


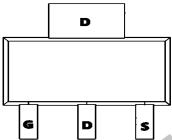
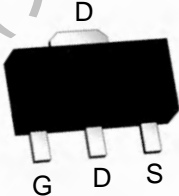
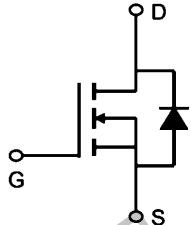


TM03N20SI

N-Channel Enhancement Mosfet

<p>General Description</p> <ul style="list-style-type: none"> • Low $R_{DS(ON)}$ • RoHS and Halogen-Free Compliant <p>Applications</p> <ul style="list-style-type: none"> • Load switch • PWM 	<p>General Features</p> <p>$V_{DS}=200V$ $I_D=3.0A$</p> <p>$R_{DS(ON)}=520m\Omega$(typ.) @$V_{GS}=10V$</p> <p>100% UIS Tested 100% R_g Tested</p> 
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SI: SOT-89-3L

Marking: 03N20 OR ZK3

Absolute Maximum Ratings ($T_C = 25^\circ C$ Unless Otherwise Noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	3	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	1.8	A
I_{DM}	Pulsed Drain Current	11	A
P_D	Total Power Dissipation	3	W
T_{STG}	Storage Temperature Range	-55 to 175	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 175	$^\circ C$

Thermal Data

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



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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\ \mu A$	200	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS}=0V, V_{DS}=200V$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0A$	---	---	± 100	nA
On Characteristics						
$V_{GS(th)}$	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\ \mu A$	2	2.5	3	V
$R_{DS(on)}$	Drain-Source On Resistance	$V_{GS}=10V, I_D=2A$	---	520	580	$m\ \Omega$
Dynamic Characteristics						
C_{iss}	Input Capacitance ⁴	$V_{DS}=25V, V_{GS}=0V, f=1MHz$	---	579	---	pF
C_{oss}	Output Capacitance ⁴		---	89	---	
C_{rss}	Reverse Transfer Capacitance ⁴		---	2	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time ⁴	$V_{DS}=100V$ $R_{ENG}=2.5\ \Omega, V_{GS}=10V$	---	9	---	ns
t_r	Rise Time ⁴		---	11	---	ns
$t_{d(off)}$	Turn-Off Delay Time ⁴		---	14	---	ns
t_f	Fall Time ⁴		---	14	---	ns
Q_g	Total Gate Charge ⁴	$V_{GS}=10, V_{DS}=100V,$ $I_D=2A$	---	11	---	nc
Q_{gs}	Gate-Source Charge ⁴		---	2.4	---	nc
Q_{gd}	Gate-Drain "Miller" Charge ⁴		---	3.7	---	nc
Drain-Source Diode Characteristics						
I_S	Continuous Drain Current ²	$V_D=V_G=0V$	---	---	3	A
I_{SM}	Pulsed Drain Current		---	---	11	A
V_{SD}	Diode Forward Voltage ³	$V_{GS}=0V, I_{SD}=2A$	---	---	1.2	V

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Typical Characteristics

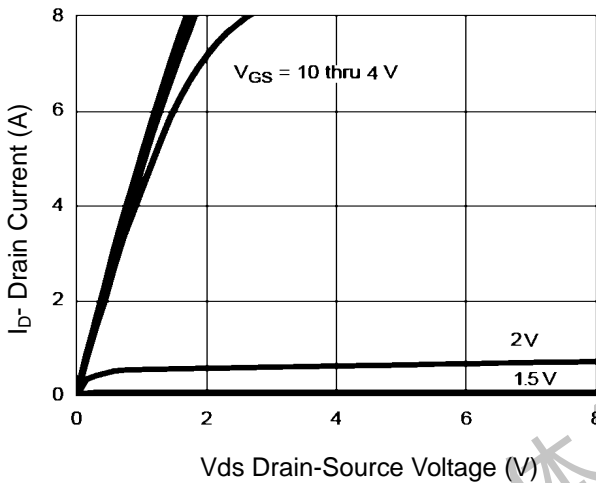


Figure 1 Output Characteristics

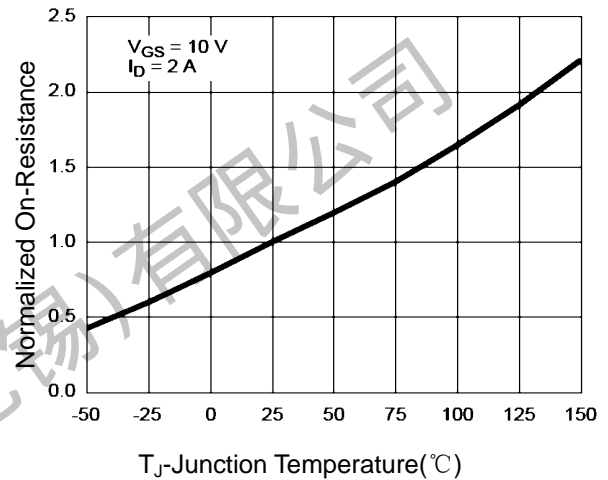


Figure 4 Rds(on)-Junction Temperature

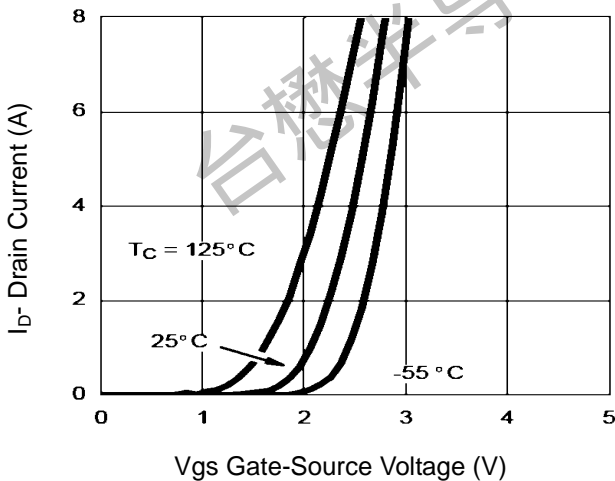


Figure 2 Transfer Characteristics

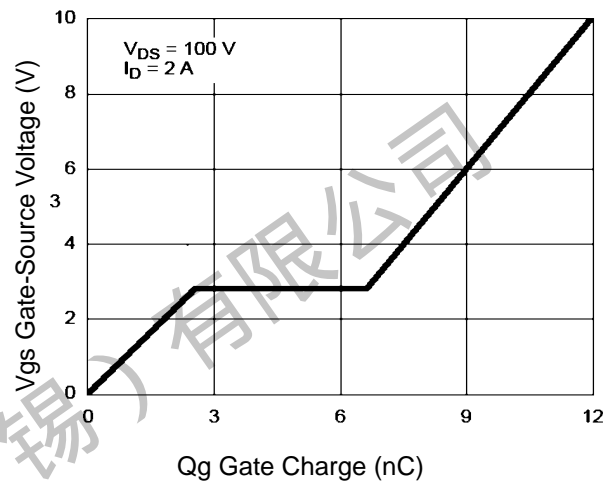


Figure 5 Gate Charge

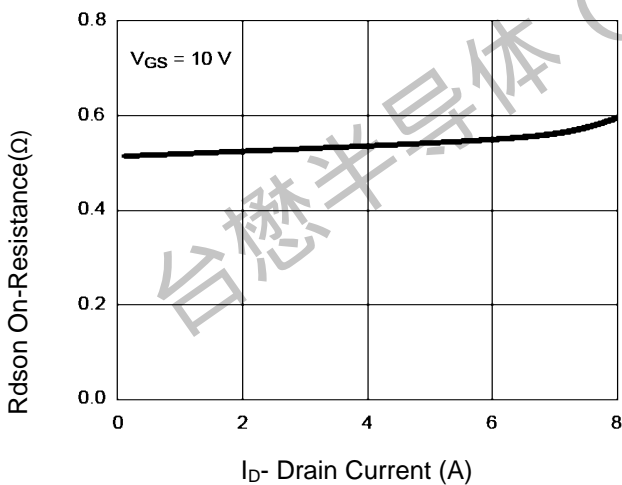


Figure 3 Rds(on)- Drain Current

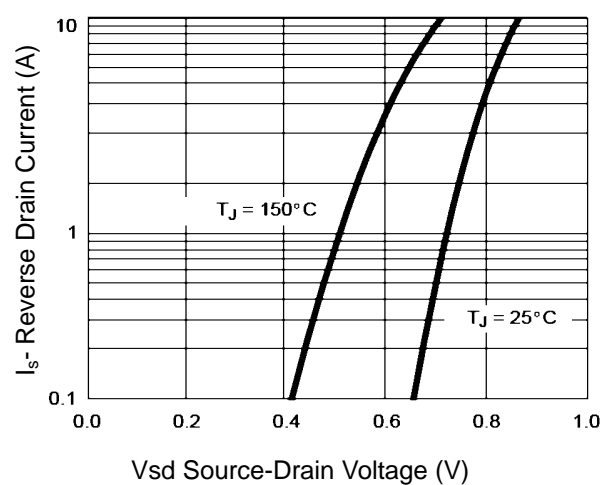


Figure 6 Source- Drain Diode Forward

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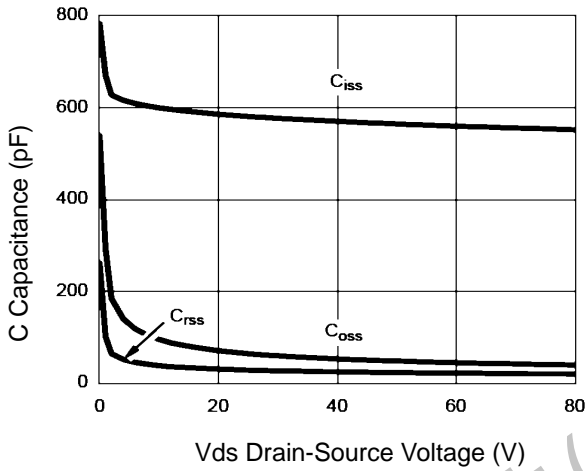


Figure 7 Capacitance vs Vds

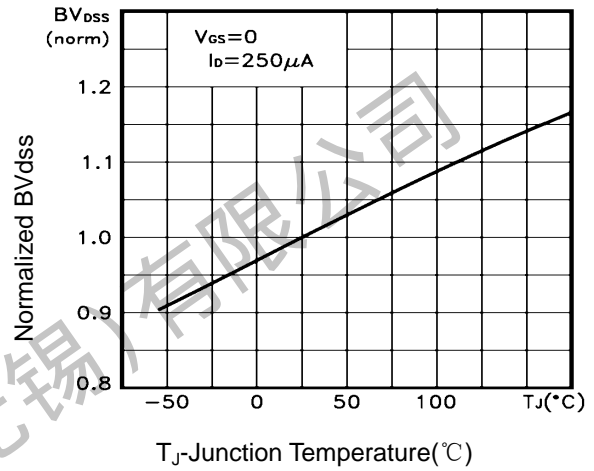


Figure 9 BV_{DSS} vs Junction Temperature

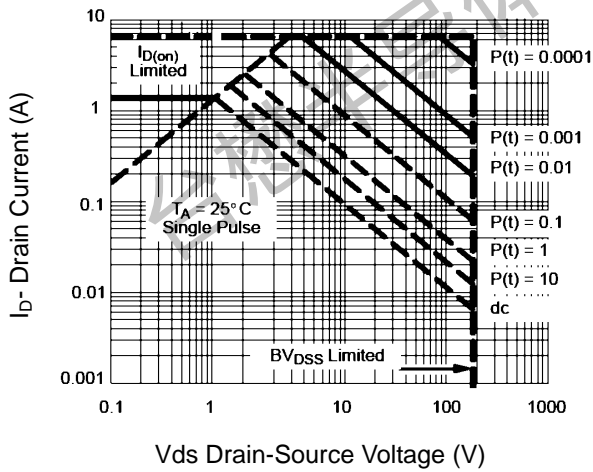


Figure 8 Safe Operation Area

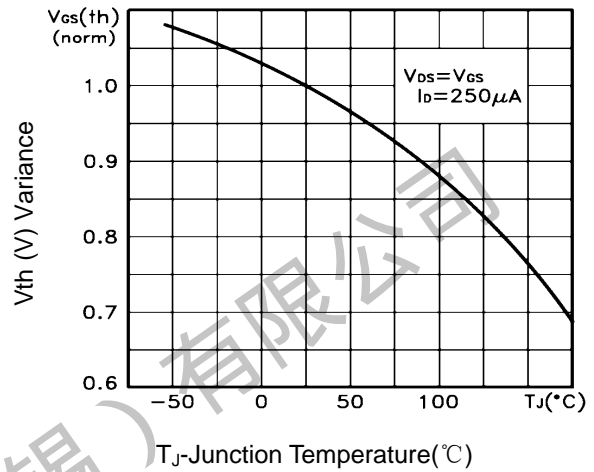


Figure 10 $V_{GS(th)}$ vs Junction Temperature

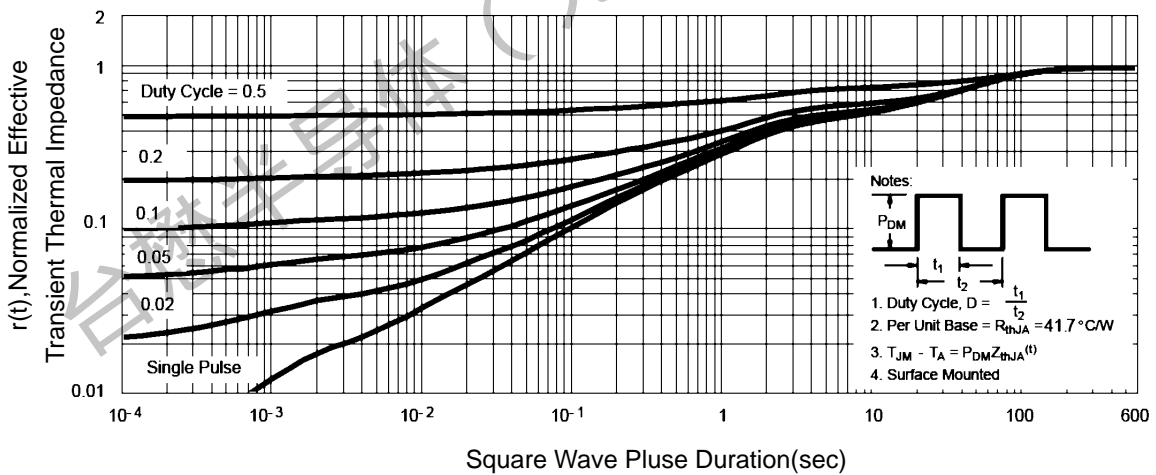


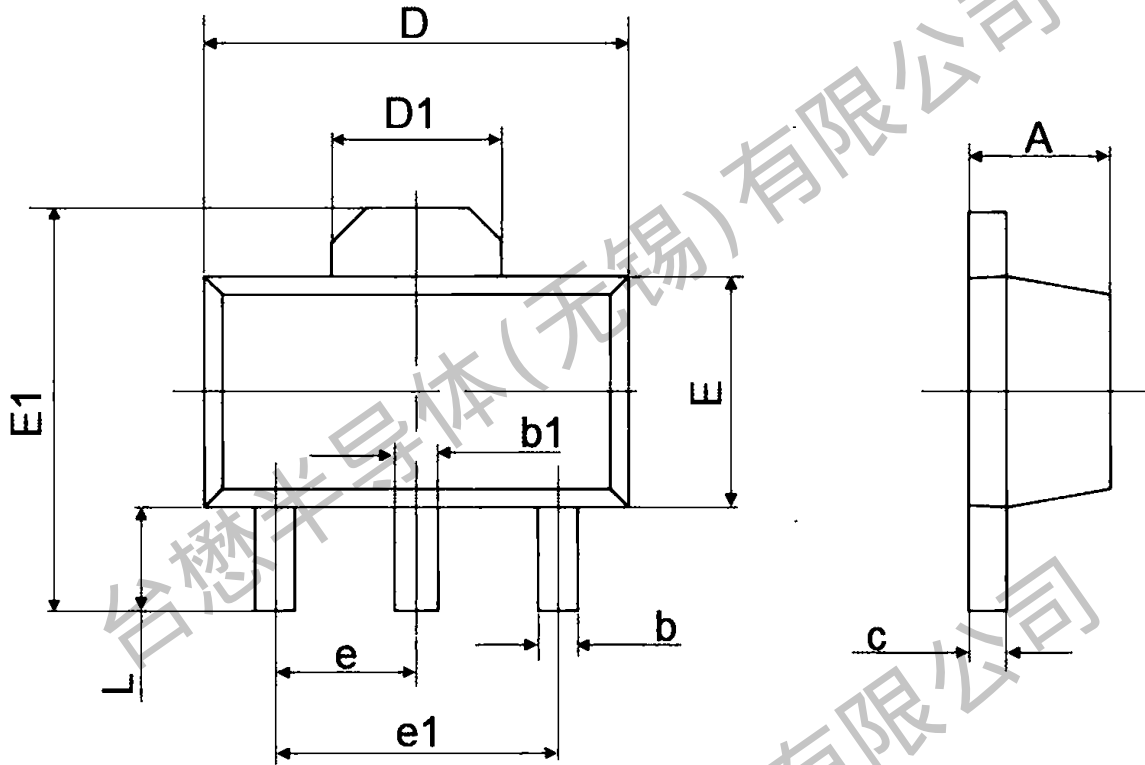
Figure 11 Normalized Maximum Transient Thermal Impedance



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Package Mechanical Data:SOT-89-3L

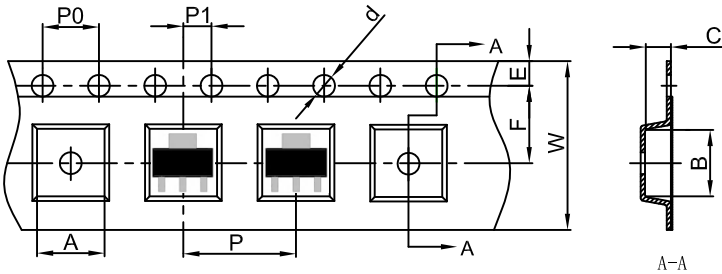


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060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

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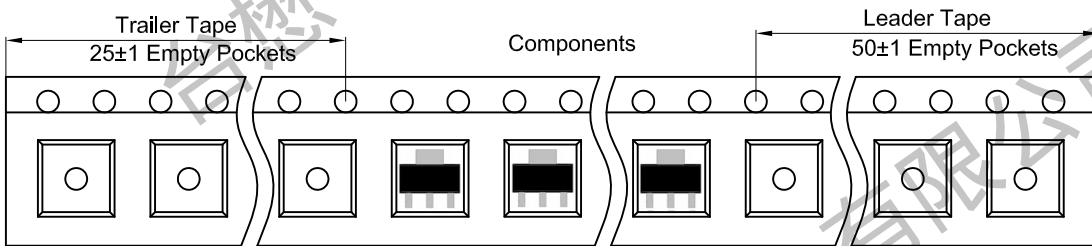
SOT-89-3L Embossed Carrier Tape



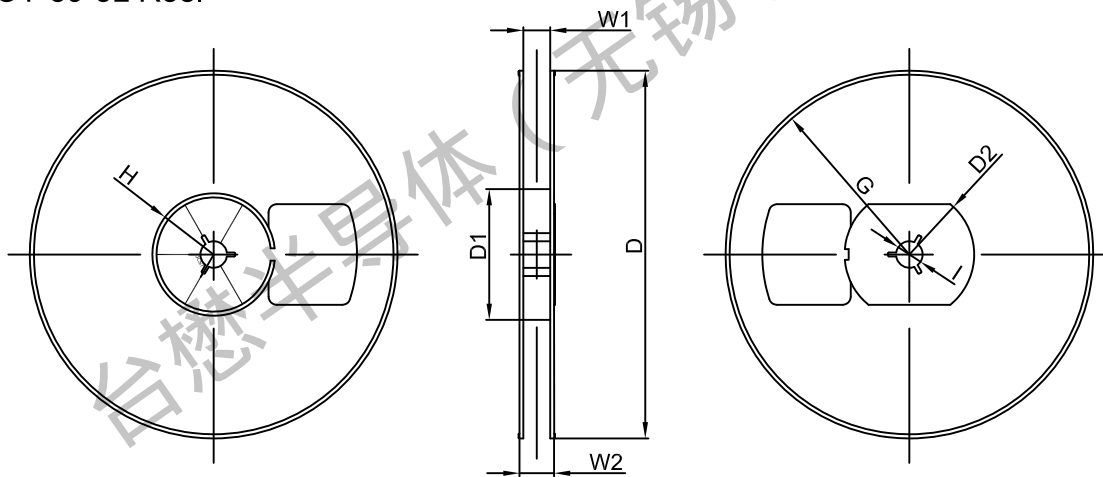
Packaging Description:
SOT-89-3L parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. 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	205x195x220	40,000 pcs	430x415x240	



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Revision history:

Date	Rev	Description	Page
2023.10.19	23.10	Original	