

### ● General Description

The AGM314MD 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
- 100% Avalanche tested
- 100% DVDS tested

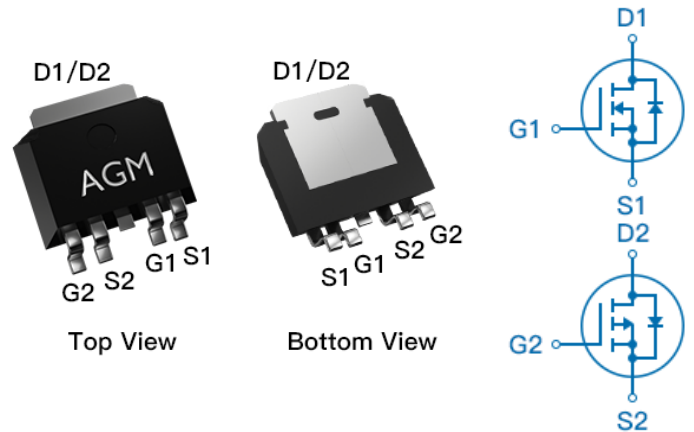
### ● Application

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

### Product Summary

BVDSS	RDSON	ID
30V	8.5mΩ	30A
-30V	21mΩ	-20A

### TO-252-4 Pin Configuration



### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM314MD	AGM314MD	TO-252-4	330mm	16mm	2500

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

Symbol	Parameter	Rating		Units
		N-Ch	P-Ch	
$V_{DS}$	Drain-Source Voltage ( $V_{GS}=0V$ )	30	-30	V
$V_{GS}$	Gate-Source Voltage ( $V_{DS}=0V$ )	±20	±20	V
$I_D$	Drain Current-Continuous( $TC=25^{\circ}C$ ) (Note 1)	30	-20	A
	Drain Current-Continuous( $TC=100^{\circ}C$ )	21	-14	A
IDM (pluse)	Drain Current-Pulsed (Note 2)	120	-80	A
$P_D$	Total Power Dissipation( $TC=25^{\circ}C$ )	29.7	29.7	W
	Total Power Dissipation( $TC=100^{\circ}C$ )	11.9	11.9	W
EAS	Avalanche energy (Note 3)	81	81	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>	---	70	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	4.2	°C/W

**Table 3. N- Channel Electrical Characteristics (T<sub>J</sub>=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	30	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=30V, VGS=0V	--	--	1	μA
IGSS	Gate-Body Leakage Current	VGS=±20V, VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS, ID=250μA	1.2	1.6	2.2	V
gFS	Forward Transconductance	VDS=5V, ID=5A	--	7	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=10A	--	8.5	13	mΩ
		VGS=4.5V, ID=5A	--	13	24	mΩ
<b>Dynamic Characteristics</b>						
Ciss	Input Capacitance	VDS=15V, VGS=0V, F=1MHZ	--	618	--	pF
Coss	Output Capacitance		--	99	--	pF
Crss	Reverse Transfer Capacitance		--	88	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V, f=1.0MHz	--	1.8	--	Ω
<b>Switching Times</b>						
td(on)	Turn-on Delay Time	VDS=15V, VGS=10V, RGEN=6.8Ω, RL=3.5Ω	--	12	--	nS
tr	Turn-on Rise Time		--	25	--	nS
td(off)	Turn-Off Delay Time		--	38	--	nS
tf	Turn-Off Fall Time		--	16	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=15V, ID=15A	--	11.7	--	nC
Qgs	Gate-Source Charge		--	3.8	--	nC
Qgd	Gate-Drain Charge		--	2.3	--	nC
<b>Source-Drain Diode Characteristics</b>						
ISD	Source-Drain Current(Body Diode)		--	--	30	A
VSD	Forward on Voltage	VGS=0V, IS=10A	--	--	1.2	V
trr	Reverse Recovery Time	IF=10A , di/dt=100A/μs , TJ=25°C	--	17	--	ns
Qrr	Reverse Recovery Charge		--	31	--	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: T<sub>J</sub>=25°C, VDD=15V, Vgs=10V, ID=18A, L=0.5mH, RG=25ohm

**Table 3. P-Channel Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

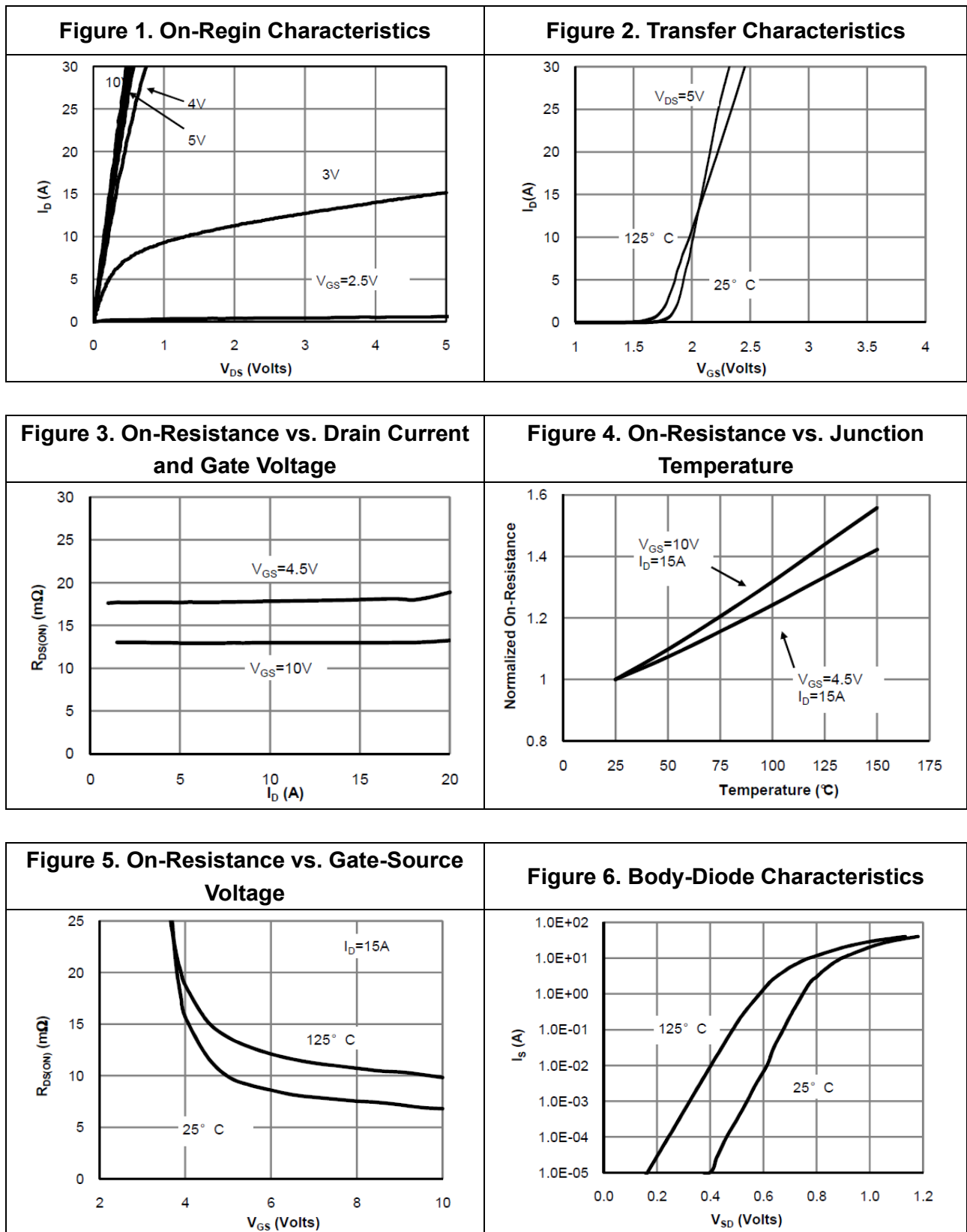
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>On/Off States</b>						
BVDSS	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA	-30	--	--	V
IDSS	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V	--	--	-1	μA
IGSS	Gate-Body Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	--	--	±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1.2	-1.5	-2.2	V
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =-10V, I <sub>D</sub> =-5A	--	7	--	S
R <sub>DS(on)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =-10V, I <sub>D</sub> =-10A	--	21	26	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-5A	--	29	35	mΩ
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, F=1MHZ	--	689	--	pF
C <sub>oss</sub>	Output Capacitance		--	101	--	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		--	88	--	pF
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1.0MHz	--	11.1	--	Ω
<b>Switching Times</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V, R <sub>L</sub> =1Ω, R <sub>GEN</sub> =3Ω	--	9	--	nS
t <sub>r</sub>	Turn-on Rise Time		--	5	--	nS
t <sub>d(off)</sub>	Turn-Off Delay Time		--	21	--	nS
t <sub>f</sub>	Turn-Off Fall Time		--	3.3	--	nS
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-25V, I <sub>D</sub> =-5A	--	13.2	--	nC
Q <sub>gs</sub>	Gate-Source Charge		--	26	--	nC
Q <sub>gd</sub>	Gate-Drain Charge		--	3.3	--	nC
<b>Source-Drain Diode Characteristics</b>						
I <sub>SD</sub>	Source-Drain Current(Body Diode)		--	--	-20	A
V <sub>SD</sub>	Forward on Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =-10A	--	--	-1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> =-10A, dI/dt=100A/μs, T <sub>J</sub> =25°C	--	13	--	ns
Q <sub>rr</sub>	Reverse Recovery Charge		--	8.5	--	nc

Notes 1.The maximum current rating is package limited.

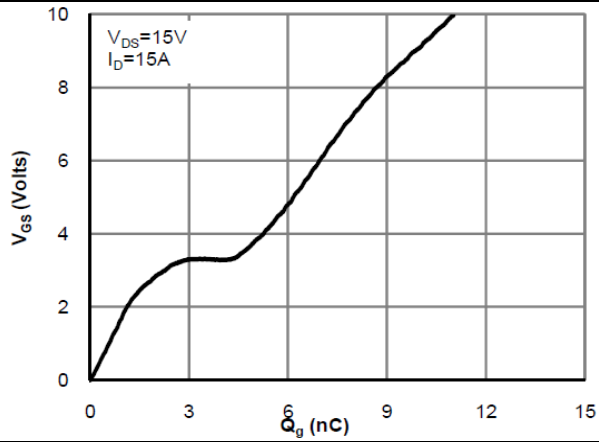
Notes 2.Repetitive Rating: Pulse width limited by maximum junction temperature Notes

3.EAS condition: T<sub>J</sub>=25°C, V<sub>DD</sub>=-15V, V<sub>gs</sub>=-10V, I<sub>D</sub>=-18A, L=0.5mH, R<sub>G</sub>=25ohm

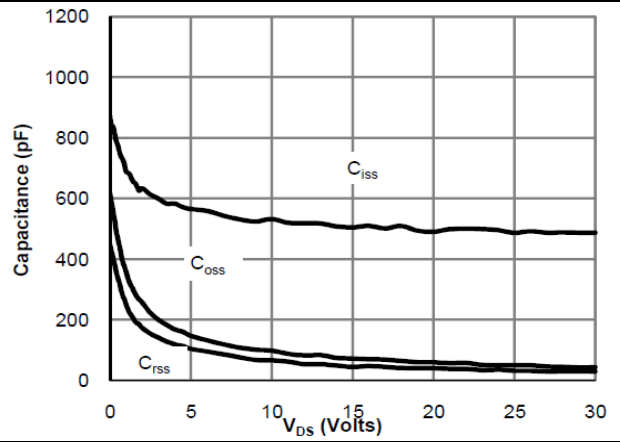
# N-Channel Electrical Characteristics Diagrams



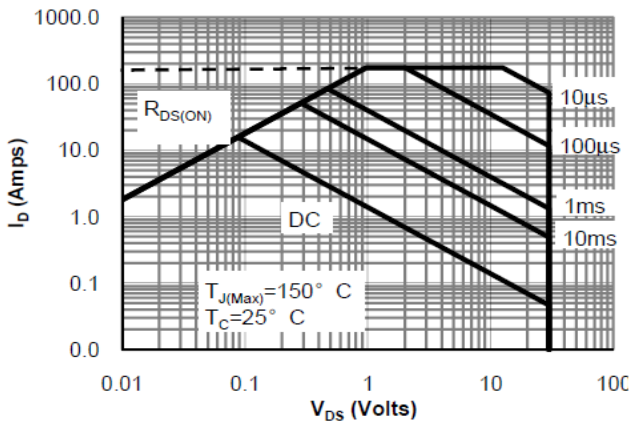
**Figure 7. Gate-Charge Characteristics**



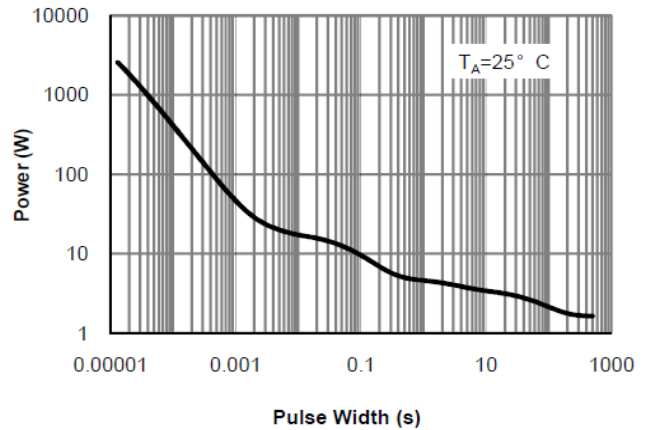
**Figure 8. Capacitance Characteristics**



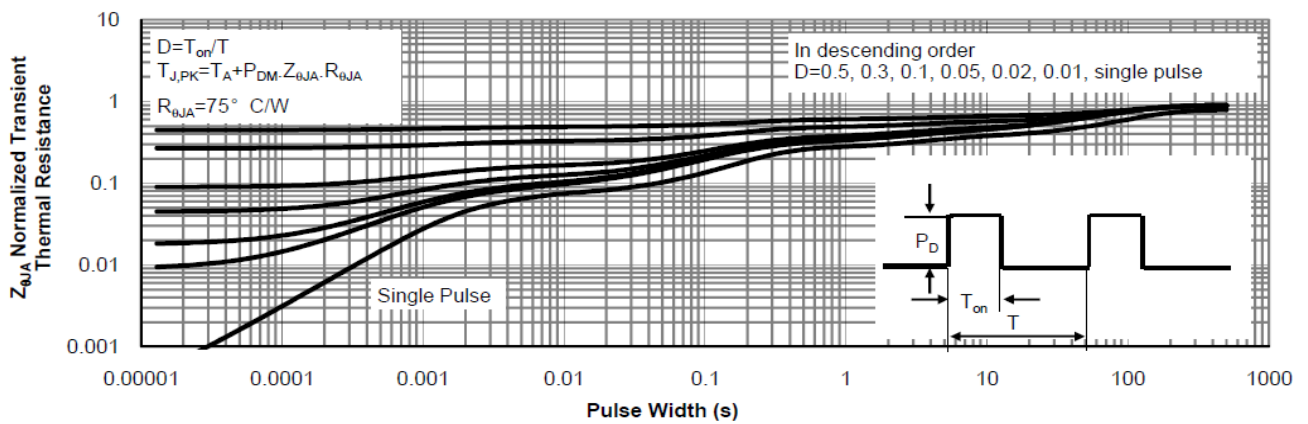
**Figure 9. Maximum Forward Biased Safe Operating Area**



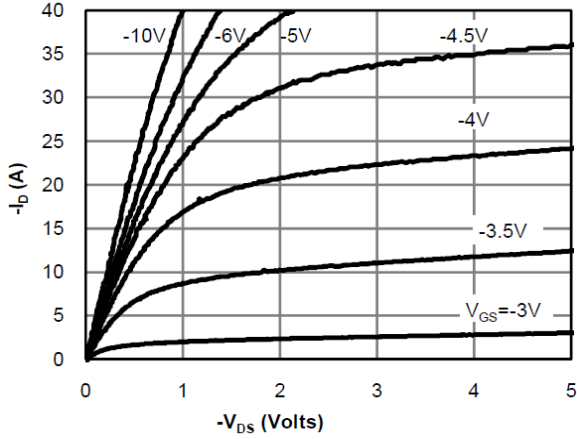
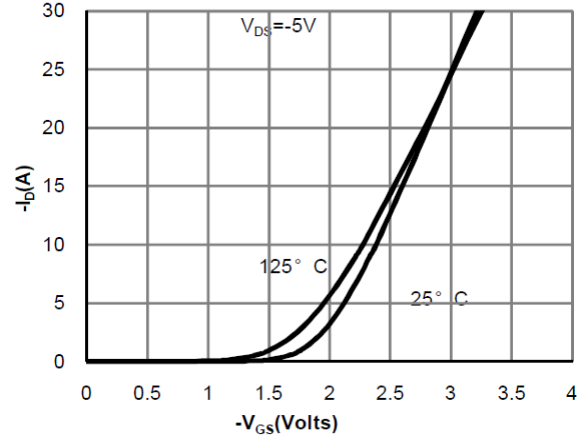
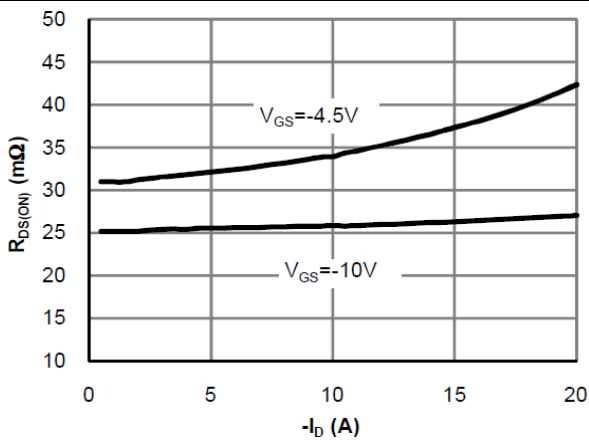
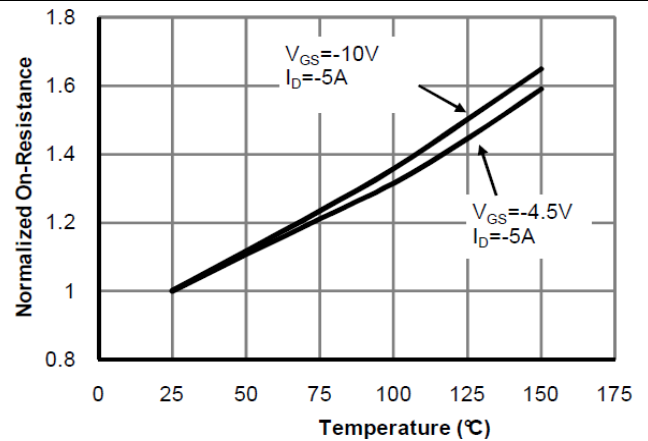
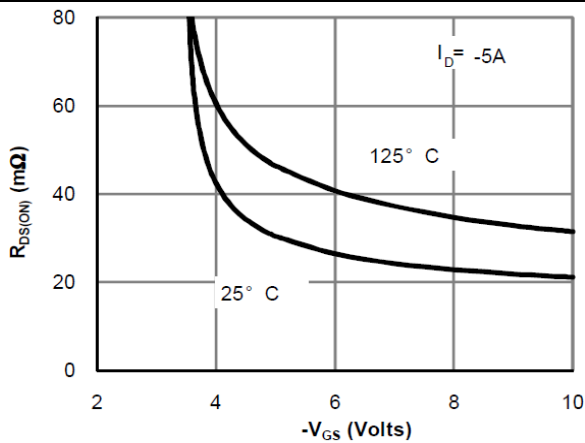
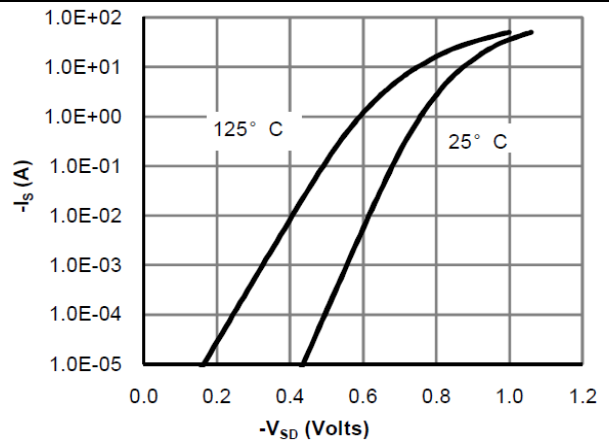
**Figure 10. Single Pulse Power Rating Junction-to-Ambient**

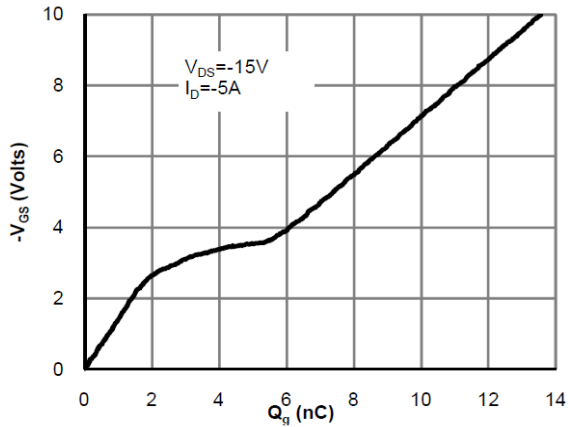
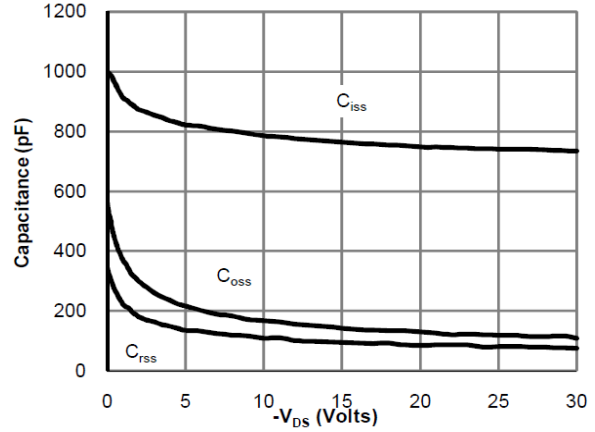
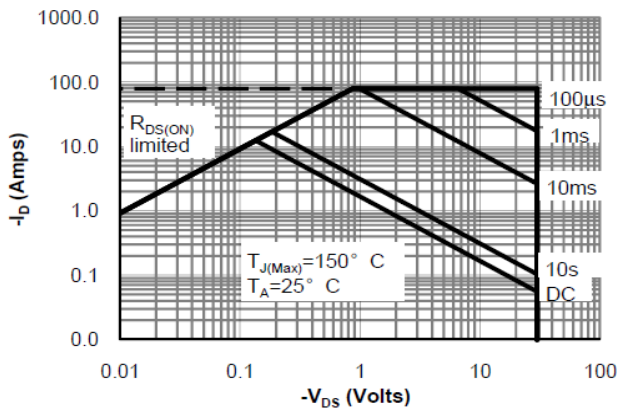
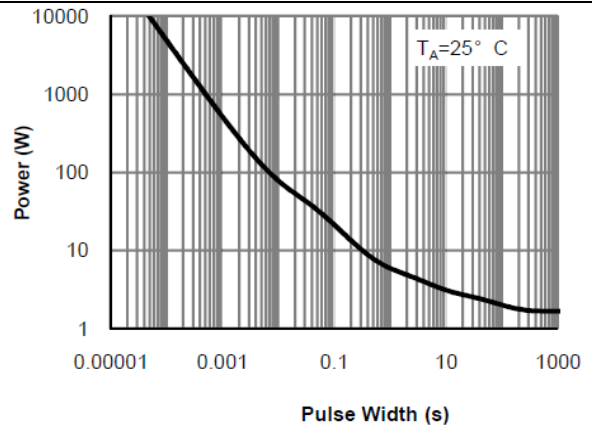
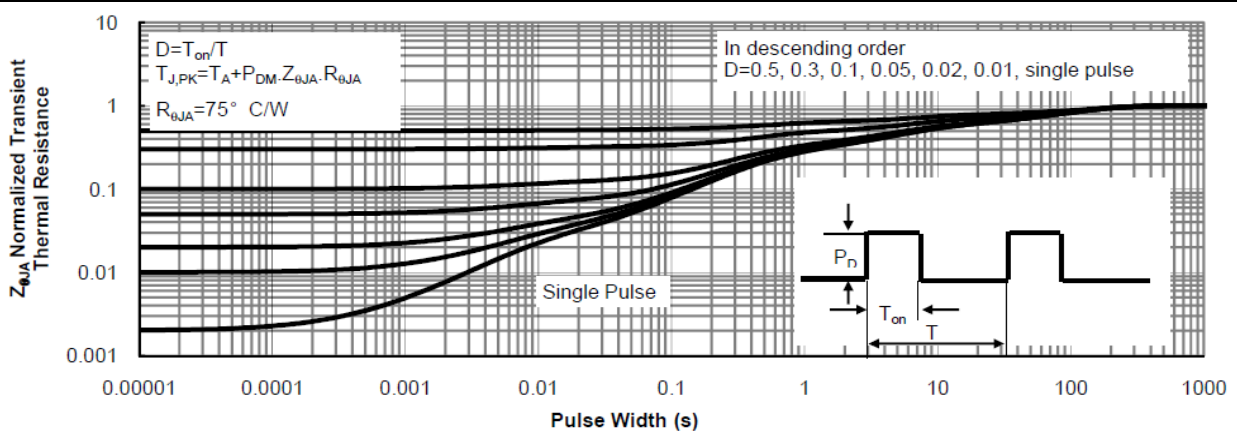


**Figure 11. Normalized Maximum Transient Thermal Impedance**

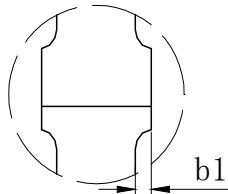
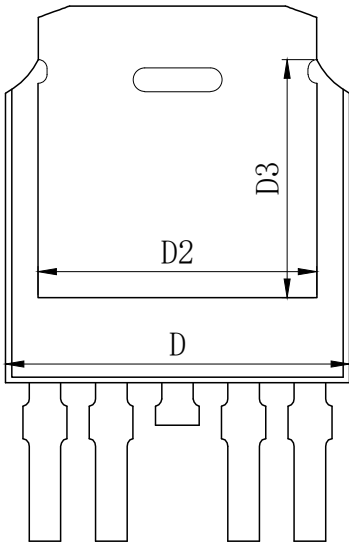
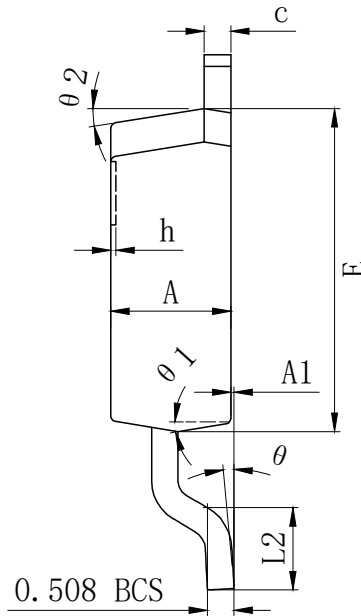
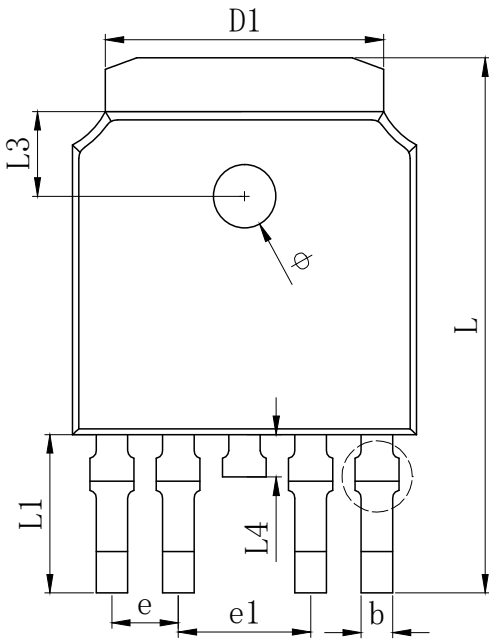


# P-Channel Electrical Characteristics Diagrames

**Figure 1. On-Regin Characteristics**

**Figure 2. Transfer Characteristics**

**Figure 3. On-Resistance vs. Drain Current and Gate Voltage**

**Figure 4. On-Resistance vs. Junction Temperature**

**Figure 5. On-Resistance vs. Gate-Source Voltage**

**Figure 6. Body-Diode Characteristics**


**Figure 7. Gate-Charge Characteristics**

**Figure 8. Capacitance Characteristics**

**Figure 9. Maximum Forward Biased Safe Operating Area**

**Figure 10. Single Pulse Power Rating Junction-to-Ambient**

**Figure 11. Normalized Maximum Transient Thermal Impedance**


### TO-252-4L Package Outline Data



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	2.200	2.300	2.400
A1	0.000		0.127
b	0.550	0.600	0.650
b1	0.000		0.120
c (电镀后)	0.460	0.520	0.580
D	6.500	6.600	6.700
D1	5.334 REF		
D2	5.346 REF		
D3	4.490 REF		
E	6.000	6.100	6.200
e	1.270 TYP		
e1	2.540 TYP		
h	0.000	0.100	0.200
L	9.900	10.100	10.300
L1	2.988 REF		
L2	1.400	1.550	1.700
L3	1.600 REF		
L4	0.700	0.800	0.900
Φ	1.100	1.200	1.300
θ	0°		8°
θ 1	9° TYP		
θ 2	9° TYP		




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