TM10N02SI

N-Channel Enhancement Mosfet

General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

Applications

- Load switch
- PWM

General Features

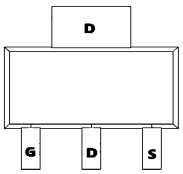
V_{DS} = 20V I_D =10 A

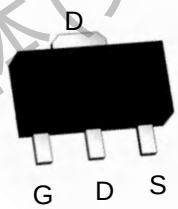
$R_{DS(ON)}$ = 8mΩ (typ.)@ V_{GS}=4.5V

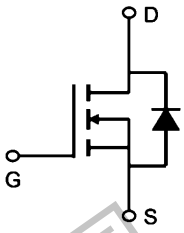
100% UIS Tested
100% R_g Tested

Green Product

SI:SOT-89-3L







Marking: 10N02

Absolute Maximum Ratings (T_C = 25°C Unless Otherwise Noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D@T_C=25°C	Continuous Drain Current, V_{GS} @ 10V[1]	10	A
I_D@T_C=100°C	Continuous Drain Current, V_{GS} @ 10V[1]	6.5	A
I_{DM}	Pulsed Drain Current[2]	37	A
EAS	Single Pulse Avalanche Energy[3]	30	mJ
P_D	Total Power Dissipation[3]	1.4	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1]	---	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	6.6	°C/W

TM10N02SI N-Channel Enhancement Mosfet

Electrical Characteristics: (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	20	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=20V	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±10V, V_{DS}=0A	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	0.5	0.7	0.9	V
$R_{DS(ON)}$	Drain-Source On Resistance[4]	V_{GS}=4.5V,I_D=15A	---	8	11	mΩ
		V_{GS}=2.5V,I_D=10A	---	10	13	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=10V, V_{GS}=0V, f=1MHz	---	1194	---	pF
C_{oss}	Output Capacitance		---	174	--	
C_{rss}	Reverse Transfer Capacitance		---	149	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=10V, I_D=15A, R_{ENG}=3Ω,V_{GS}=4.5V	---	7	---	ns
t_r	Rise Time		---	18	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	29	---	ns
t_f	Fall Time		---	10	---	ns
Q_g	Total Gate Charge	V_{GS}=4.5V, V_{DS}=10V, I_D=15A	---	12	---	nc
Q_{gs}	Gate-Source Charge		---	2.4	---	nc
Q_{gd}	Gate-Drain “Miller” Charge		---	3.4	---	nc
Drain-Source Diode Characteristics						
I_S	Continuous Drain Curren	VD=VG=0V	---	---	10	A
I_{SM}	Pulsed Drain Current		---	---	37	A
Trr	Reverse Recovery Time	I_F=15A,T_J=25℃ dI/dt=100A/us	---	7.5	---	ns
Qrr	Reverse Recovery Charge		---	1.5	---	nc
V_{SD}	Diode Forward Voltage[3]	V_{GS}=0V, I_{SD}=30A	---	---	1.2	V

Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting T_J=25C, V_{DD}=10V, V_G=10V, R_G=25ohm, L=0.5mH, I_{AS}=11A
3. $R_{\theta JA}$ is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

Typical Characteristics

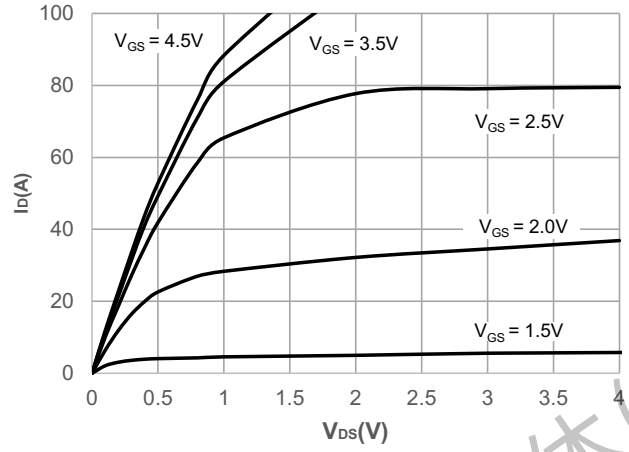


Figure 1: Output Characteristics

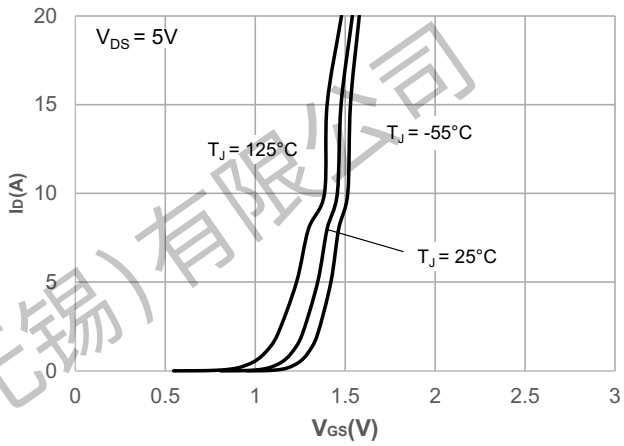


Figure 2: Typical Transfer Characteristics

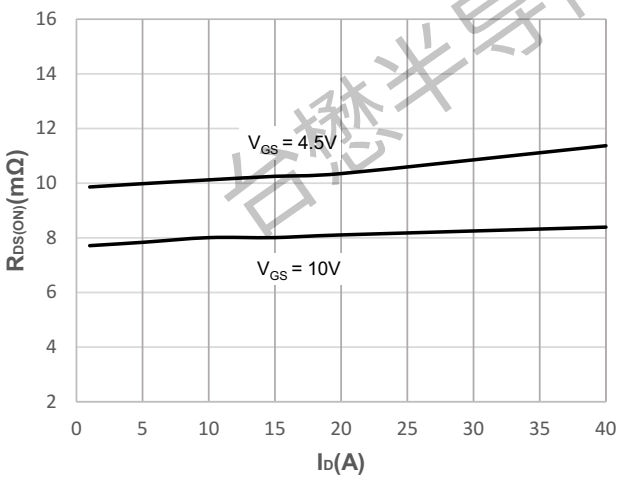


Figure 3: On-resistance vs. Drain Current

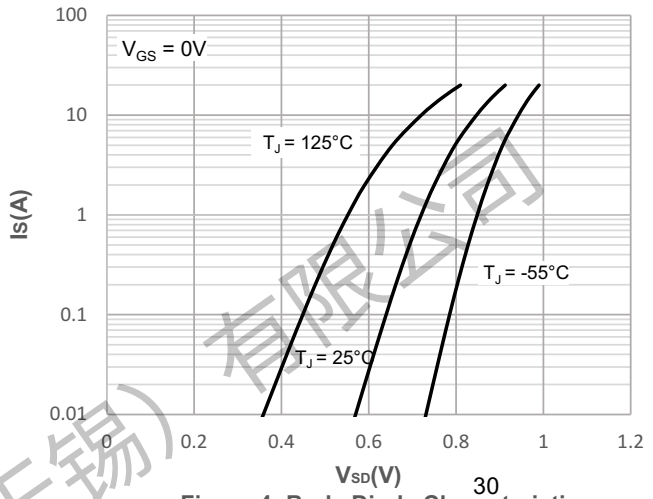


Figure 4: Body Diode Characteristics

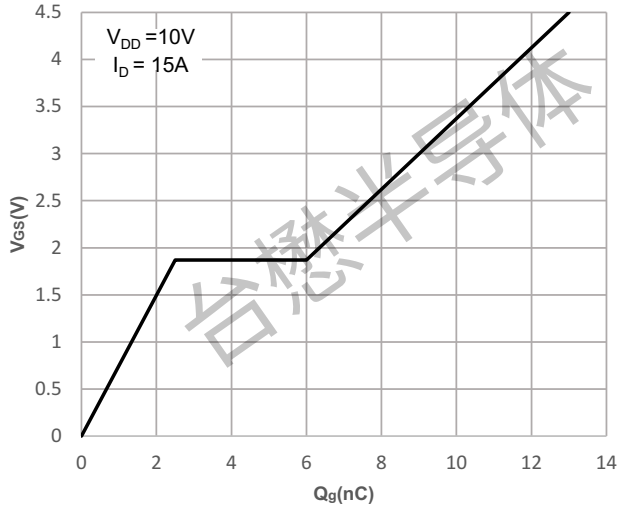


Figure 5: Gate Charge Characteristics

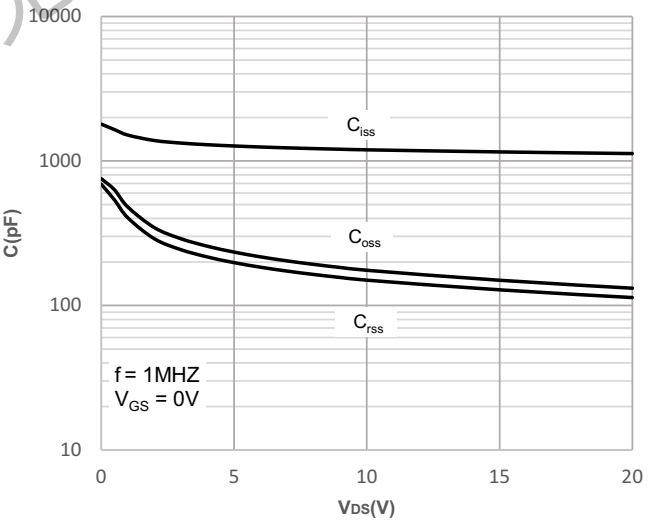


Figure 6: Capacitance Characteristics

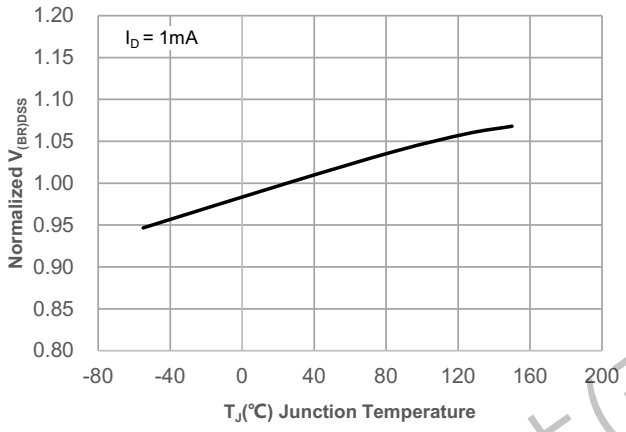


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

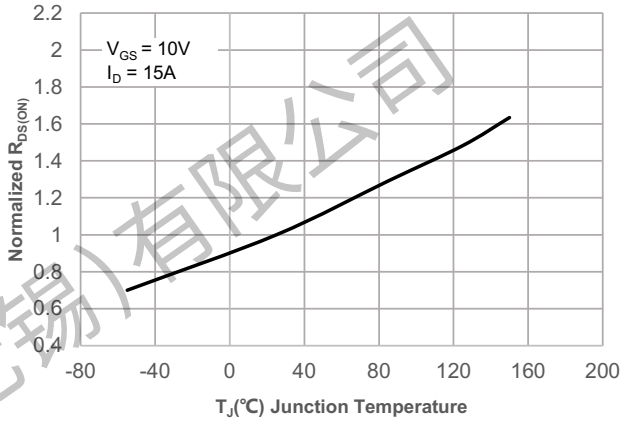


Figure 8: Normalized on Resistance vs. Junction Temperature

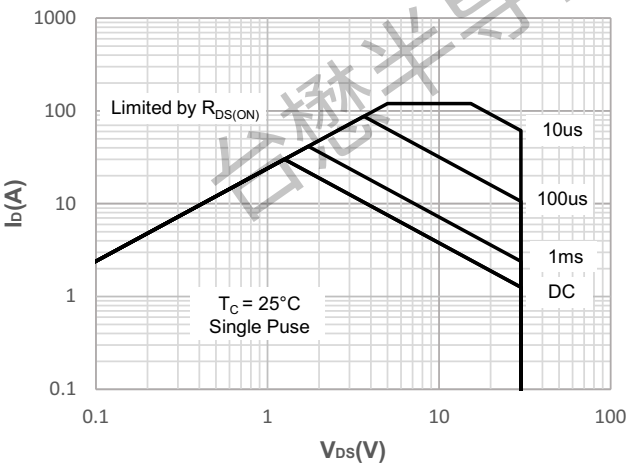


Figure 9: Maximum Safe Operating Area

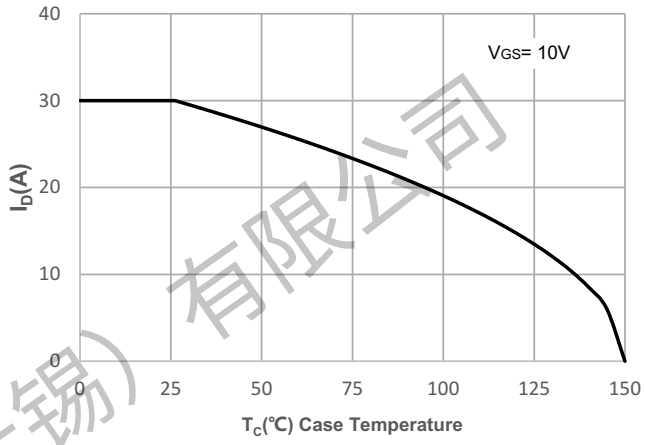


Figure 10: Maximum Continuous Drian Current vs. Case Temperature

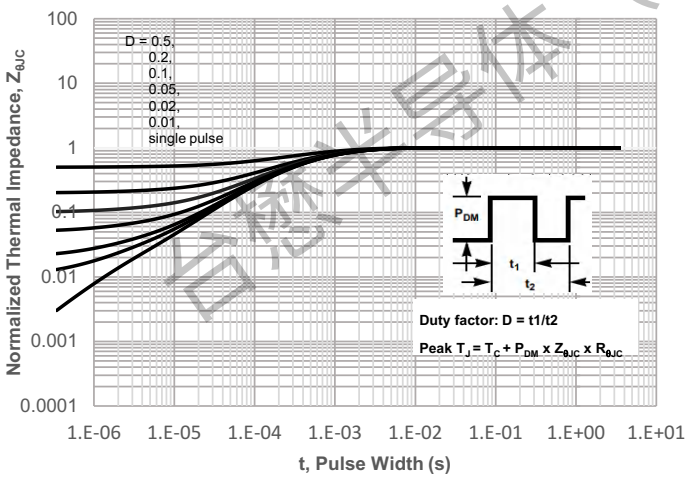


Figure 11: Normalized Maximum Transient Thermal Impedance

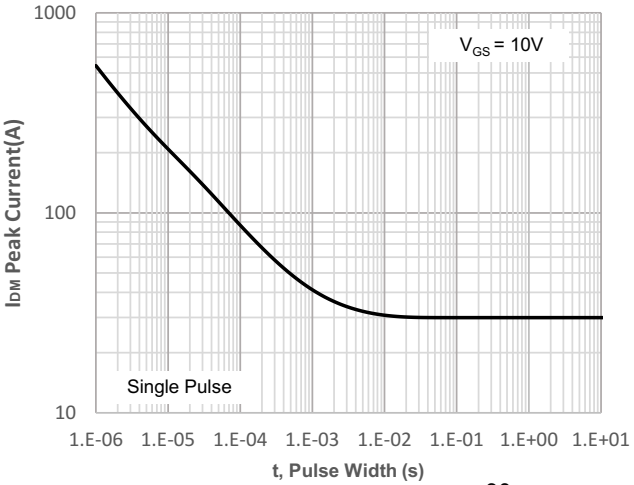
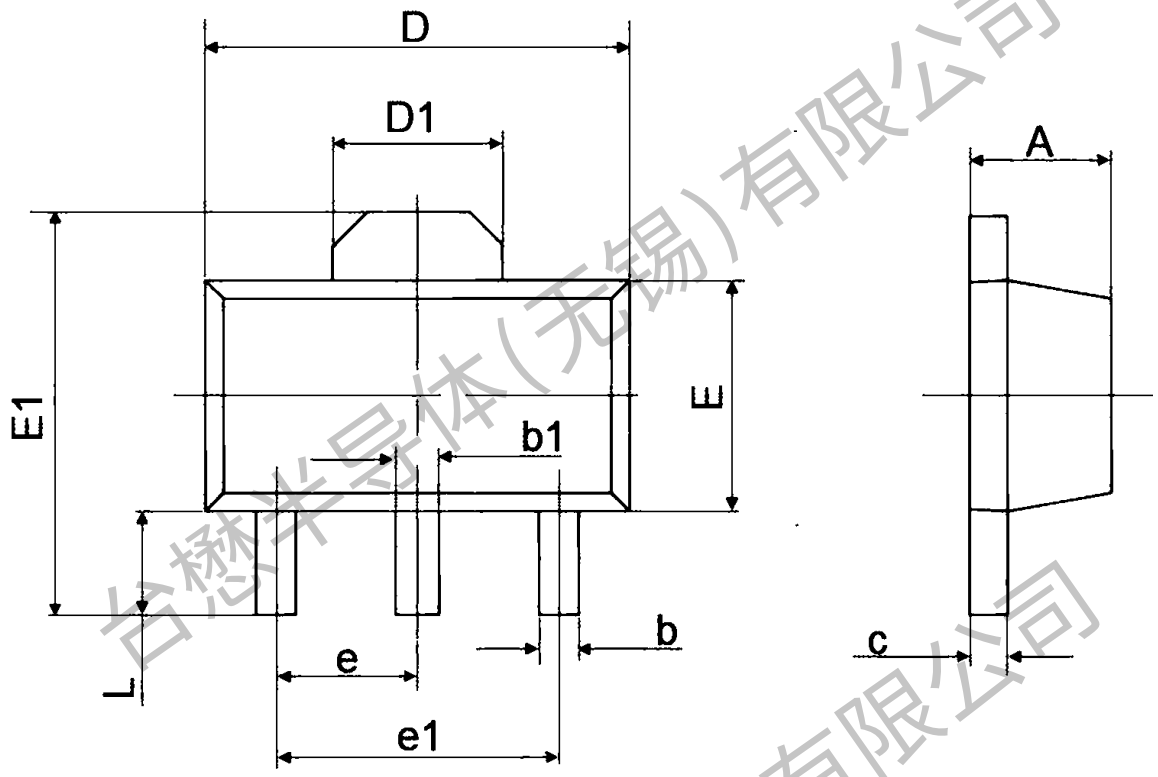


Figure 12: Peak Current Capacity

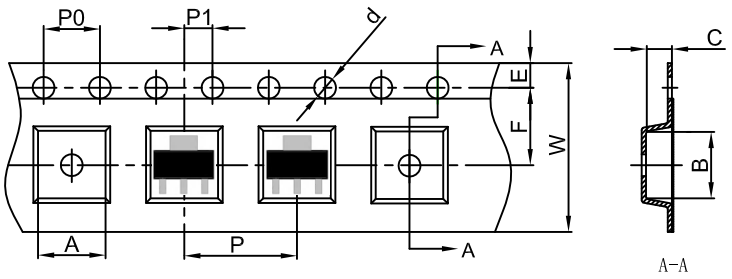
Package Mechanical Data:SOT-89-3L



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

TM10N02SI N-Channel Enhancement Mosfet

SOT-89-3L Embossed Carrier Tape



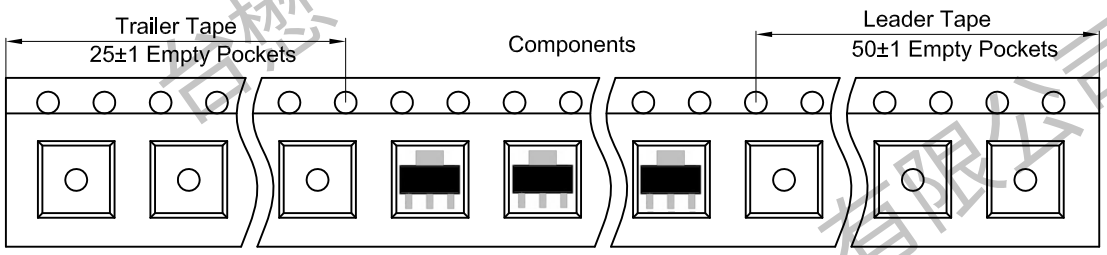
Packaging Description:

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).

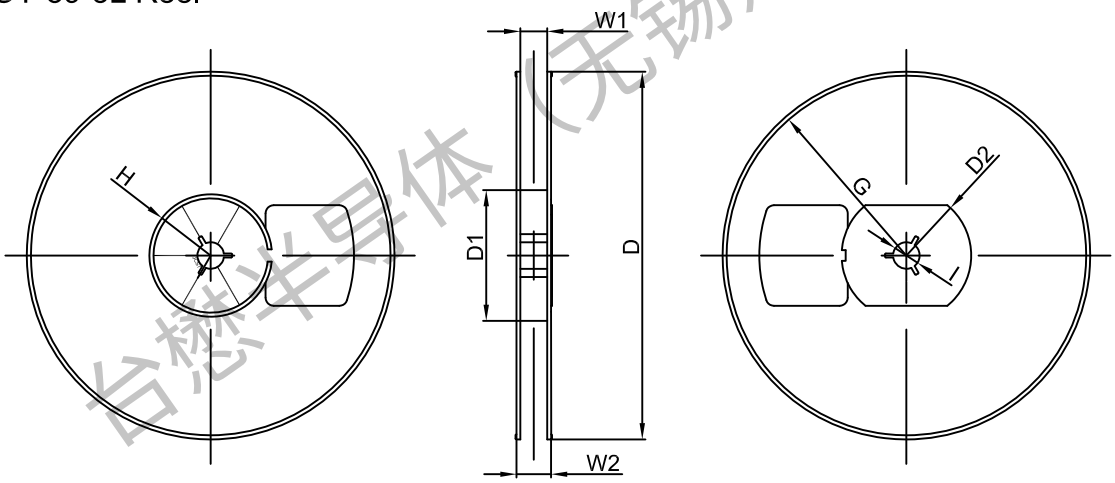
ALL DIM IN mm

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	205×195×220	40,000 pcs	430×415×240	

Important Notices and Disclaimers

- Tritech-MOS Technology Corp.reserves the right to change thisdocument, its products, and specifications at any time without prior notice.
- Before final design, purchase, or use, customers should obtain and confirm the latest product information and specifications.
- Tritech-MOS Technology Corp. makes no warranties, representations or warranties regarding the suitability of its products for any specific purpose, and Tritech-MOS Technology Corp. does not assume any responsibility for application assistance or customer product design.
- Tritech-MOS Technology Corp. does not guarantee or assume any responsibility for the purchase or use of any unexpected or unauthorized products.
- Any intellectual property rights of Tritech-MOS Technology Corp. are not licensed through implicate or other means.
- Products of Tritech-MOS Technology Corp. are not included as critical components in life support equipment or systems without explicit written approval from Tritech-MOS Technology Corp.

Revision history:

Date	Rev	Description	Page
2023.06.14	23.06	Original	