

**• General Description**

The AGM312D 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**

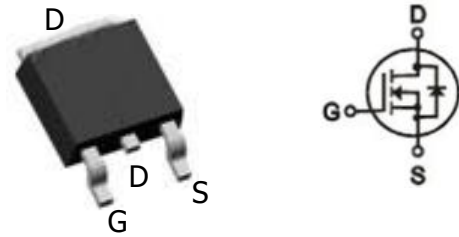
- Advance high cell density Trench technology
- Low  $R_{DS(ON)}$  to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance

**• Application**

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

**Product Summary**

BVDSS	RDSON	ID
30V	14mΩ	20A

**TO-252 Pin Configuration**

**Package Marking and Ordering Information**

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM312D	AGM312D	TO-252	325mm	16mm	2500

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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current ( $T_C=25^\circ\text{C}$ )	$I_D$	35	A
Drain Current ( $T_C=100^\circ\text{C}$ )		20	
Drain Current ( $T_A=25^\circ\text{C}$ )		11	
Drain Current ( $T_A=100^\circ\text{C}$ )		9	
Pulsed Drain Current <sup>a</sup>	$I_{DM}$	110	A
Single Pulse Avalanche energy <sup>b</sup>	$E_{AS}$	24	mJ
Power Dissipation	$P_D$	37.5	W
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 ~ +150	$^\circ\text{C}$

**Thermal Characteristics**

Parameter	Symbol	Maximum	Units
Thermal Resistance, Junction-to-Case <sup>c</sup>	$R_{\theta JC}$	4	$^\circ\text{C/W}$

<b>Electrical Characteristics</b> ( $T_A = 25^\circ\text{C}$ unless otherwise noted)						
<b>Symbol</b>	<b>Parameter</b>	<b>Conditions</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Units</b>
<b>Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	30			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 30V, V_{GS} = 0V$			1	$\mu A$
$I_{GSS}$	Gate-Body Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$			$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	1	1.5	3	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	$V_{GS} = 10V, I_D = 30A$		14	20	$m\Omega$
		$V_{GS} = 4.5V, I_D = 24A$		20	26	$m\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS} = 5.0V, I_D = 24A$		34		S
<b>Drain-Source Diode Characteristics</b>						
$V_{SD}$	Diode Forward Voltage	$V_{GS} = 0V, I_S = 1.0A$			1.2	V
$I_S$	Maximum Body-Diode Continuous Current				35	A
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS} = 15V, V_{GS} = 0V$ $f = 1.0MHz$		950		$\mu F$
$C_{oss}$	Output Capacitance			153		$\mu F$
$C_{rss}$	Reverse Transfer Capacitance			129		$\mu F$
<b>Switching Characteristics</b>						
		$Q_g$ Total Gate Charge $V_{DS} = 10V, I_D = 15A$ $V_{GS} = 4.5V$		12		nC
$Q_{gs}$	Gate-Source Charge			4.5		nC
$Q_{gd}$	Gate-Drain Charge			3.8		nC
$t_{D(ON)}$	Turn-On Delay Time	$V_{DD} = 15V, I_D = 15A$ $V_{GS} = 10V$ $R_{GEN} = 3.3\Omega$		5		ns
$t_r$	Turn-On Rise Time			9		ns
$t_{D(OFF)}$	Turn-Off Delay Time			32		ns
$t_f$	Turn-Off Fall Time			5		ns

- Repetitive rating, Pulse width limited by junction temperature  $T_{J(MAX)} = 150^\circ\text{C}$ . Ratings are based on low frequency and duty cycles to keep initial  $T_J = 25^\circ\text{C}$
- EAS Condition:  $T_J = 25^\circ\text{C}, V_{DD} = 25V, V_G = 10V, L = 0.1mH, R_g = 25\Omega$
- The value of  $R_{\theta JC}$  is measured with the device mounted on  $1in^2$  FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ\text{C}$ . The value in any given application depends on the user's specific board design.

Typical Characteristics

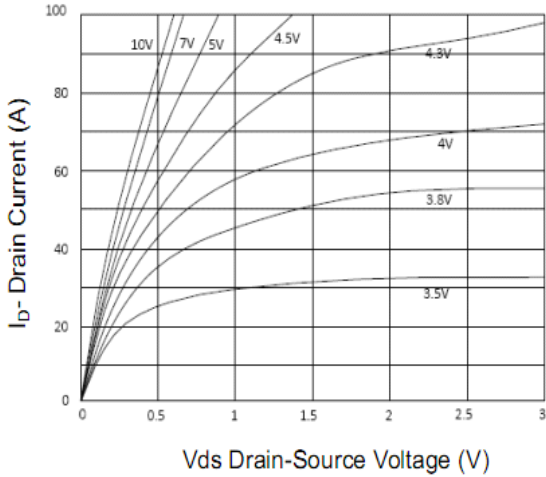


Figure 1 Output Characteristics

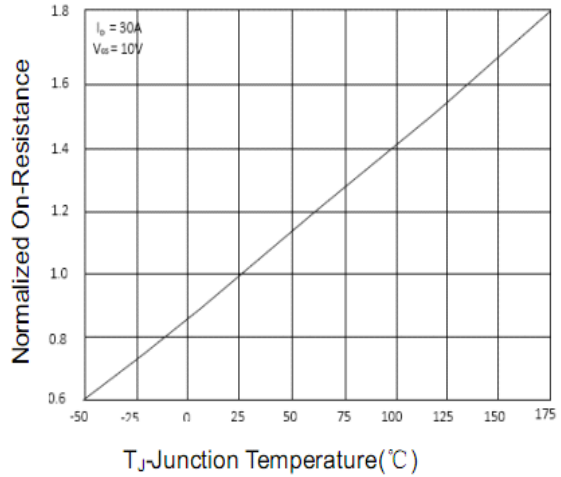


Figure 4 Rdson-Junction Temperature

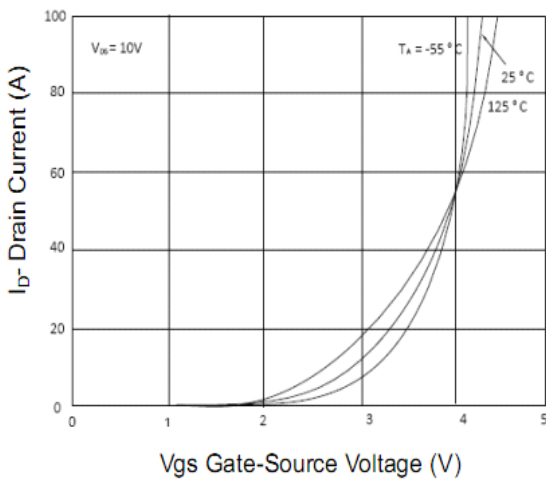


Figure 2 Transfer Characteristics

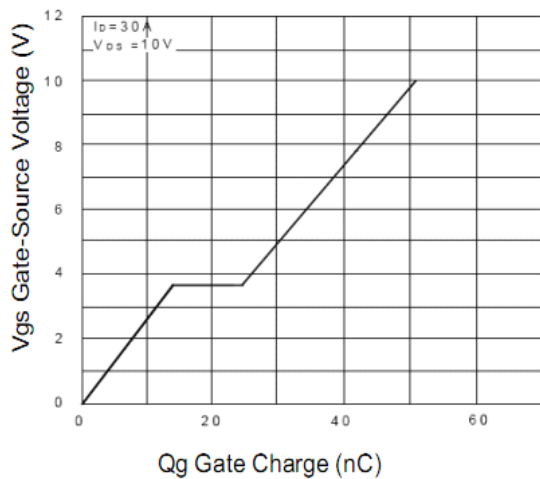
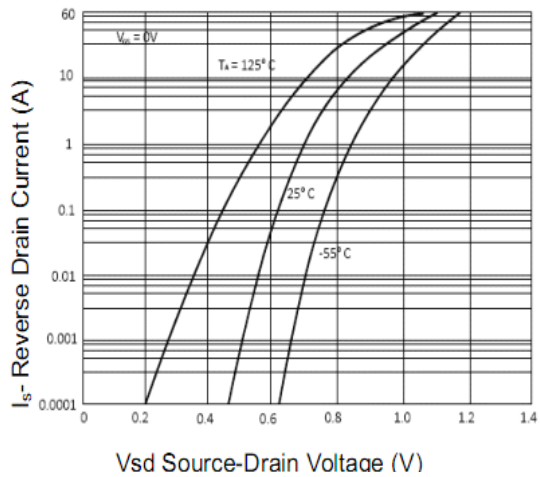
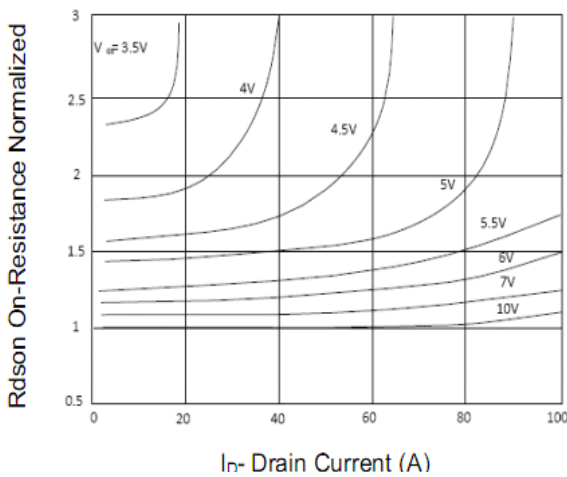
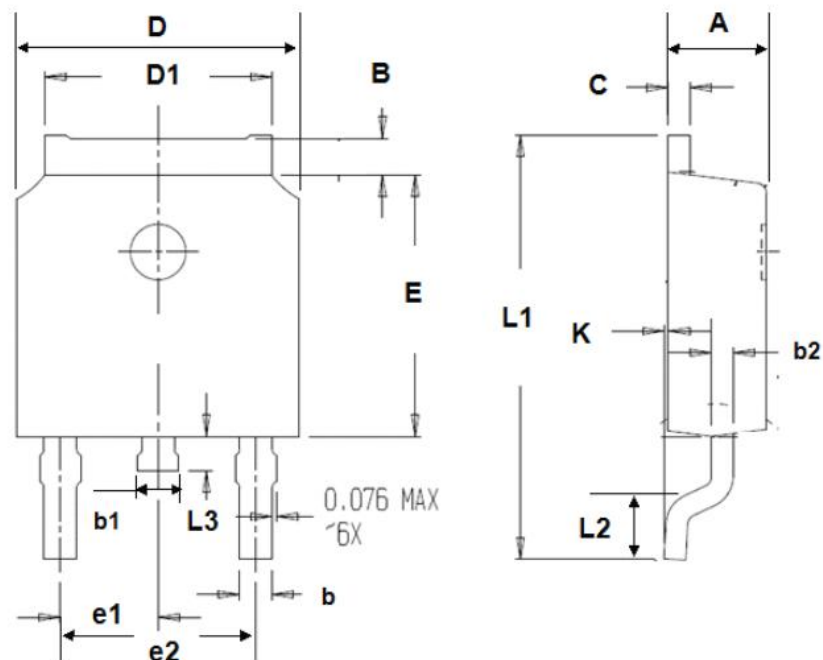


Figure 5 Gate Charge



**•Dimensions**

SYMBOL	min	max	SYMBOL	min	max
A	2.10	2.50	B	0.85	1.25
b	0.50	0.80	b1	0.50	0.90
b2	0.45	0.70	C	0.45	0.70
D	6.30	6.75	D1	5.10	5.50
E	5.30	6.30	e1	2.25	2.35
L1	9.20	10.60	e2	4.45	4.75
L2	0.90	1.75	L3	0.60	1.10
K	0.00	0.23			




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