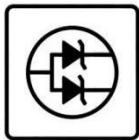


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SEMICONDUCTOR



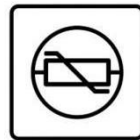
ESD



TVS



TSS



MOV



GDT



PLED

MS50N03

Product specification

General Features

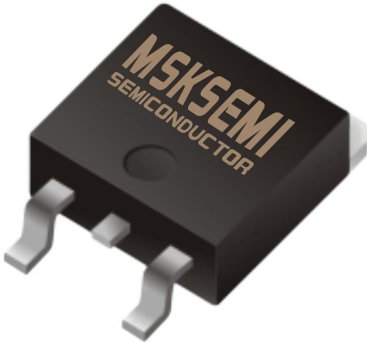
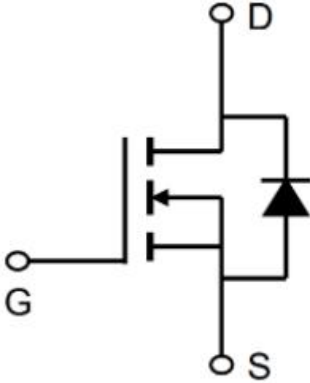

- 30V,50A, RDS(ON) =9mΩ@ VGS = 10V
- Improved dv/dt capability
- Fast switching
- Green Device Available

Application

- MB / VGA / Vcore
- POL Applications
- SMPS 2nd SR

BVDSS	RDSON	ID
30V	7mΩ	50A

Reference News

PACKAGE OUTLINE	Pin Configuration	Marking
		
TO-252	N-Channel MOSFET	

Absolute Maximum Ratings $T_A=25^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain- Source Voltage	30	V
V_{GS}	Gate- Source Voltage	± 20	V
I_D	Drain Current – Continuous ($T_C=25^{\circ}\text{C}$)	50	A
	Drain Current – Continuous ($T_C=100^{\circ}\text{C}$)	30	A
I_{DM}	Drain Current – Pulsed ¹	200	A
P_D	Power Dissipation ($T_C=25^{\circ}\text{C}$)	30	W
	Power Dissipation – Derate above 25°C	0.32	W/ $^{\circ}\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	-	62	$^{\circ}\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	-	3.1	$^{\circ}\text{C}/\text{W}$

Static State Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain- Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25 °C, $I_D=1mA$	-	0.04	-	V/°C
I_{DSS}	Drain- Source Leakage Current	$V_{DS}=30V, V_{GS}=0V, T_J=25^\circ C$	-	-	1	μA
		$V_{DS}=24V, V_{GS}=0V, T_J=125^\circ C$	-	-	10	μA
I_{GSS}	Gate- Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	μA
$R_{DS(ON)}$	Static Drain- Source On-Resistance ³	$V_{GS}=10V, I_D=16A$	-	7.0	10	m Ω
		$V_{GS}=4.5V, I_D=8A$	-	9.0	18	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1	1.5	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		-	-4	-	mV/°C

Dynamic Characteristics

Q_g	Total Gate Charge ^{3, 4}	$V_{DS}=15V, V_{GS}=4.5V, I_D=20A$	-	7.5	-	°C
Q_{gs}	Gate- Source Charge ^{3, 4}		-	1.3	-	
Q_{gd}	Gate- Drain Charge ^{3, 4}		-	4.5	-	
$T_{d(on)}$	Turn-On Delay Time ^{3, 4}	$V_{DD}=15V, V_{GS}=10V, R_G=3.3\Omega, I_D=15A$	-	4.8	-	ns
T_r	Rise Time ^{3, 4}		-	12.5	-	
$T_{d(off)}$	Turn-Off Delay Time ^{3, 4}		-	27.6	-	
T_f	Fall Time ^{3, 4}		-	8.2	-	
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, F=1MHz$	-	1100	-	pF
C_{oss}	Output Capacitance		-	150	-	
C_{rss}	Reverse Transfer Capacitance		-	110	-	
R_g	Gate resistance		$V_{GS}=0V, V_{DS}=0V, F=1MHz$	-	2.7	

Guaranteed Avalanche Energy

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy	$V_{DD}=25V, L=0.1mH, I_{AS}=15A$	12	-	-	mJ

Drain-Source Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V, \text{ Force Current}$	-	-	50	A
I_{SM}	Pulsed Source Current ³		-	-	200	A
V_{SD}	Diode Forward Voltage ³	$V_{GS}=0V, I_S=1A, T_J=25^\circ C$	-	-	1.2	V

Typical Performance Characteristics

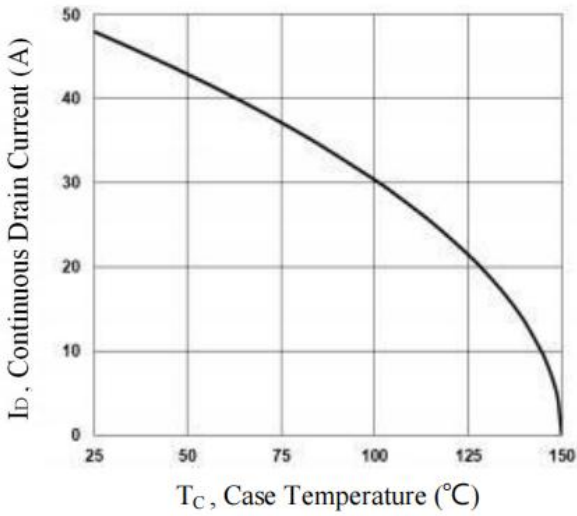


Fig. 1 Continuous Drain Current vs. T_c

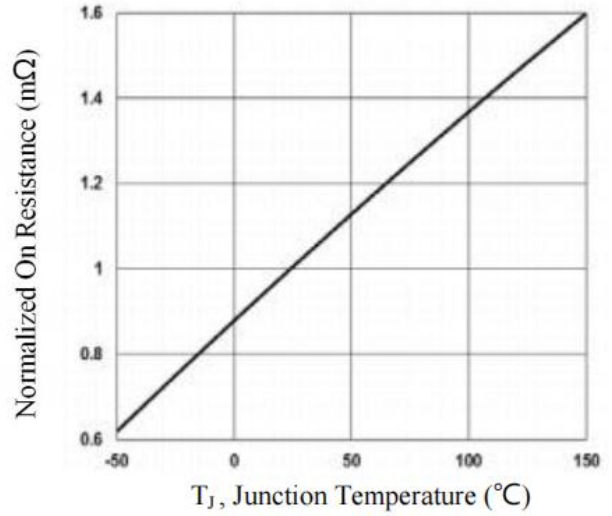


Fig. 2 Normalized $R_{DS(on)}$ vs. T_j

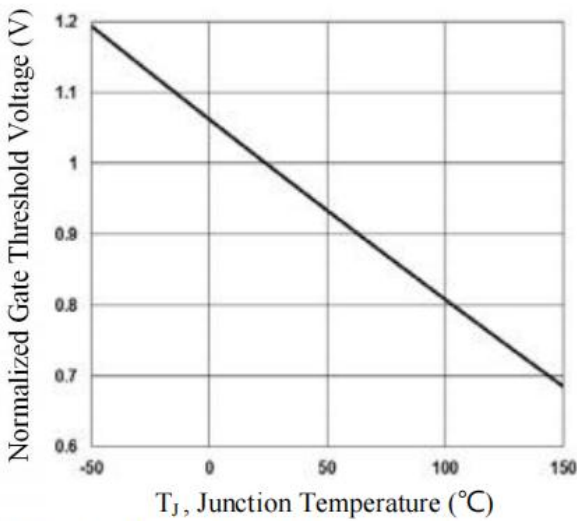


Fig. 3 Normalized V_{th} vs. T_j

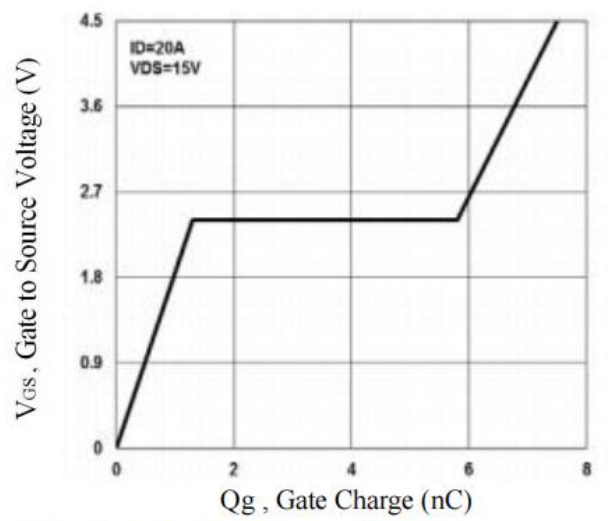


Fig. 4 Gate Charge Waveform

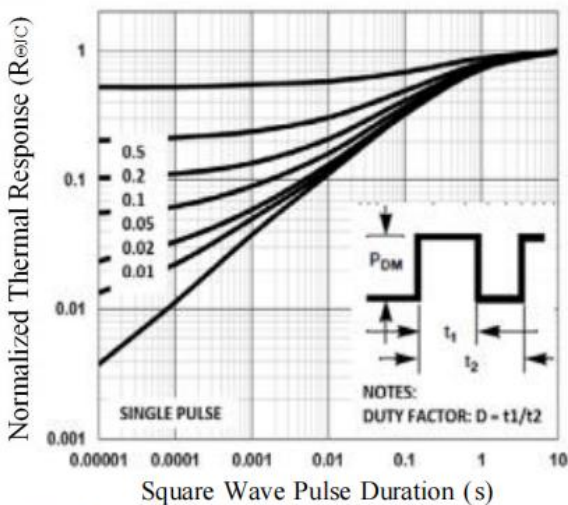


Fig. 5 Normalized Transient Impedance

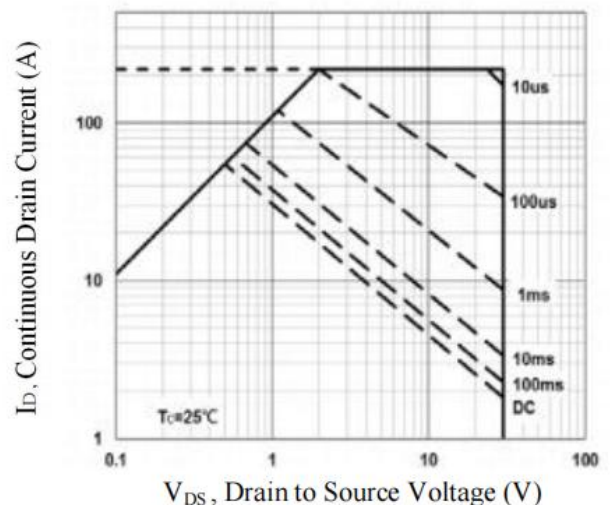


Fig. 6 Maximum Safe Operation Area

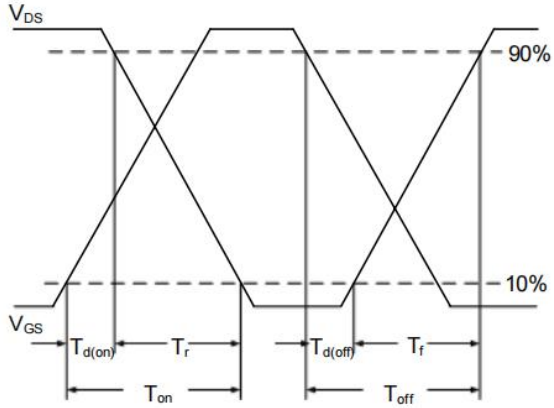
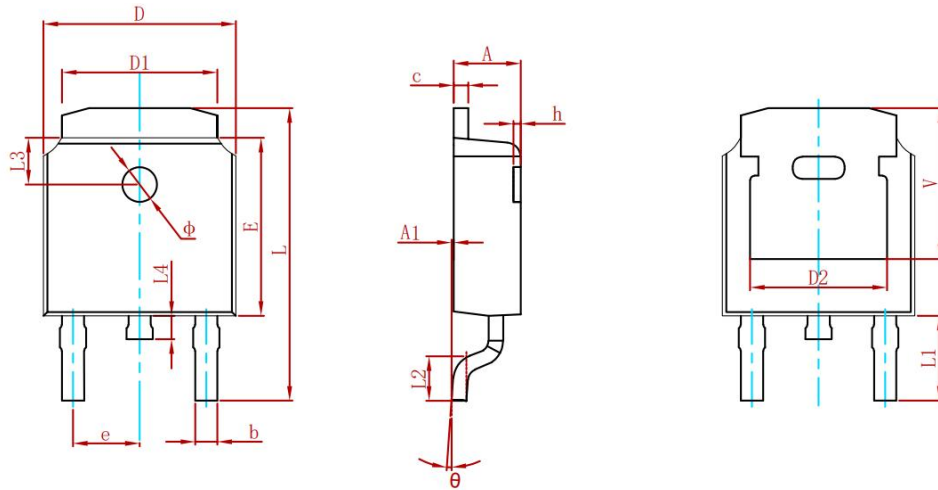


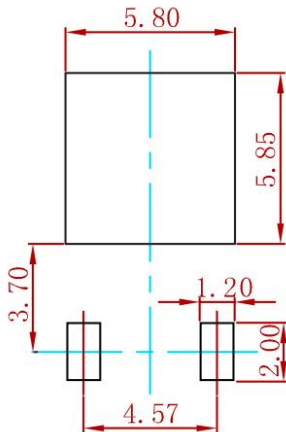
Fig. 7 Switching Time Waveform

PACKAGE MECHANICAL DATA



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	

Suggested Pad Layout



Note:

1. Controlling dimension: in millimeters.
2. General tolerance: ±0.05mm.
3. The pad layout is for reference purposes only

REEL SPECIFICATION

P/N	PKG	QTY
MS50N03	TO-252	2500

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