

### ● General Description

The AGM628MD combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ .

This device is ideal for load switch and battery protection applications.

### ● Features

- Advance high cell density Trench technology
- Low  $R_{DS(ON)}$  to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance

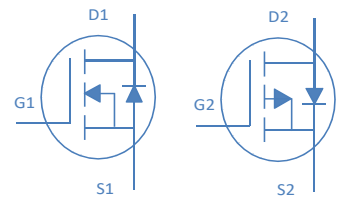
### ● Application

- MB/VGA Vcore
- SMPS 2<sup>nd</sup> Synchronous Rectifier
- POL application
- BLDC Motor driver

### Product Summary

BVDSS	RDSON	ID
60V	27mΩ	30A
-60V	53mΩ	-25A

### TO-254-4 Pin Configuration



### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM628MD	AGM628MD	TO-252-4	--mm	--mm	2500

**Table 1. Absolute Maximum Ratings (TA=25°C)**

Symbol	Parameter	Rating		Units
		N-Ch	P-Ch	
$V_{DS}$	Drain-Source Voltage ( $V_{GS}=0V$ )	60	-60	V
$V_{GS}$	Gate-Source Voltage ( $V_{DS}=0V$ )	±20	±20	V
$I_D$	Drain Current-Continuous( $T_c=25^\circ C$ ) (Note 1)	30	-25	A
	Drain Current-Continuous( $T_c=100^\circ C$ )	16	-12	A
IDM (pluse)	Drain Current-Continuous@ Current-Pulsed (Note 2)	40	-40	A
$P_D$	Total Power Dissipation( $T_c=25^\circ C$ )	35	35	W
	Total Power Dissipation( $T_c=100^\circ C$ )	13.8	13.8	W
EAS	Avalanche energy (Note 3)	44	53	mJ
TJ,TSTG	Operating Junction and Storage Temperature Range	-55 To 150	-55 To 150	°C

**Table 2. Thermal Characteristic**

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient (Steady State) <sup>1</sup>	---	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	3.6	°C/W

**Table 3. N- Channel Electrical Characteristics (TA=25°C unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>On/Off States</b>						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=250μA	60	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=60V, VGS=0V	--	--	1	μA
IGSS	Gate-Body Leakage Current	VGS=±20V, VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS, ID=250μA	1.0	1.8	2.5	V
gFS	Forward Transconductance	VDS=5V, ID=6A	--	35	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=6A	--	27	34	mΩ
		VGS=4.5V, ID=5A	--	36	50	mΩ
<b>Dynamic Characteristics</b>						
Ciss	Input Capacitance	VDS=30V, VGS=0V, F=1MHZ	--	916	--	pF
Coss	Output Capacitance		--	42	--	pF
Crss	Reverse Transfer Capacitance		--	38	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V, f=1.0MHz	--	--	--	Ω
<b>Switching Times</b>						
td(on)	Turn-on Delay Time	VGS=10V, VDS=30V, RL=2.5Ω, RGEN=3Ω	--	4.5	--	nS
tr	Turn-on Rise Time		--	18	--	nS
td(off)	Turn-Off Delay Time		--	14.5	--	nS
tf	Turn-Off Fall Time		--	18	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=30V, ID=3A	--	19	--	nC
Qgs	Gate-Source Charge		--	4.2	--	nC
Qgd	Gate-Drain Charge		--	2.5	--	nC
<b>Source-Drain Diode Characteristics</b>						
ISD	Source-Drain Current(Body Diode)		--	--	30	A
VSD	Forward on Voltage	VGS=0V, IS=2A	--	0.8	1.2	V
trr	Reverse Recovery Time	IF=2A , dI/dt=100A/μs , TJ=25°C	--	--	--	ns
Qrr	Reverse Recovery Charge		--	--	--	nc

Notes 1.The maximum current rating is package limited.

Notes 2.Repetitive Rating: Pulse width limited by maximum junction temperature

Notes 3.EAS condition: TJ=25°C

**Table 3. P-Channel Electrical Characteristics (TA=25°C unless otherwise noted)**

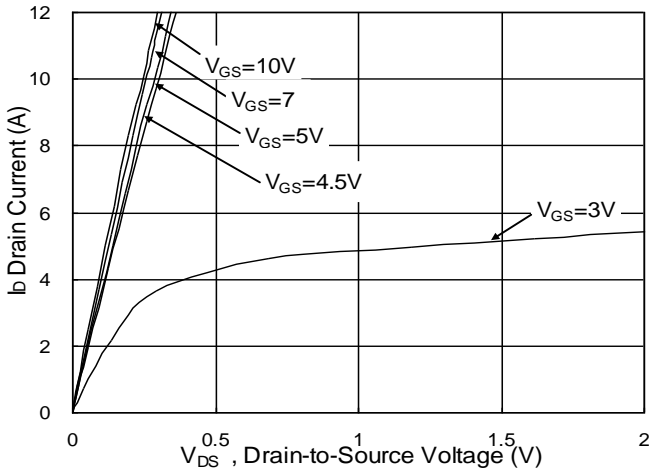
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>On/Off States</b>						
BVDSS	Drain-Source Breakdown Voltage	VGS=0V ID=-250μA	-60	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=-60V,VGS=0V	--	--	-1	μA
IGSS	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS,ID=-250μA	-1.1	-1.7	-2.5	V
gFS	Forward Transconductance	VDS=-10V,ID=-2A	--	32	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=-10V, ID=-15A	--	53	67	mΩ
		VGS=-4.5V, ID=-5A	--	67	88	mΩ
<b>Dynamic Characteristics</b>						
Ciss	Input Capacitance	VDS=-30V,VGS=0V, F=1MHZ	--	1200	--	pF
Coss	Output Capacitance		--	75	--	pF
Crss	Reverse Transfer Capacitance		--	58	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	--	--	Ω
<b>Switching Times</b>						
td(on)	Turn-on Delay Time	VGS=-10V,VDS=-30V, RGEN=3Ω	--	--	--	nS
tr	Turn-on Rise Time		--	--	--	nS
td(off)	Turn-Off Delay Time		--	--	--	nS
tf	Turn-Off Fall Time		--	--	--	nS
Qg	Total Gate Charge	VGS=-10V, VDS=-30V, ID=-3A	--	25	--	nC
Qgs	Gate-Source Charge		--	5.8	--	nC
Qgd	Gate-Drain Charge		--	3.1	--	nC
<b>Source-Drain Diode Characteristics</b>						
ISD	Source-Drain Current(Body Diode)		--	--	-25	A
VSD	Forward on Voltage	VGS=0V,IS=-2A	--	-0.8	-1.2	V
trr	Reverse Recovery Time	IF=-2A , dl/dt=100A/μs , TJ=25°C	--	--	--	ns
Qrr	Reverse Recovery Charge		--	--	--	nc

Notes 1.The maximum current rating is package limited.

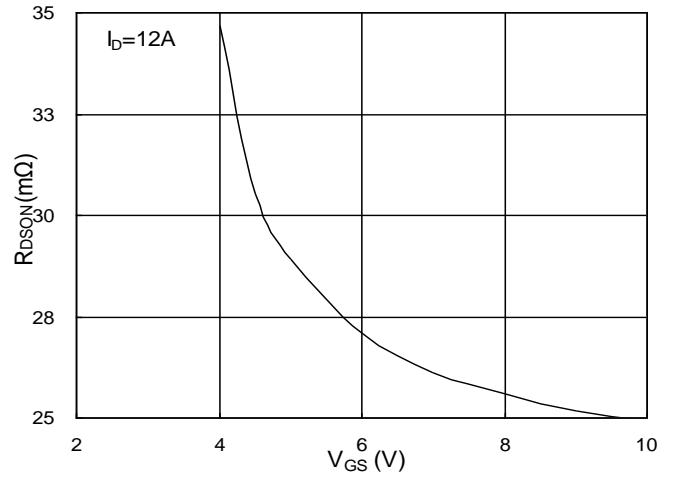
Notes2.Repetitive Rating: Pulse width limited by maximum junction temperature Notes

3.EAS condition: TJ=25°C

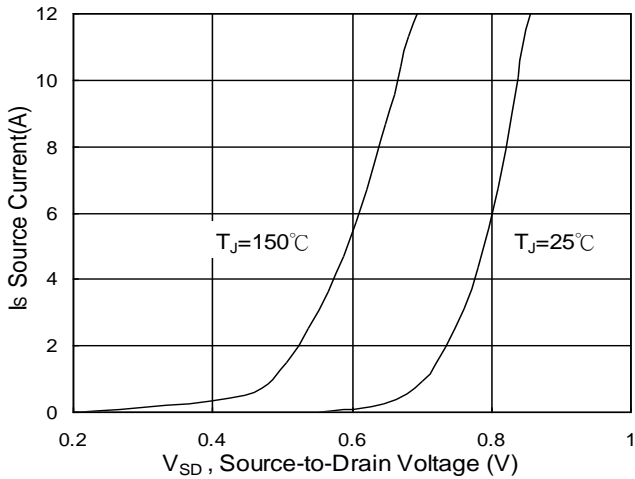
### N-Channel Typical Characteristics



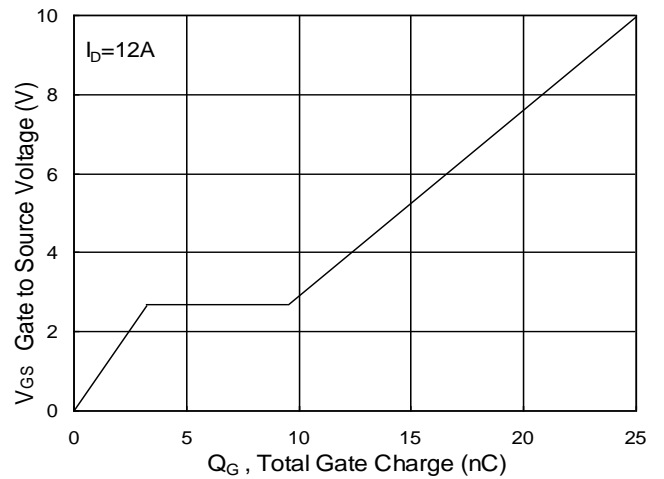
**Fig.1 Typical Output Characteristics**



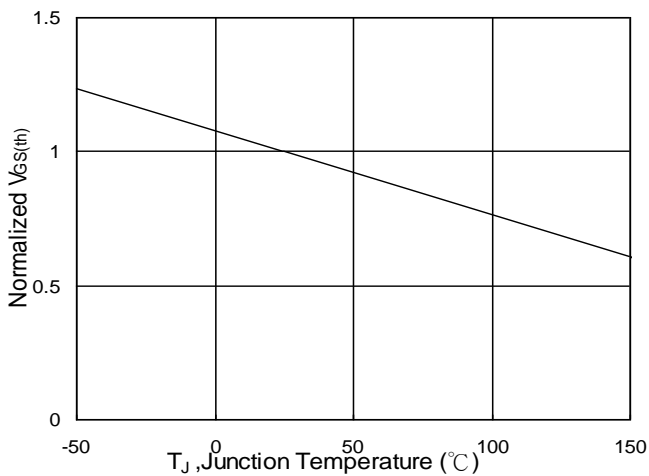
**Fig.2 On-Resistance v.s Gate-Source**



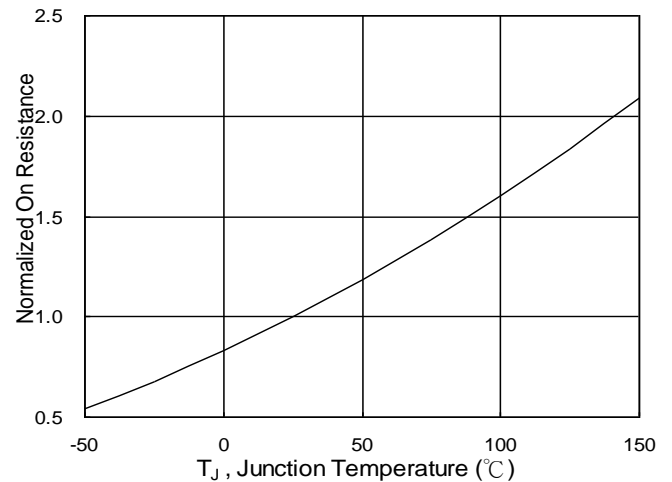
**Fig.3 Forward Characteristics of Reverse**



**Fig.4 Gate-Charge Characteristics**



**Fig.5 Normalized  $V_{GS(th)}$  v.s  $T_J$**



**Fig.6 Normalized  $R_{DS(on)}$  v.s  $T_J$**

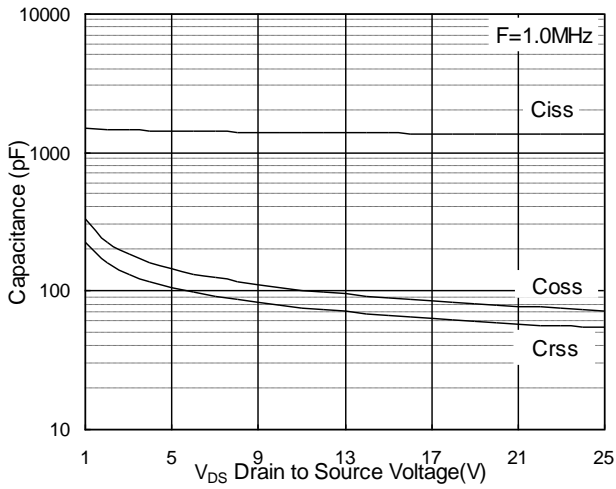


Fig.7 Capacitance

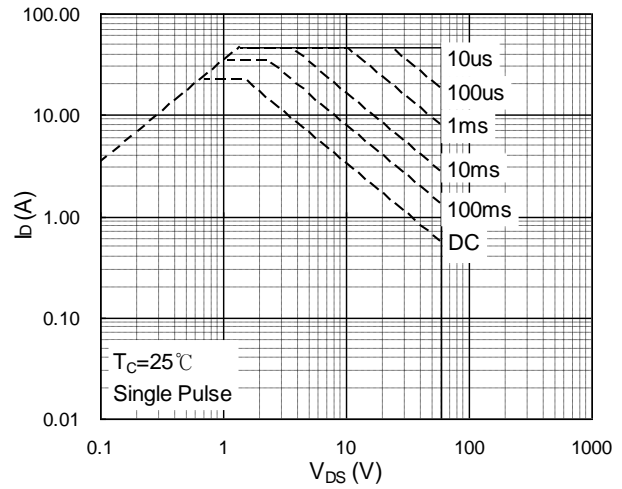


Fig.8 Safe Operating Area

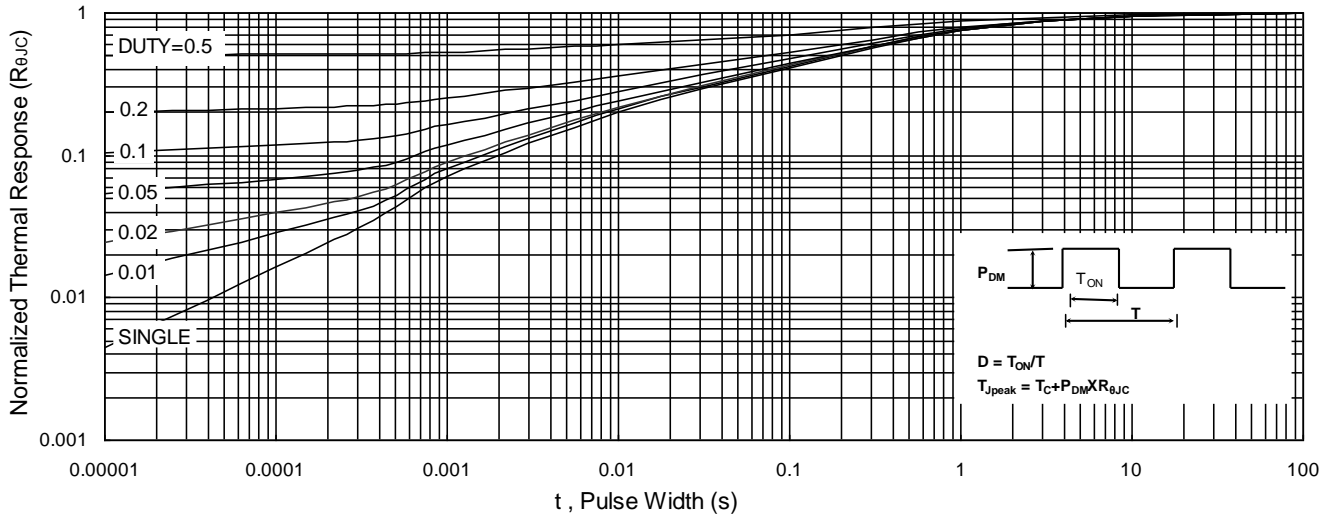


Fig.9 Normalized Maximum Transient Thermal Impedance

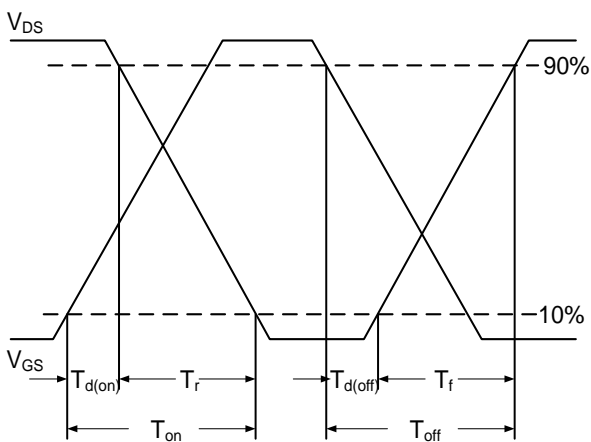


Fig.10 Switching Time Waveform

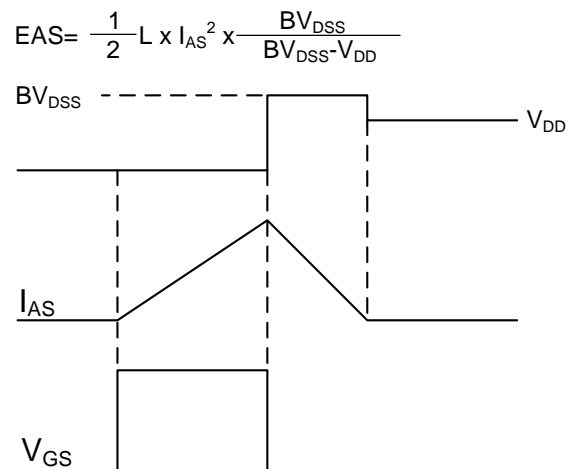


Fig.11 Unclamped Inductive Waveform

### P-Channel Typical Characteristics

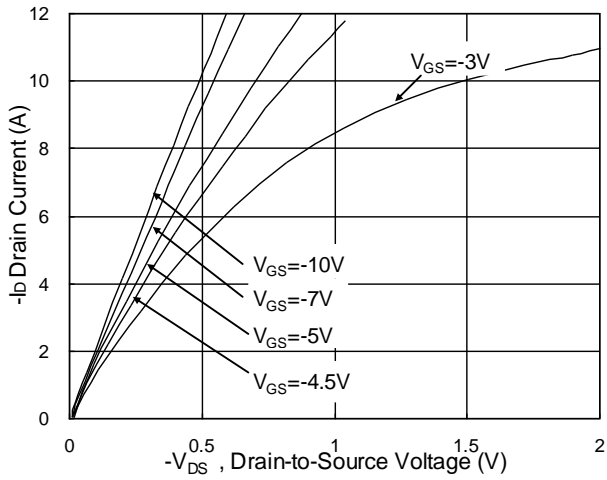


Fig.1 Typical Output Characteristics

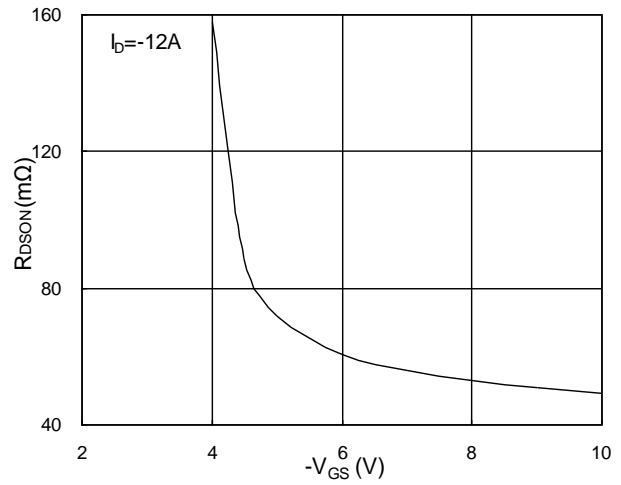


Fig.2 On-Resistance v.s Gate-Source

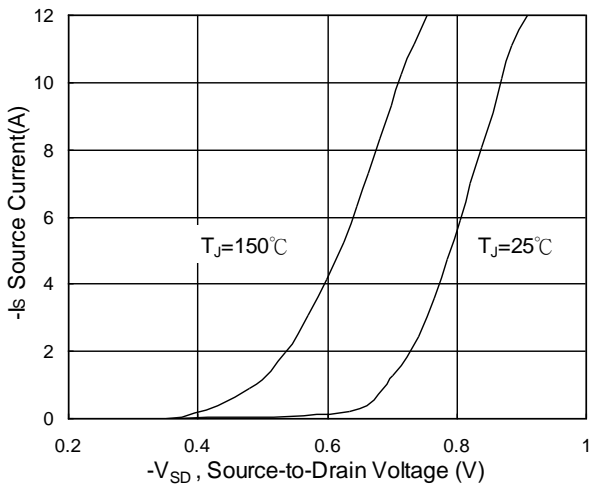


Fig.3 Forward Characteristics of Reverse

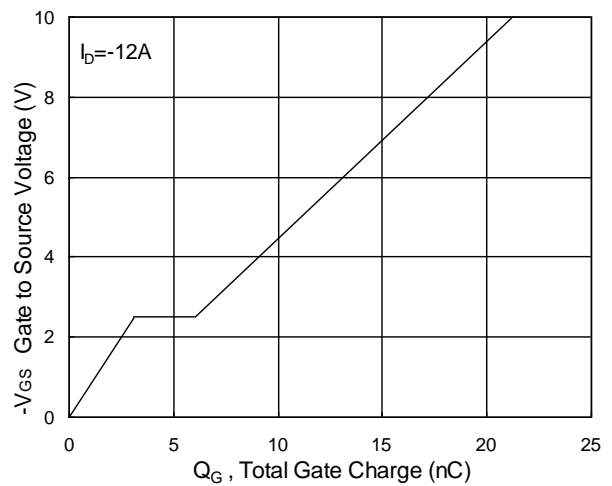


Fig.4 Gate-Charge Characteristics

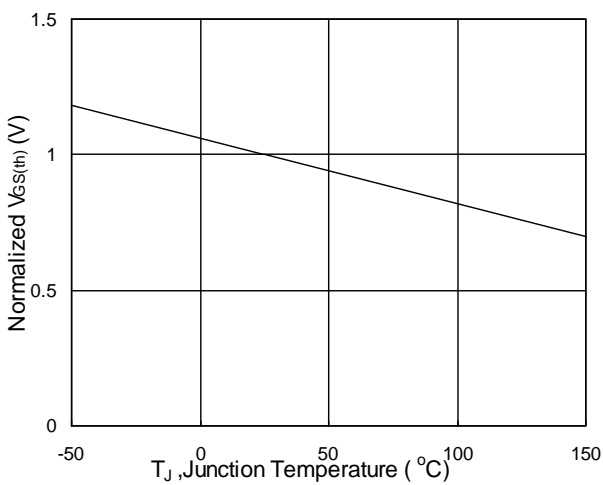


Fig.5 Normalized  $V_{GS(th)}$  v.s  $T_J$

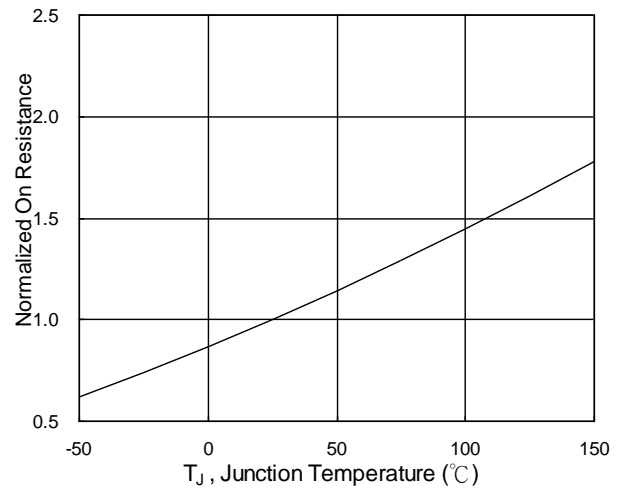


Fig.6 Normalized  $R_{DS(on)}$  v.s  $T_J$

### P-Channel Typical Characteristics

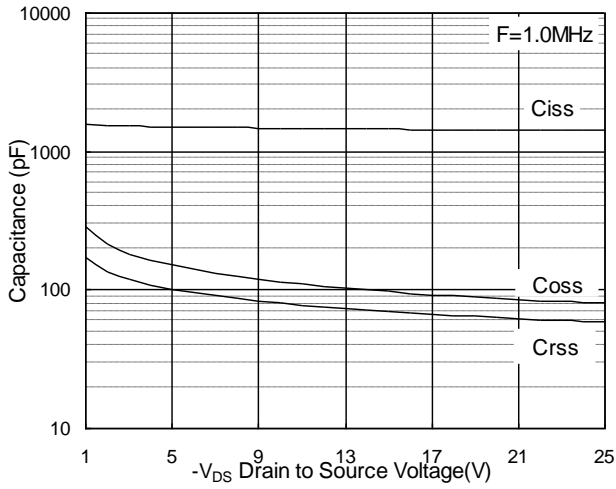


Fig.7 Capacitance

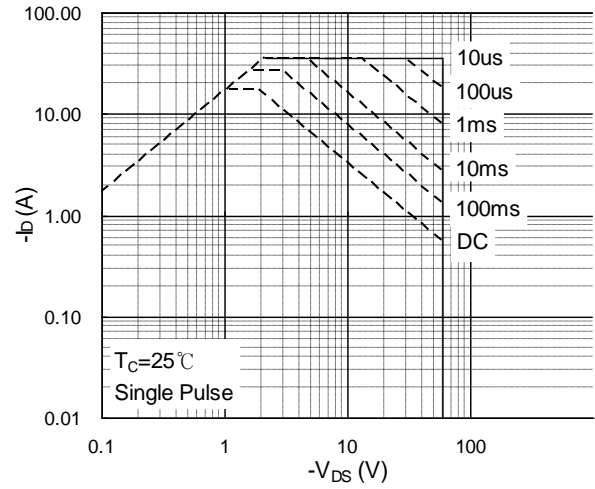


Fig.8 Safe Operating Area

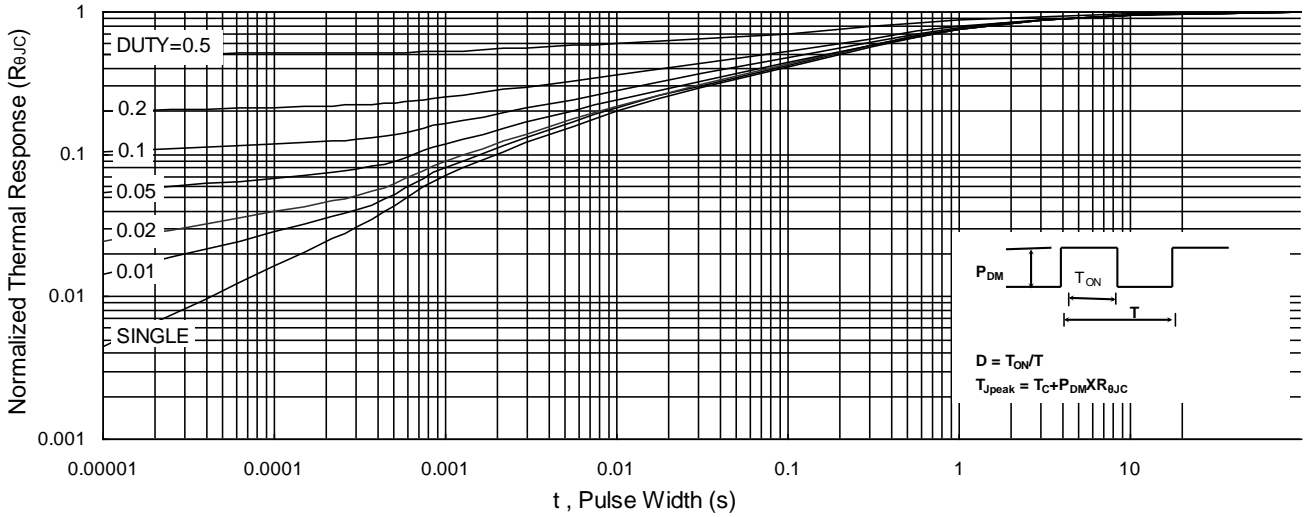


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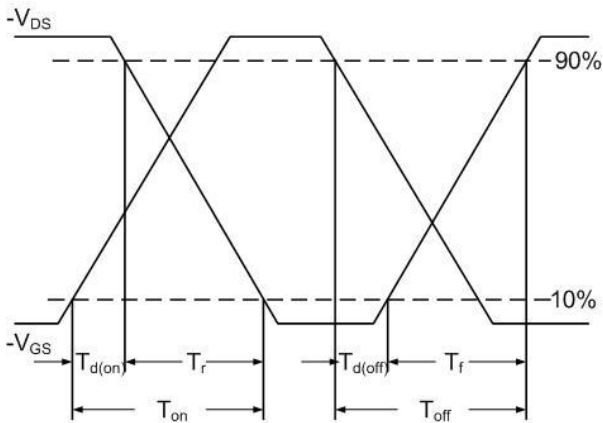


Fig.10 Switching Time Waveform

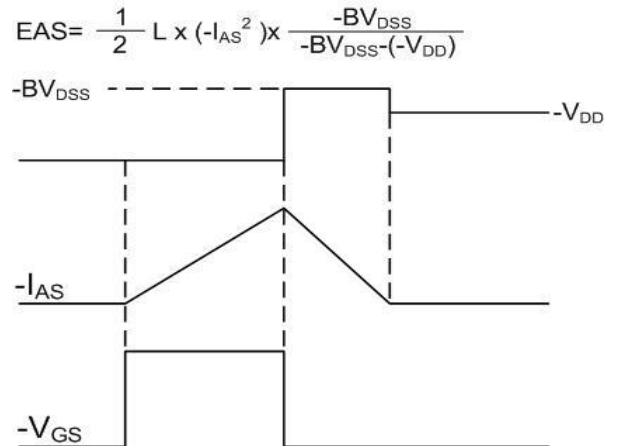
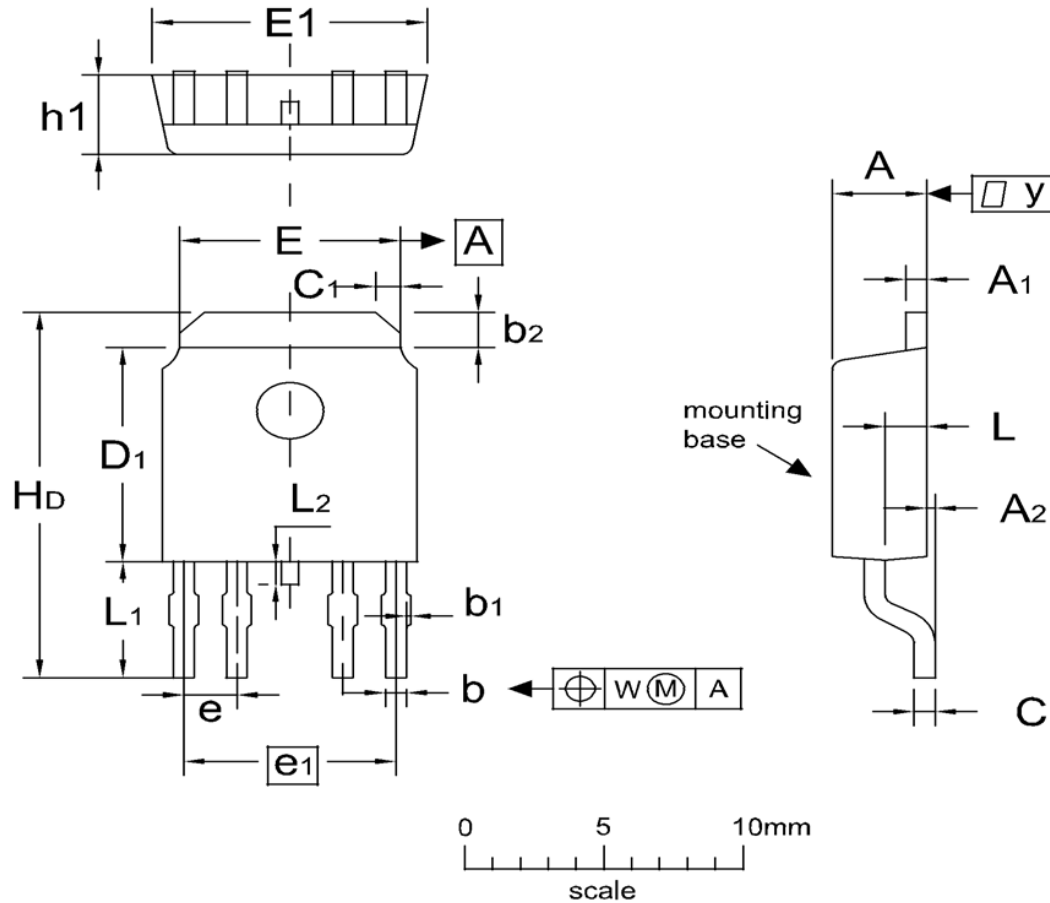


Fig.11 Unclamped Inductive Waveform

## TO-252-4L Package Outline Data



### DIMENSIONS ( unit : mm )

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	2.1	2.3	2.5	A <sub>1</sub>	0.4	0.5	0.6
A <sub>2</sub>	--	--	0.3	b	0.4	0.5	0.6
b <sub>1</sub>	--	--	0.1	b <sub>2</sub>	0.8	1.0	1.2
C	0.4	0.5	0.6	C <sub>1</sub>	0.4	0.6	0.8
D <sub>1</sub>	5.7	6.1	6.5	E	5.0	5.3	5.6
E <sub>1</sub>	6.3	6.6	6.9	e	--	1.27	--
e <sub>1</sub>	--	5.08	--	H <sub>D</sub>	9.6	10.0	10.4
h <sub>1</sub>	2.1	2.3	2.5	L	0.80	1.0	1.2
L <sub>1</sub>	2.6	2.9	3.2	L <sub>2</sub>	0.35	0.65	0.95




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