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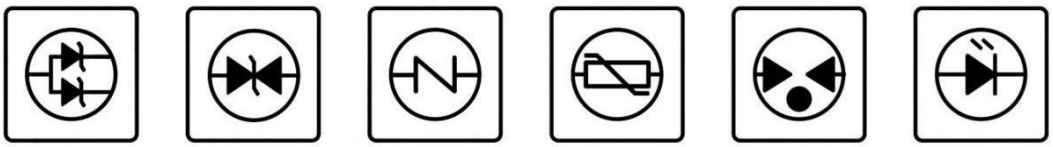
SEMICONDUCTOR



MSCEP023N10LL

Product specification

General Description

These N-Channel enhancement mode power field effect transistors are using trench SGT echnology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

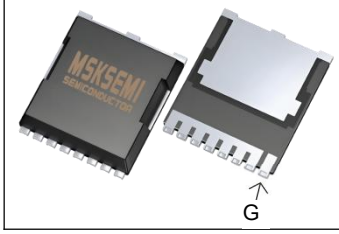
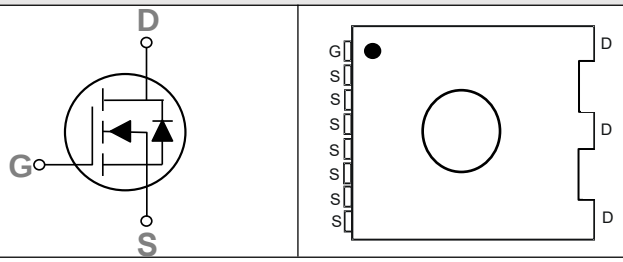
Features

- 100V,RDS(ON) =1.9mΩ @VGS = 10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

Application

- Networking
- Load Switch
- LED applications
- Quick Charger

Reference News

TOLL-8	Pin Configuration	Marking
		

Absolute Maximum Ratings T_C=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current - Continuous (T_C=25℃)	300	A
	Drain Current - Continuous (T_C=100℃)	160	A
I_{DM}	Drain Current - Pulsed[1]	1020	A
EAS	Single Pulse Avalanche Energy[2]	582	mJ
P_D	Power Dissipation (T_C=25℃)	55	W
	Power Dissipation - Derate above 25℃	350	W/℃
T_{STG}	Storage Temperature Range	2.38	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	0.42	℃/W

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Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	100	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=100V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=80V , V_{GS}=0V , T_J=75℃	---	---	10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance[3]	V_{GS}=10V , I_D=20A	---	1.9	2.6	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	2	3.0	4	V
gfs	Forward Transconductance	V_{DS}=10V , I_D=3A	---	21	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[3,4]	V_{DS}=50V , V_{GS}=10V , I_D=80A	---	122	---	nC
Q_{gs}	Gate-Source Charge[3,4]		---	27	---	
Q_{gd}	Gate-Drain Charge[3,4]		---	33	---	
$T_{d(on)}$	Turn-On Delay Time[3,4]	V_{DD}=50V , V_{GS}=10V , R_G=6Ω I_D=80A	---	20	---	ns
T_r	Rise Time[3,4]		---	32	---	
$T_{d(off)}$	Turn-Off Delay Time[3,4]		---	98	---	
T_f	Fall Time[3,4]		---	32	---	
C_{iss}	Input Capacitance	V_{DS}=50V , V_{GS}=0V , F=1MHz	---	9100	---	pF
C_{oss}	Output Capacitance		---	1500	---	
C_{rss}	Reverse Transfer Capacitance		---	40	---	
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz	---	2	---	Ω

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	300	A
I_{SM}	Pulsed Source Current		---	---	600	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V
t_{rr}	Reverse Recovery Time	V_R=100V, I_S=10A di/dt=100A/μs , T_J=25℃	---	105	---	ns
Q_{rr}	Reverse Recovery Charge		---	210	---	nC

Note :
1.Repetitive Rating : Pulsed width limited by maximum junction temperature.
2.V_{DD}=50V,V_{GS}=10V,L=0.1mH,I_{AS}=138A.,R_G=25Ω,Starting T_J=25℃.
3.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
4.Essentially independent of operating temperature.

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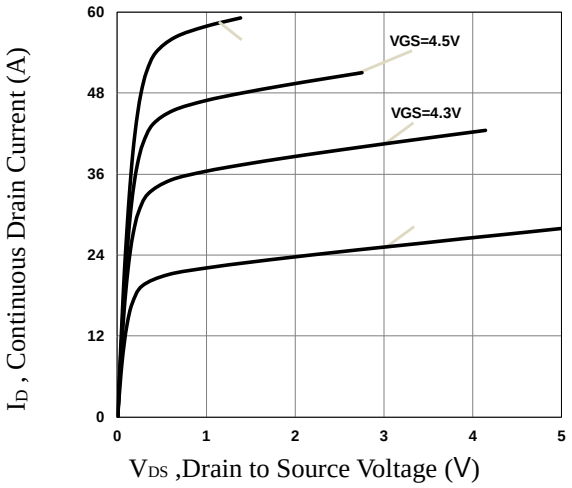

Fig.1 Typical Output Characteristics

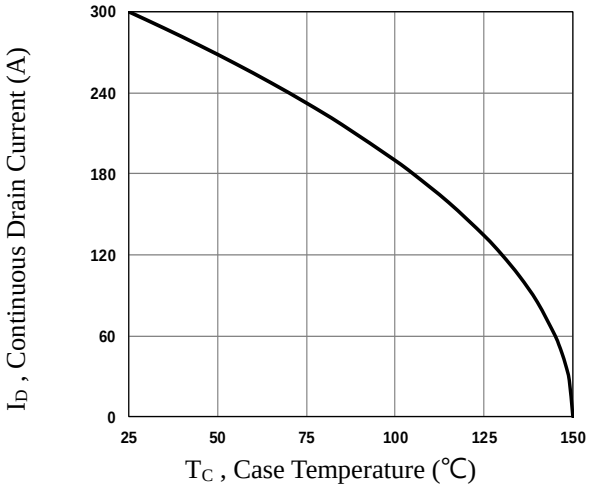

Fig.2 Continuous Drain Current vs. T_C

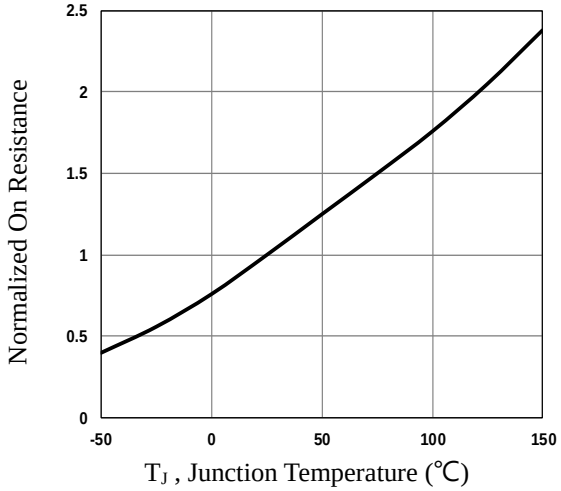

Fig.3 Normalized RDSON vs. T_J

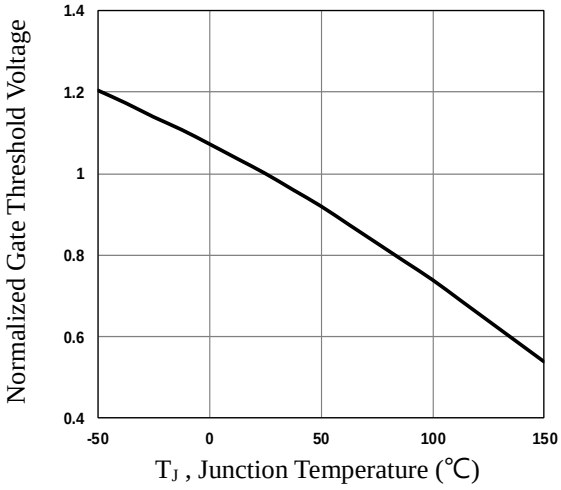

Fig.4 Normalized V_{th} vs. T_J

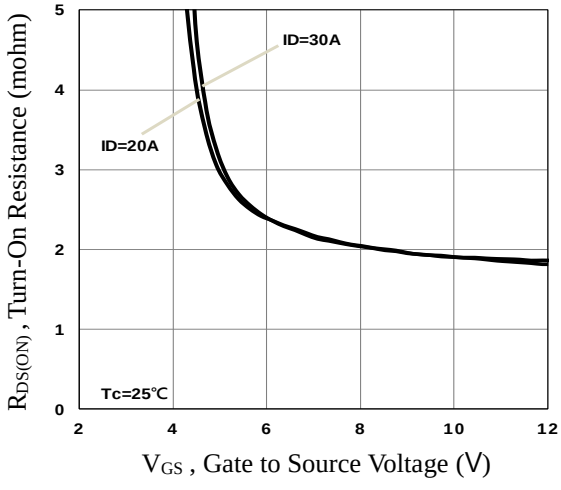

Fig.5 Turn-On Resistance vs. V_{GS}

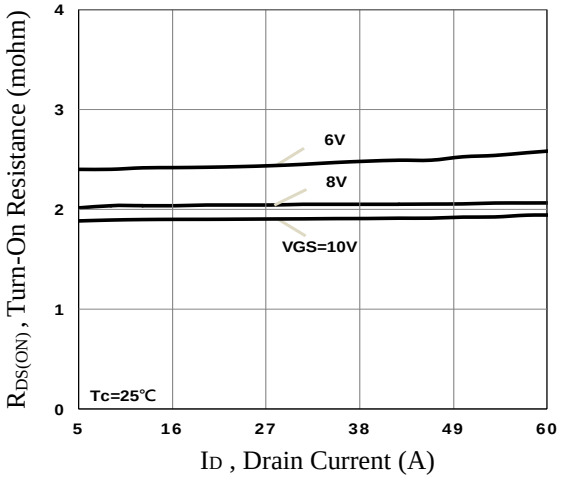

Fig.6 Turn-On Resistance vs. I_D

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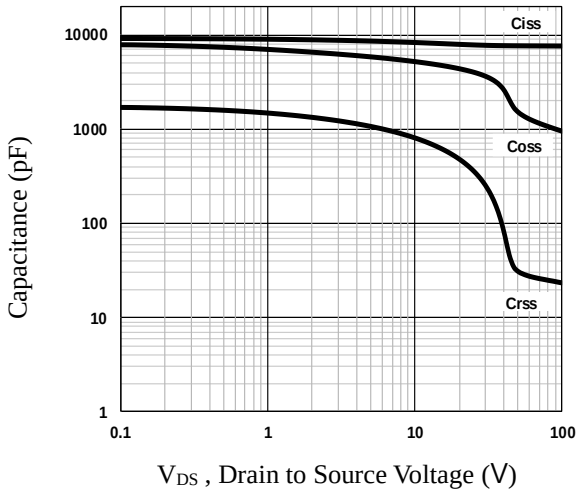

Fig.7 Capacitance Characteristics

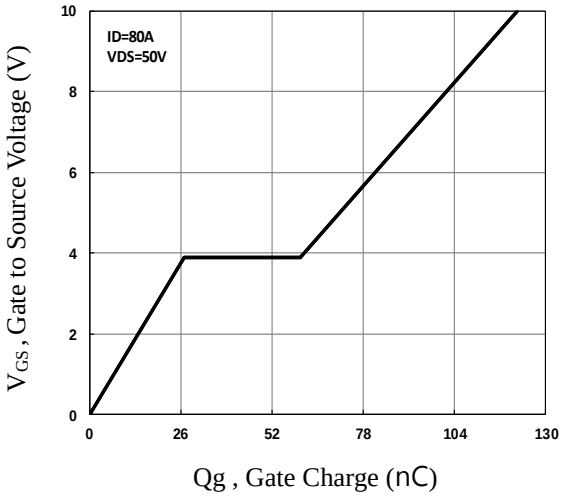

Fig.8 Gate Charge Characteristics

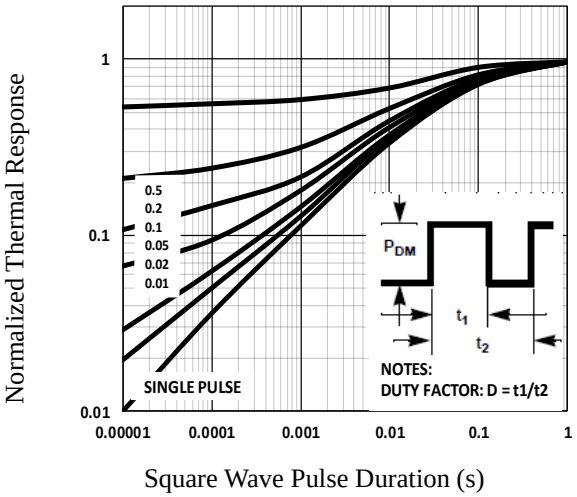

Fig.9 Normalized Transient Impedance

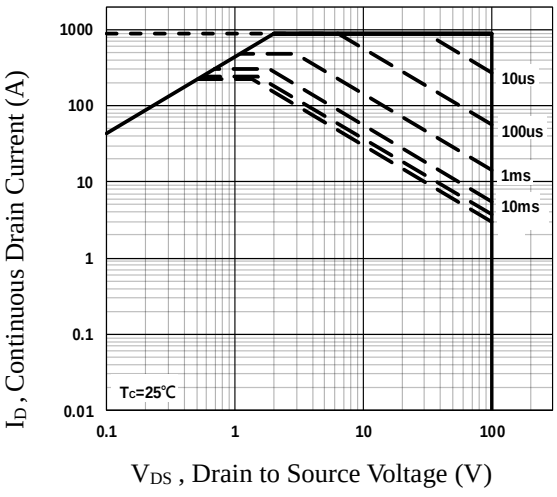

Fig.10 Maximum Safe Operation Area

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$

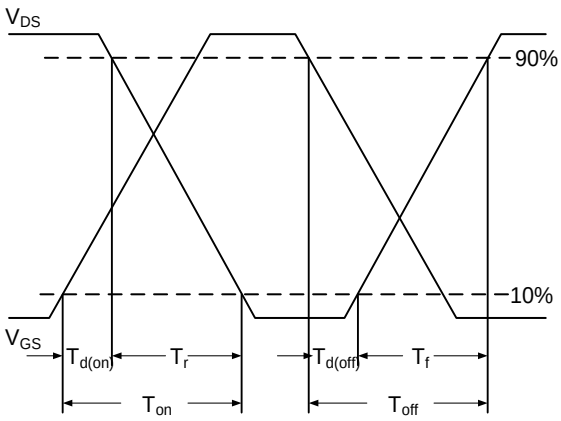

Fig.11 Switching Time Waveform

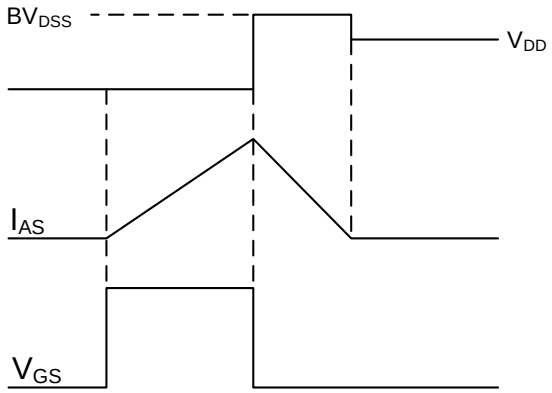

Fig.12 EAS Waveform

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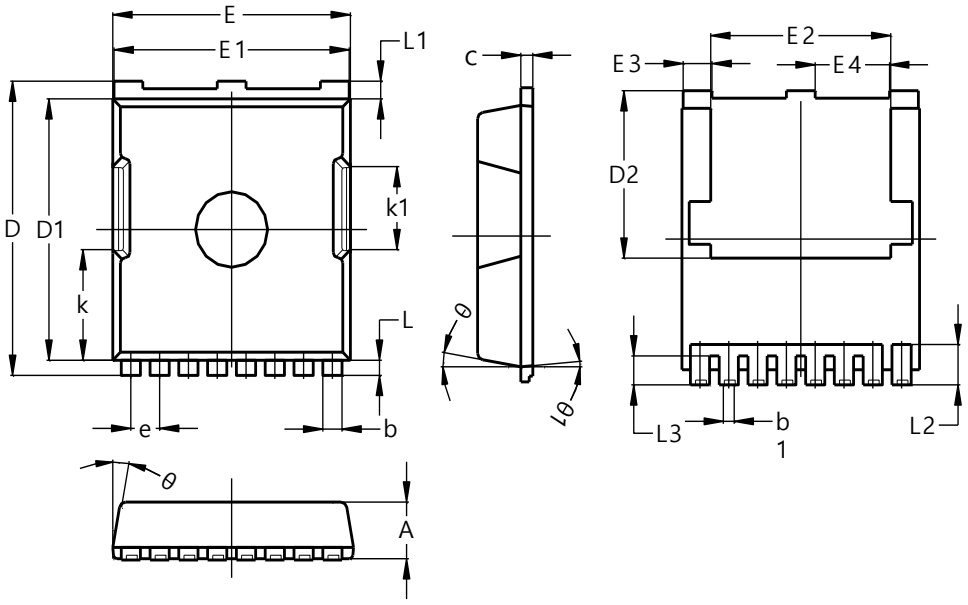
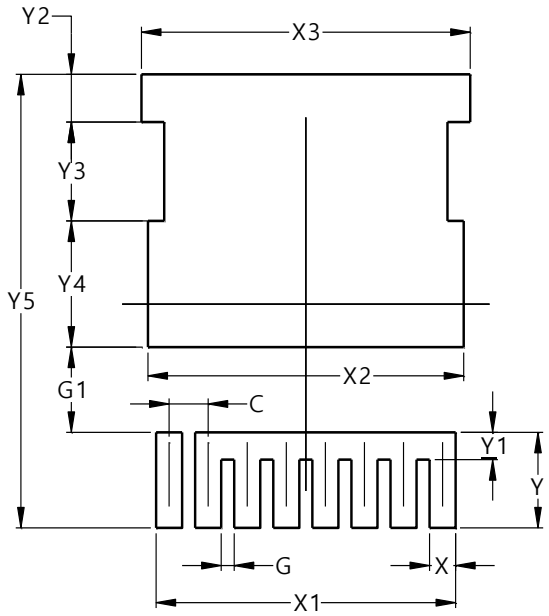


TOLL-8			
Dim	Min	Max	Typ
A	2.20	2.40	2.30
b	0.70	0.90	0.80
b1	0.42	0.50	0.45
c	0.40	0.60	0.50
D	11.48	11.88	11.68
D1	10.23	10.53	10.38
D2	6.45	6.85	6.65
E	9.70	10.10	9.90
E1	9.70	9.90	9.80
E2	7.00	8.00	7.50
E3	1.10	1.30	1.20
E4	3.00	3.20	3.10
e	1.20 BSC		
k	4.39 REF		
k1	3.30 REF		
L	0.50	0.70	0.60
L1	0.50	0.90	0.70
L2	1.40	1.80	1.60
L3	1.00	1.30	1.15
θ	0°	15°	10°
θ1	0°	10°	5°
All Dimensions in mm			

Suggested PadLayout

TOLL-8



Dimensions	Value (in mm)
C	1.200
G	0.400
G1	2.500
X	0.800
X1	9.200
X2	9.700
X3	10.100
Y	2.800
Y1	0.800
Y2	1.400
Y3	2.900
Y4	3.700
Y5	13.300

REELSPECIFICATION

P/N	PKG	QTY
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