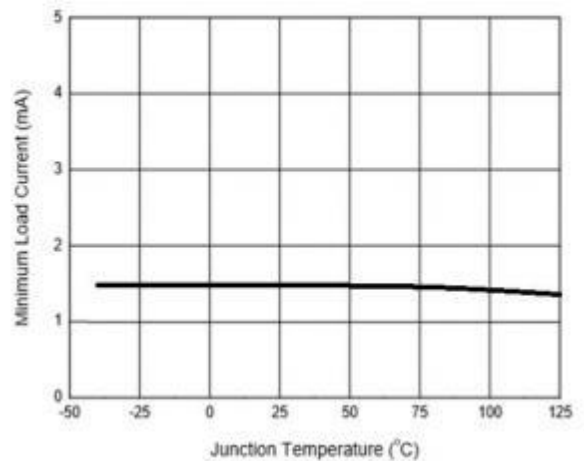
Reference Voltage vs. Junction Temperature



Output Voltage vs. Junction Temperature

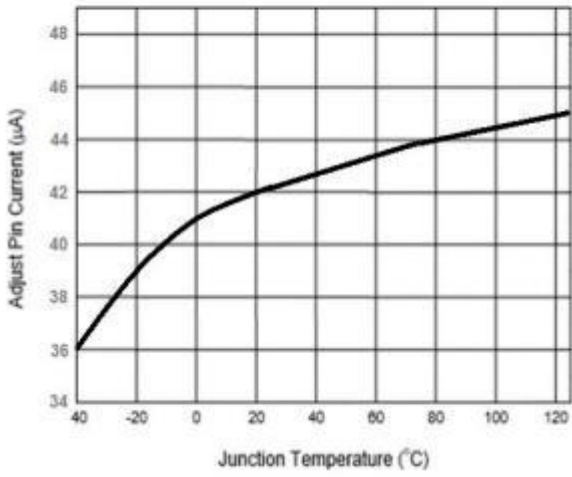


Minimum Load Current vs. Junction Temperature

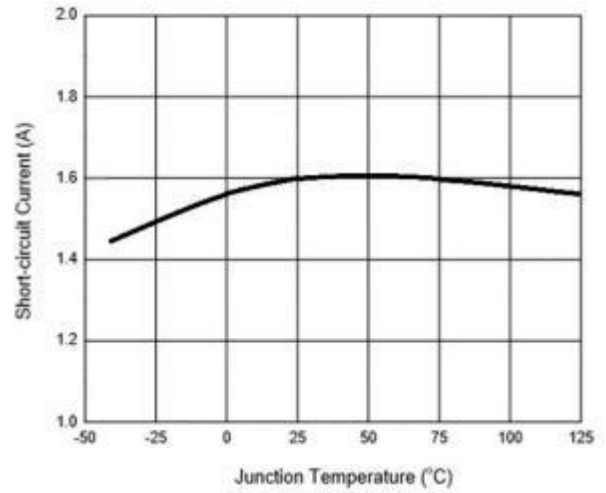


TYPICAL PERFORMANCE CHARACTERISTICS

Adjust Pin Current vs. Junction Temperature

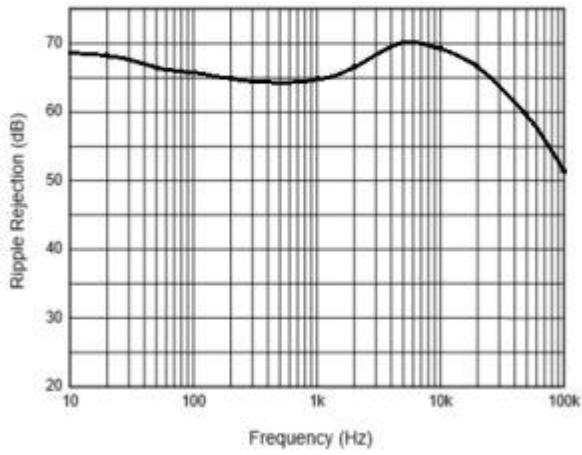


Short-circuit Current vs. Junction Temperature

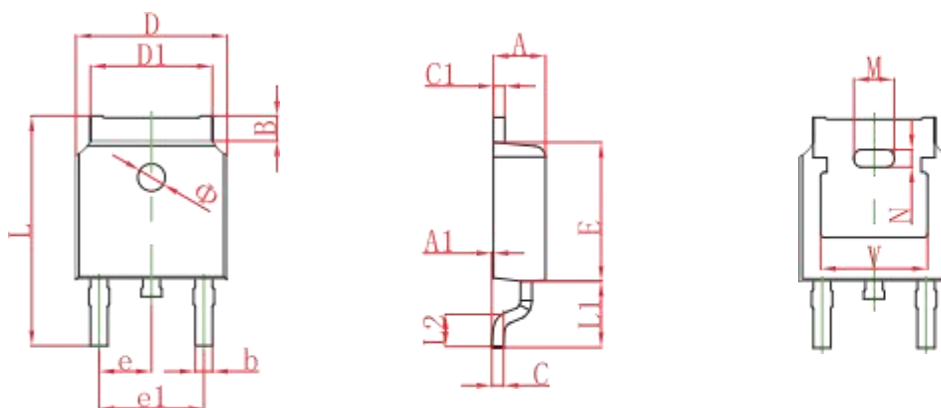


Ripple Rejection vs. Frequency

$V_{in} - V_{out} = 2.5\text{ V}$, $I_{out} = 100\text{ mA}$, $C_{out} = 10\text{ }\mu\text{F}$

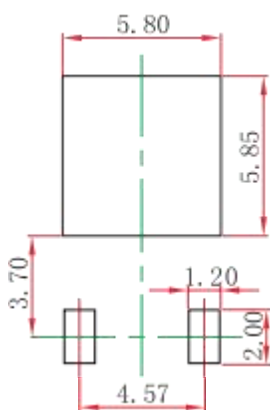


TO-252(4R)-2L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.380	0.087	0.094
A1	0.000	0.100	0.000	0.004
B	0.800	1.400	0.031	0.055
b	0.710	0.810	0.028	0.032
c	0.460	0.560	0.018	0.022
c1	0.460	0.560	0.018	0.022
D	6.500	6.700	0.256	0.264
D1	5.130	5.460	0.202	0.215
E	6.000	6.200	0.236	0.244
e	2.286 TYP.		0.090 TYP.	
e1	4.327	4.727	0.170	0.186
M	1.778REF.		0.070REF.	
N	0.762REF.		0.018REF.	
L	9.800	10.400	0.386	0.409
L1	2.9REF.		0.114REF.	
L2	1.400	1.700	0.055	0.067
V	4.830 REF.		0.190 REF.	
Φ	1.100	1.300	0.043	0.051

TO-252(4R)-2L Suggested Pad Layout

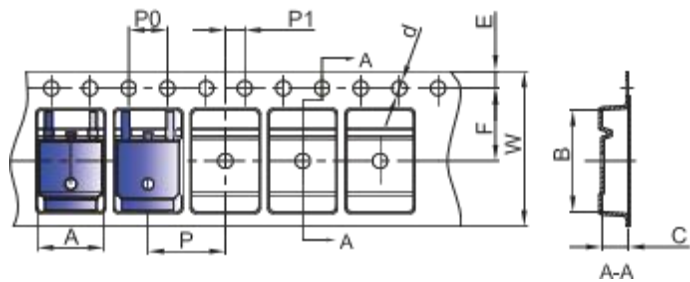


NOTE:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

To-252(4R)-2L Tape and Reel

TO-252 Embossed Carrier Tape

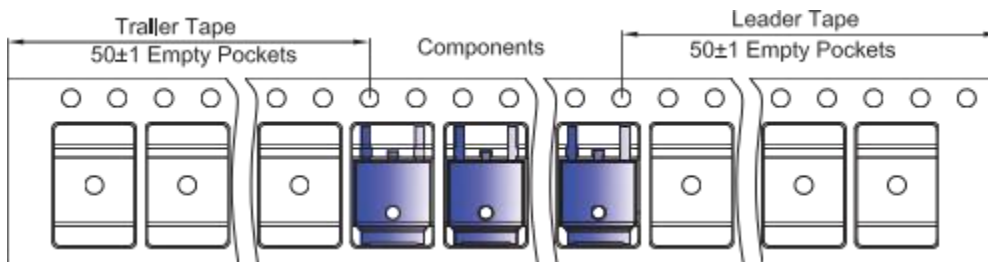


Packaging Description:

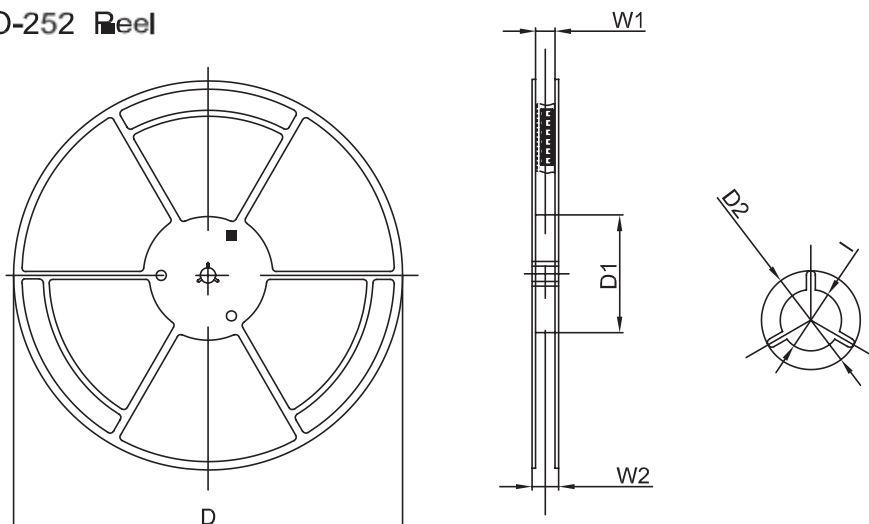
TO-252 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 25,000 units per 13" or 33,0 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
TO-252	6.90	10.50	2.70	Ø1.55	1.75	7.50	4.00	8.00	2.00	16.00

TO-252 Tape Leader and Trailer



TO-252 Reel



Dimensions are in millimeter						
Reel Option	D	D1	D2	W1	W2	I
13" Dia	330.00	100.00	Ø21.00	16.40	21.00	Ø13.00

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
2,500 pcs	13Inch	2,500 pcs	340×336×29	25,000 pcs	353×346×365	

DISCLAIMER

IMPORTANT NOTICE, PLEASE READ CAREFULLY

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