MSD60N50

N-Channel 60-V (D-S) MOSFET

Description

The device uses advanced Trench technology and designs to provide excellent RDS(ON) with low gate charge. This device is suitable for use in PWM, load switching and general purpose applications.

The device meets the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

Features

- RDS(ON) =12mΩ @ VGS =10V
- Low Miller Charge
- Low Input Capacitance
- 100% EAS Guaranteed
- Green Device Available

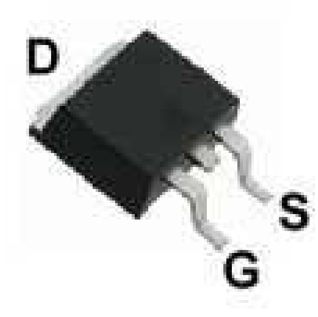
Typical Applications

- Motor Drive
- Power Tools
- LED Lighting

Package type：TO-252

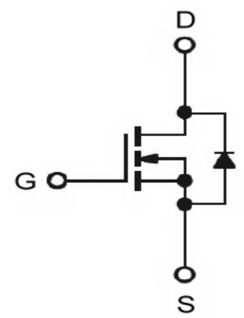
Packing & Order Information

2,500/Reel

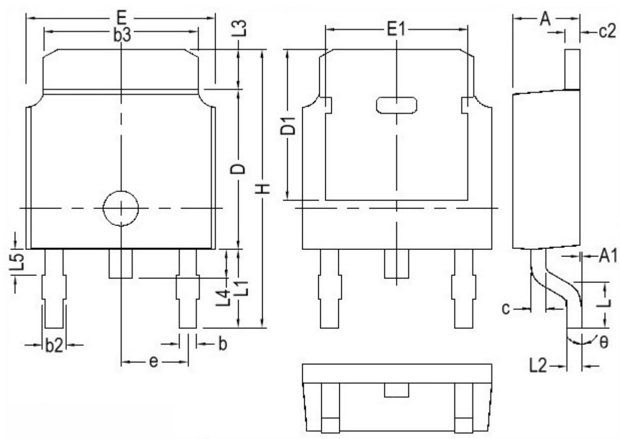


RoHS Compliant

Graphic Symbol

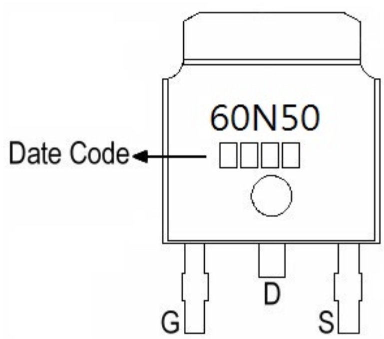


Package Dimension



REF.	Millimeter			REF.	Millimeter		
	Min.	Nom.	Max.		Min.	Nom.	Max.
A	2.20	2.30	2.38	E1	4.40	-	-
A1	0	-	0.127	e	2.286 BSC		
b	0.64	0.76	0.88	H	9.40	10.00	10.40
b2	0.77	0.84	1.14	L	1.40	1.52	1.77
b3	5.21	5.34	5.46	L1	2.743 Ref.		
c	0.45	0.50	0.60	L2	0.508 BSC		
c2	0.45	0.50	0.58	L3	0.89	-	1.27
D	6.00	6.10	6.223	L4	0.64	-	1.01
D1	5.21	-	-	L5	-	-	-
E	6.40	6.60	6.731	θ	0°	-	10°

Marking



Brückewell

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MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Current[1] (T_C =25°C)	50	A
	Continuous Drain Current[1] (T_C =100°C)	32	A
I_{DM}	Pulsed Drain Current[1,2]	100	A
I_{AS}	Single Pulse Avalanche Current, L =0.1mH[3]	38	A
E_{AS}	Single Pulse Avalanche Energy, L =0.1mH[3]	72	mJ
P_D	Power Dissipation[4] (T_C =25°C)	52	W
T_J/T_{STG}	Operating Junction and Storage Temperature	-55 to +150	°C

Thermal Resistance Ratings

Symbol	Parameter	Maximum	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient[1]	62	°C/W
$R_{\theta JC}$	Maximum Junction-to-Case[1]	2.4	°C/W

Electrical Characteristics (T_J=25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$V_{GS\,(th)}$	Gate Threshold Voltage	V_{DS} =V_{GS}, I_D =250μA	1.0	1.7	2.5	V
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} =0V, I_D =250μA	60	-	-	V
g_{fs}	Forward Transconductance	V_{DS} =5V, I_D =30A	-	42	-	S
I_{GSS}	Gate-Source Leakage Current	V_{DS} =0V, V_{GS} =±20V	-	-	±100	nA
I_{DSS}	Drain-Source Leakage Current	V_{DS} =48V, V_{GS} =0V, T_J =25°C V_{DS} =48V, V_{GS} =0V, T_J =125°C	-	-	1 10	μA
$R_{DS\,(on)}$	Static Drain-Source On-Resistance[2]	V_{GS} =10V, I_D =30A V_{GS} =4.5V, I_D =15A	- -	10.5 12	12 15	mΩ
EAS	Single Pulse Avalanche Energy[5]	V_{DD} =25V, L =0.1mH, I_{AS} =26A	33.8	-	-	mJ
V_{SD}	Diode Forward Voltage[2]	I_S =30A, V_{GS} =0V, T_J =25°C	-	-	1.2	V
I_S	Continuous Source Current[1,6]	V_G =V_D =0V, Force Current	-	-	50	A
I_{SM}	Pulsed Source Current[2,6]		-	-	100	

Notes

1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
3. The EAS data shows maximum rating. The test condition is V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=38A.
4. The power dissipation is limited by 150℃ junction temperature.
5. The Min. value is 100% EAS tested guarantee.
6. The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

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Dynamic						
Symbol	**Parameter**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Units**
Q_g	Total Gate Charge[2]	V_{DS} =48V I_D =15A V_{GS} =4.5V	--	28.7	--	nC
Q_{gs}	Gate-Source Charge		--	10.5	--	
Q_{gd}	Gate-Drain Charge		--	9.9	--	
$t_{d(on)}$	Turn-On Delay Time[2]	V_{DS} =30V I_D =15A V_{GS} =10V R_G =3.3Ω	--	10.4	--	ns
t_r	Rise Time		--	9.2	--	
$t_{d(off)}$	Turn-Off Delay Time		--	63	--	
t_f	Fall Time		--	4.8	--	
C_{ISS}	Input Capacitance	V_{DS} =15V V_{GS} =0V f =1.0MHz	--	3240	--	pF
C_{OSS}	Output Capacitance		--	210	--	
C_{RSS}	Reverse Transfer Capacitance		--	146	--	
Rg	Gate Resistance	V_{GS} =V_{DS} =0V, f =1.0MHz	--	1.6	3.2	Ω

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- **Typical Electrical Characteristics**

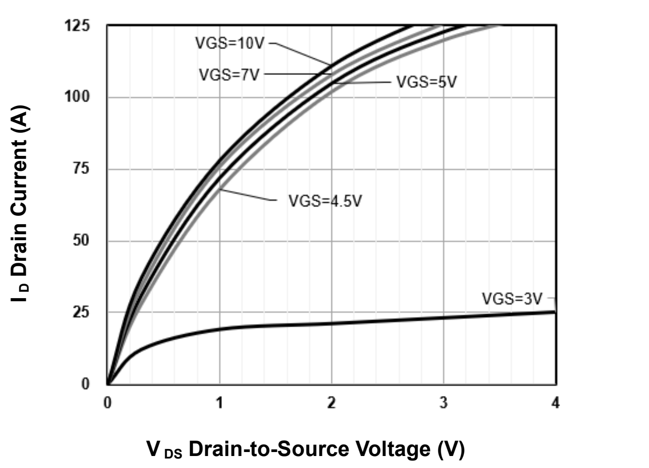

FIG.1-Output Characteristics T_J=25°C

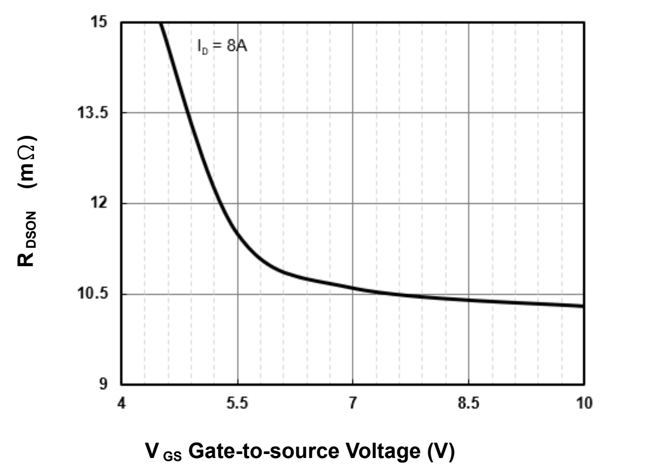

FIG.2-On-Resistance vs. G-S Voltage

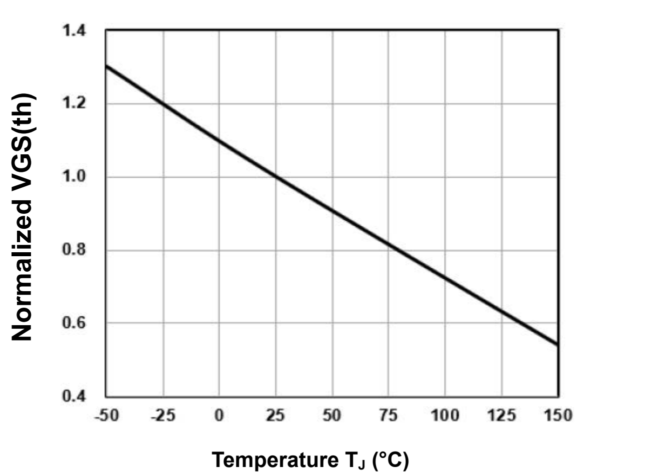

FIG.3- Normalized VGS(th) vs. TJ

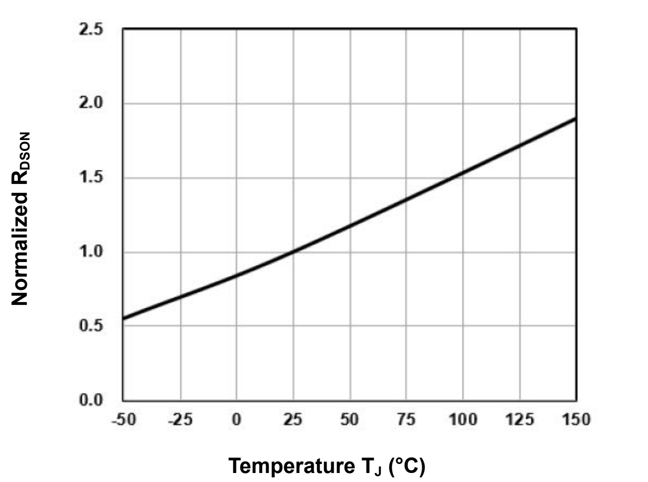

FIG.4-Normalized R_{DSON} vs. Temperature T_J

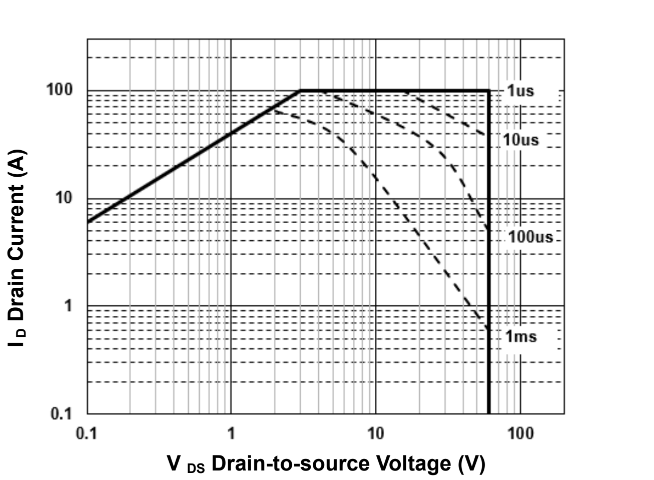

FIG.5- Safe Operating Area

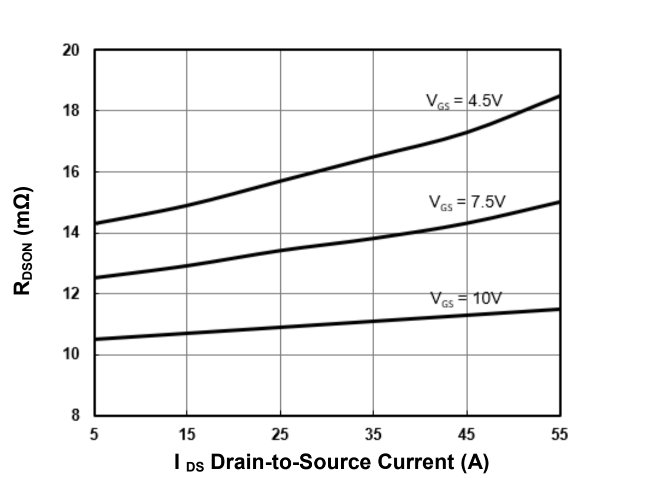

FIG.6- On-Resistance vs Drain-to-Source Current

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- **Typical Electrical Characteristics**

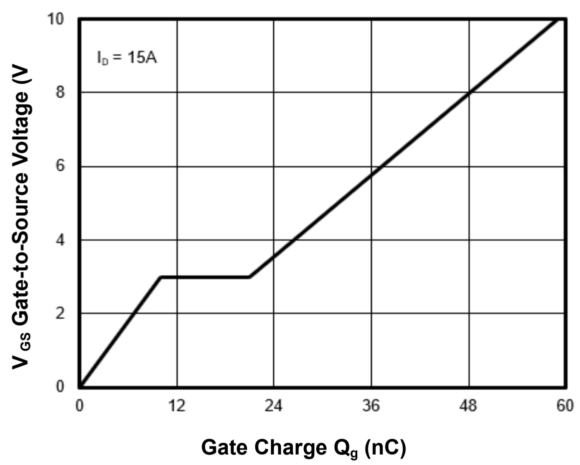

FIG.7- Gate Charge Characteristics

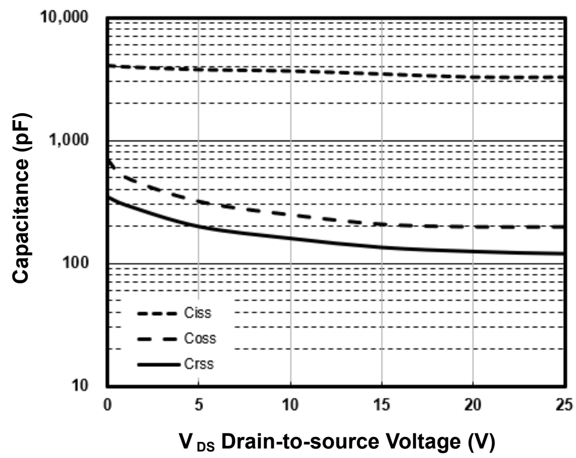

FIG.8-Capacitance Characteristics

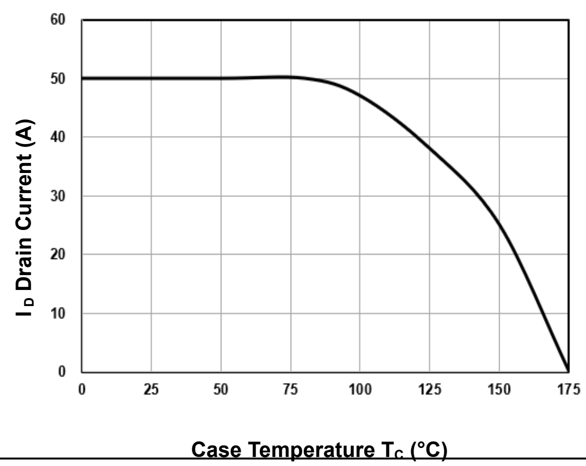

FIG.9- Drain Current vs. Tc Case Temperature

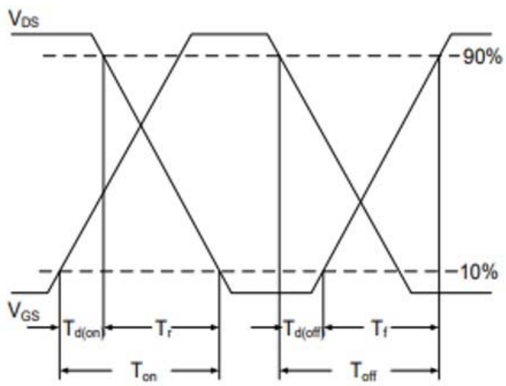

FIG.10- Switching Time Waveform

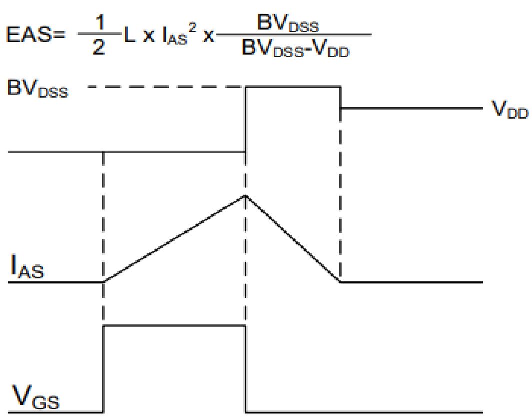

FIG.11-Unclamped Inductive Switching Waveform

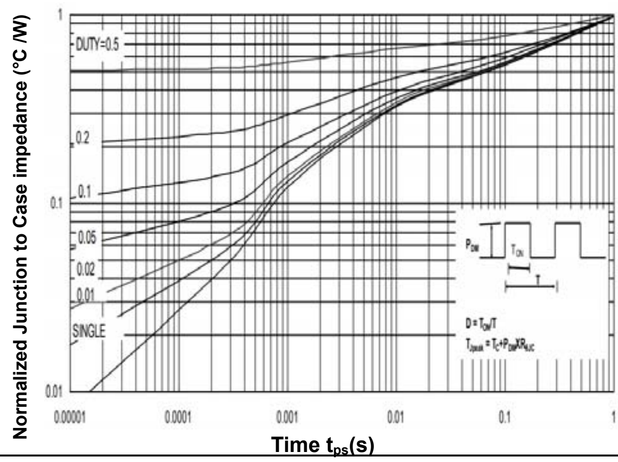

FIG.12- Transient Thermal impedance (Junction to Case)

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