

MT3455

N-Channel 150V Switch MOSFET

Features

- Typ $R_{DS(on)}=0.8\Omega$ @ $V_{GS}=4.5V, I_D=2A$
- Fast Switching Speed
- Low Gate Charge
- High Power and Current Handling Capability
- ESD Rating:2000V HBM

General Description

This N-Channel MOSFET is produced using MOS-TECH Semiconductor's advanced PowerTrench process that has been especially tailored to minimize the on-state resistance and yet

Applications

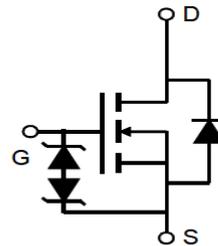
- DC Switch
- Led Driver



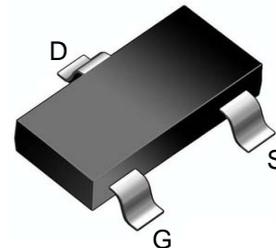
MT Semiconductor®

<http://www.mtsemi.com>

Simplified Schematic



MARKING DIAGRAM & PIN ASSIGNMENT



MOSFET Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Ratings	Units	
V_{DSS}	Drain to Source Voltage	150	V	
V_{GSS}	Gate to Source Voltage	± 10	V	
I_D	Drain Current - Continuous (Silicon Limited) $T_C = 25^\circ\text{C}$	2.0	A	
	- Continuous (Package Limited) $T_C = 25^\circ\text{C}$	3		
	- Continuous $T_C = 25^\circ\text{C}$ (Note 1a)	4		
	- Pulsed	6		
E_{AS}	Single Pulsed Avalanche Energy (Note 3)	1.0	mJ	
P_D	Power Dissipation	- $T_C = 25^\circ\text{C}$ (Note 1a)	1.25	W
		- $T_A = 25^\circ\text{C}$ (Note 1b)	0.2	W/ $^\circ\text{C}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +155	$^\circ\text{C}$	

Thermal Characteristics

Symbol	Parameter	Ratings	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case (Note 1)	5.0	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a)	100	

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
MT3455	MT3455	SOT-23	-	-	3000

Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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Off Characteristics

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	150	--	--	V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\ \mu\text{A}$, Referenced to 25°C	--	0.09	--	$V/^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}$	--	--	1	μA
		$V_{DS} = 80\text{ V}, T_C = 125^\circ\text{C}$	--	--	10	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{GS} = -20\text{ V}, V_{DS} = 0\text{ V}$	--	--	-100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	--	1.1	--	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 4.5\text{ V}, I_D = 1\text{ A}$	--	0.8	--	Ω
g_{FS}	Forward Transconductance	$V_{DS} = 30\text{ V}, I_D = 1\text{ A}$ (Note 4)	--	11	--	S

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$	--	--	1500	pF
C_{oss}	Output Capacitance		--	--	200	pF
C_{rSS}	Reverse Transfer Capacitance		--	--	160	pF

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 50\text{ V}, I_D = 19\text{ A},$ $R_G = 25\ \Omega$ (Note 4, 5)	--	6	--	ns
t_r	Turn-On Rise Time		--	12	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	4.5	--	ns
t_f	Turn-Off Fall Time		--	16	--	ns
Q_g	Total Gate Charge	$V_{DS} = 80\text{ V}, I_D = 19\text{ A},$ $V_{GS} = 5\text{ V}$ (Note 4, 5)	--	15	--	nC
Q_{gs}	Gate-Source Charge		--	8	--	nC
Q_{gd}	Gate-Drain Charge		--	5	--	nC

Drain-Source Diode Characteristics and Maximum Ratings

I_S	Maximum Continuous Drain-Source Diode Forward Current	--	--	6	A	
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current	--	--	6	A	
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 15.6\text{ A}$	--	--	1.2	V
t_{rr}	Reverse Recovery Time	$V_{GS} = 0\text{ V}, I_S = 19\text{ A},$ $di_F / dt = 100\text{ A}/\mu\text{s}$ (Note 4)	--	80	--	ns
Q_{rr}	Reverse Recovery Charge		--	0.195	--	μC

Notes:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. $L = 1.35\text{mH}, I_{AS} = 15.6\text{A}, V_{DD} = 25\text{V}, R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$
3. $I_{SD} \leq 19\text{A}, di/dt \leq 300\text{A}/\mu\text{s}, V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$
4. Pulse Test : Pulse width $\leq 300\ \mu\text{s}$, Duty cycle $\leq 2\%$
5. Essentially independent of operating temperature

Typical Performance Curves Unless Otherwise Specified

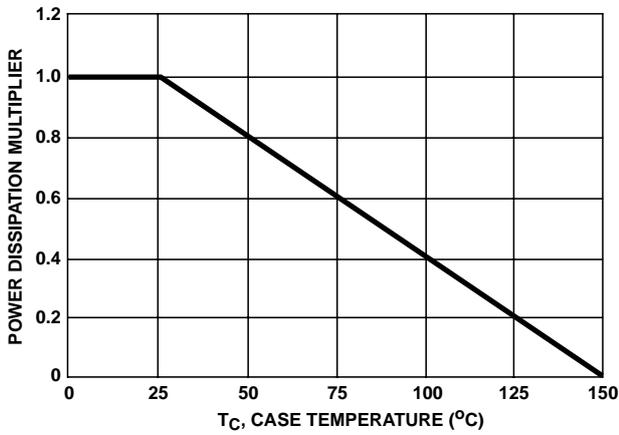


FIGURE 1. NORMALIZED POWER DISSIPATION vs CASE TEMPERATURE

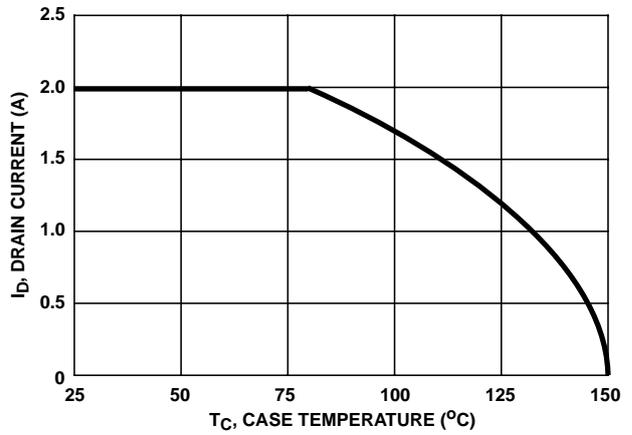


FIGURE 2. MAXIMUM CONTINUOUS DRAIN CURRENT vs CASE TEMPERATURE

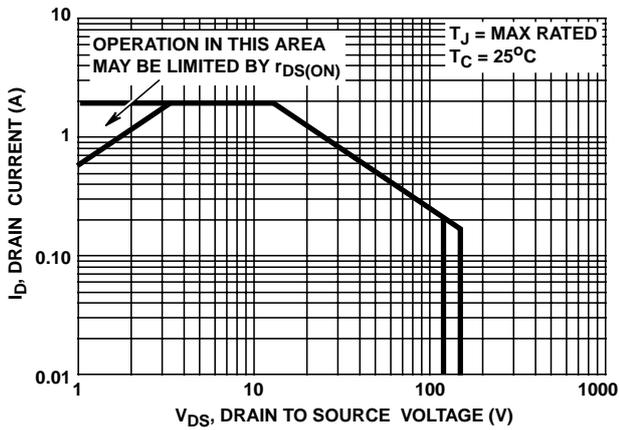


FIGURE 3. FORWARD BIAS OPERATING AREA

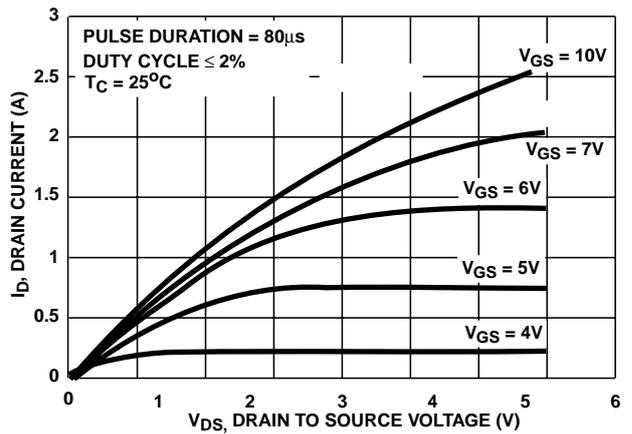


FIGURE 4. SATURATION CHARACTERISTICS

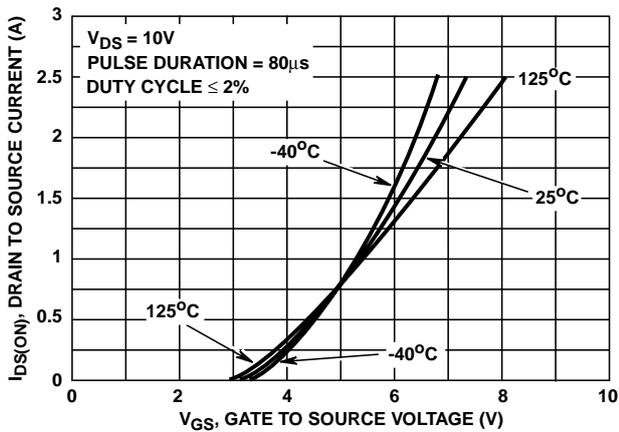


FIGURE 5. TRANSFER CHARACTERISTICS

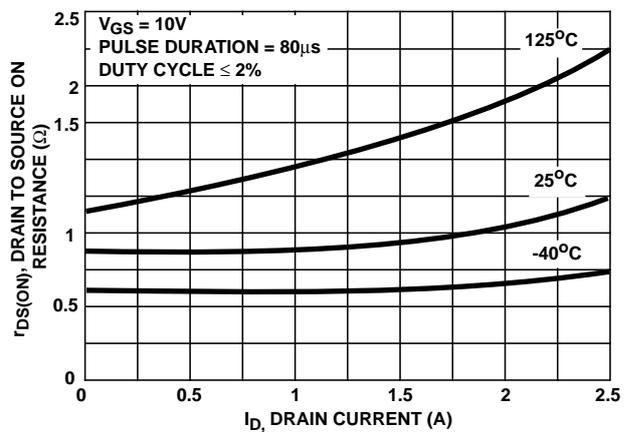


FIGURE 6. DRAIN TO SOURCE ON RESISTANCE vs DRAIN CURRENT

Typical Performance Curves Unless Otherwise Specified (Continued)

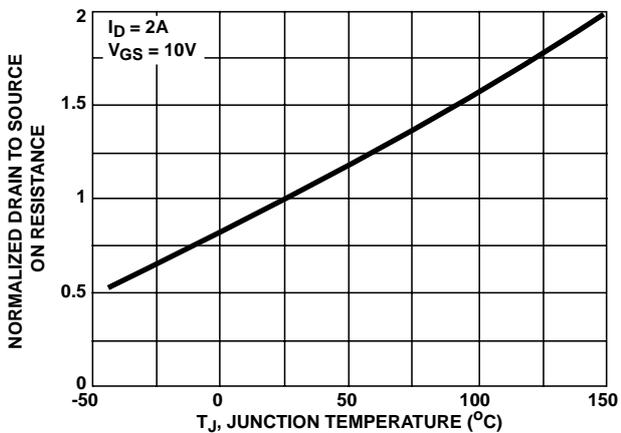


FIGURE 7. NORMALIZED DRAIN TO SOURCE RESISTANCE vs JUNCTION TEMPERATURE

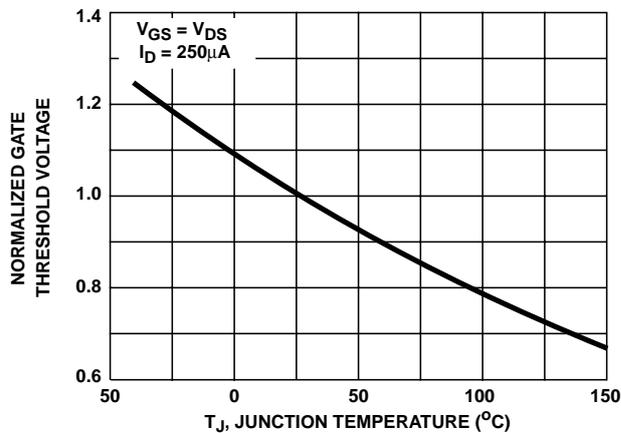


FIGURE 8. NORMALIZED GATE THRESHOLD VOLTAGE vs JUNCTION TEMPERATURE

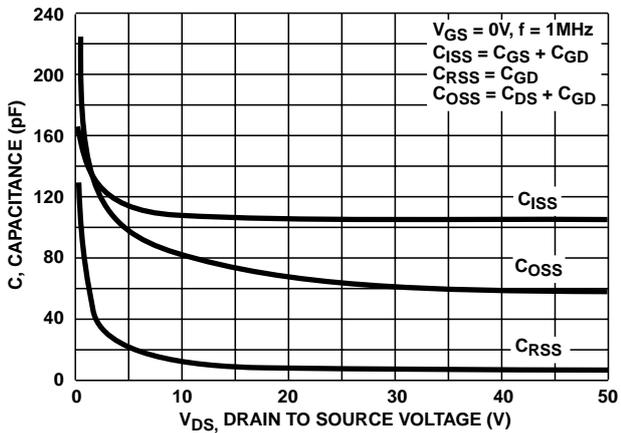


FIGURE 9. CAPACITANCE vs DRAIN TO SOURCE VOLTAGE

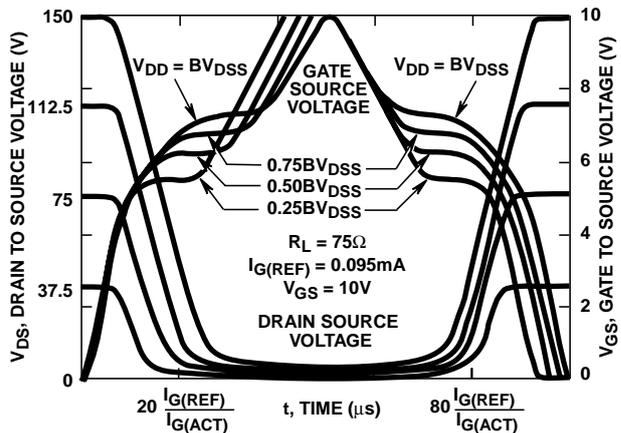


FIGURE 10. NORMALIZED SWITCHING WAVEFORMS FOR CONSTANT GATE CURRENT

Test Circuits and Waveforms

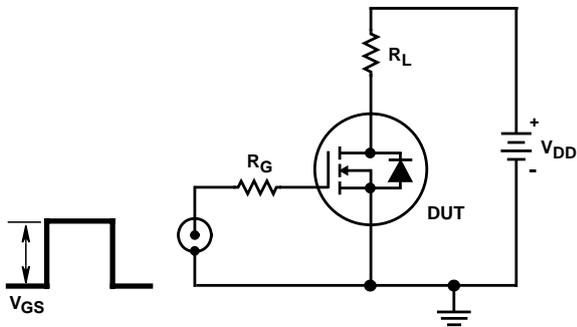


FIGURE 11. SWITCHING TIME TEST CIRCUIT

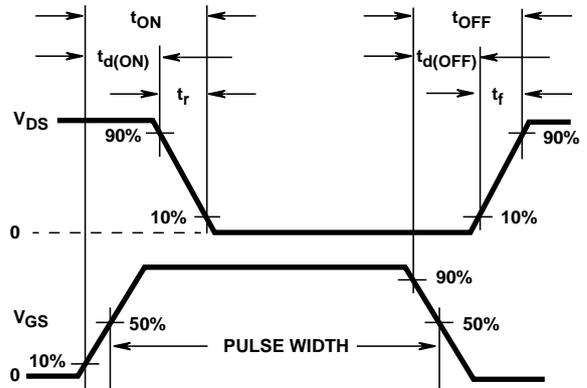


FIGURE 12. RESISTIVE SWITCHING WAVEFORMS

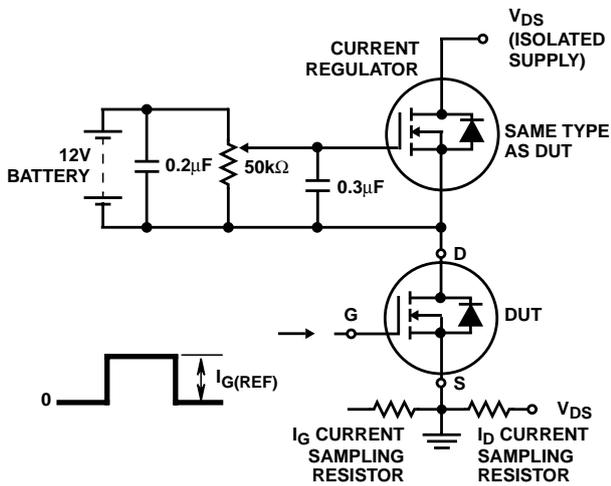


FIGURE 13. GATE CHARGE TEST CIRCUIT

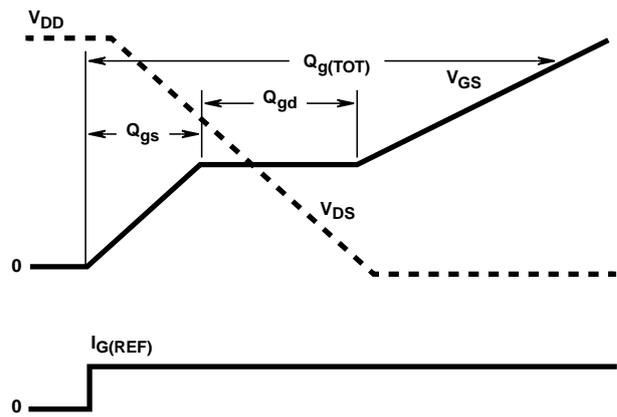
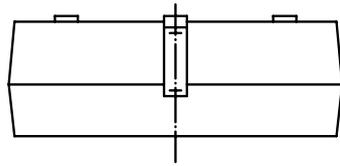
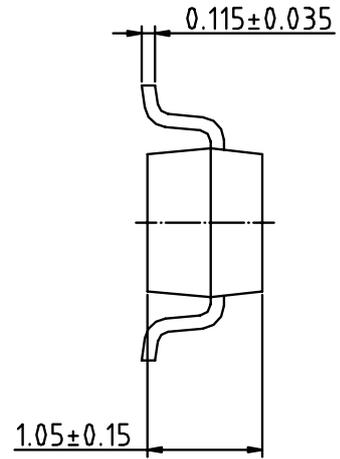
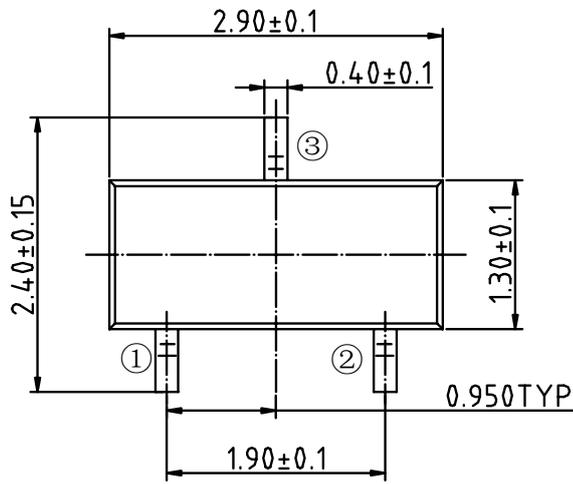


FIGURE 14. GATE CHARGE WAVEFORMS

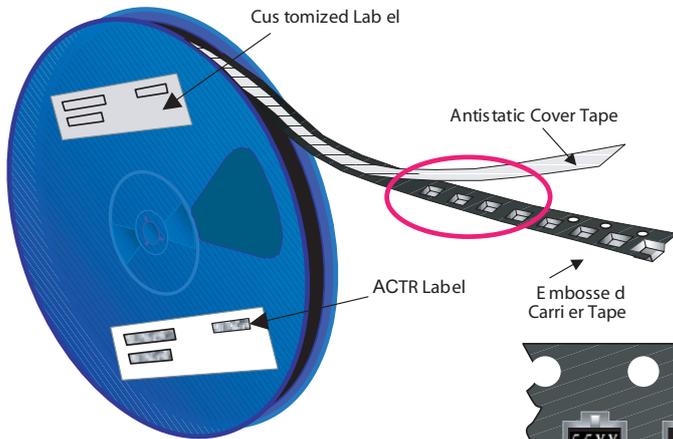
● Package Information



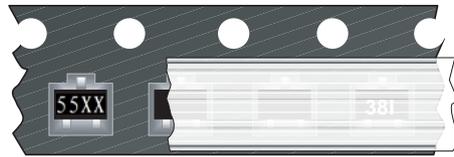
SOT23
Units:mm

SOT-23 Std Tape and Reel Data

SOT23-3L Packaging Configuration: Figure 1.0

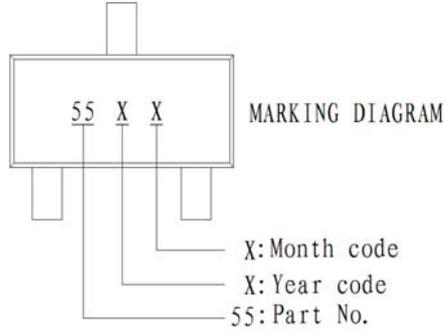


Packaging Description:
SOT23-3L parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 177mm diameter reel. The reels are dark blue in color and is made of polystyrene plastic (anti-static coated). Other option comes in 10,000 units per 13" or 330cm diameter reel. This and some other options are described in the Packaging Information table.
These full reels are individually labeled and placed inside a standard immediate box made of recyclable corrugated brown paper with a Fairchild logo printing. One box contains five reels maximum. And these immediate boxes are placed inside a labeled shipping box which comes in different sizes depending on the number of parts shipped.

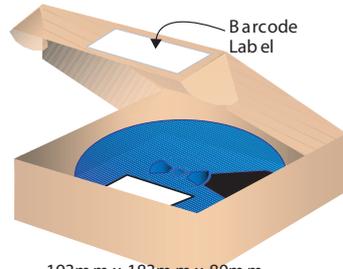


SOT23-3L Unit Orientation

SOT23-3L Packaging Information		
Packaging Option	Standard (no flow code)	D87Z
Packaging type	TNR	TNR
Qty per Reel/Tube/Bag	3,000	10,000
Reel Size	7" Dia	13"
Box Dimension (mm)	193x183x80	355x333x40
Max qty per Box	15,000	30,000
Weight per unit (gm)	0.0082	0.0082
Weight per Reel (kg)	0.1175	0.4006
Note/Comments		

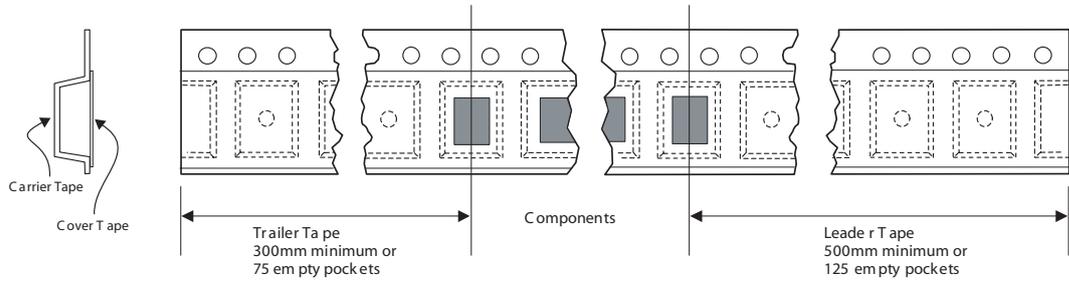


Barcode Labels sample



193mm x 183mm x 80mm Pizza Box for Standard Option

SOT23-3L Tape Leader and Trailer Configuration: Figure 2.0



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