

• General Description

The AGM40P75D 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

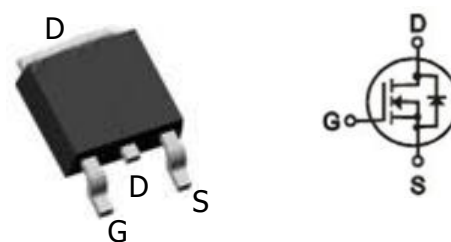
- Advance high cell density Trench technology
- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Low Thermal resistance

• Application

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

Product Summary

BVDSS	RDSON	ID
-40V	7.5mΩ	-70A

TO-252 Pin Configuration

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM40P75D	AGM40P75D	TO-252	325mm	16mm	2500

Absolute Maximum Ratings (TA= 25°C unless otherwise specified):

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	-40	V
I_D	Continuous Drain Current $T_C = 25^\circ\text{C}$	-70	A
	Continuous Drain Current $T_C = 70^\circ\text{C}$	-56	A
I_{DM}^{a1}	Pulsed Drain Current	-280	A
V_{GS}	Gate-to-Source Voltage	± 20	V
P_D	Power Dissipation	130	W
E_{AS}^{a2}	Single pulse avalanche energy	500	mJ
T_J, T_{stg}	Operating Junction and Storage Temperature Range	150, -55 to 150	$^\circ\text{C}$
T_L	Maximum Temperature for Soldering	300	$^\circ\text{C}$

Electrical Characteristics (T_c= 25°C unless otherwise specified):

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V _{DSS}	Drain to Source Breakdown Voltage	V _{GS} =0V, I _D =-250μA	-40	--	--	V
I _{DSS}	Drain to Source Leakage Current	V _{DS} = -40V, V _{GS} = 0V	--	--	-1	μA
I _{GSS(F)}	Gate to Source Forward Leakage	V _{GS} = +20V	--	--	100	nA
I _{GSS(R)}	Gate to Source Reverse Leakage	V _{GS} = -20V	--	--	-100	nA

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
R _{DS(ON)1}	Drain-to-Source On-Resistance	V _{GS} =-10V, I _D =-12A	--	7.5	10	mΩ
R _{DS(ON)2}	Drain-to-Source On-Resistance	V _{GS} =-4.5V, I _D =-12A	--	10	15	mΩ
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250μA	-1.2	-1.6	-2.3	V

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g _{fs}	Forward Transconductance	V _{DS} =-15V, I _D = -12A	20	--	--	S
C _{iss}	Input Capacitance	V _{GS} = 0V	--	6500	--	pF
C _{oss}	Output Capacitance	V _{DS} = -20V	--	790	--	
C _{rss}	Reverse Transfer Capacitance	f = 1.0MHz	--	605	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
t _{d(ON)}	Turn-on Delay Time	I _D = -12A	--	18	--	ns
t _r	Rise Time	V _{DS} = -20V	--	31	--	
t _{d(OFF)}	Turn-Off Delay Time	V _{GS} = -10V	--	70	--	
t _f	Fall Time	R _G = 3.0Ω	--	40	--	
Q _g	Total Gate Charge	I _D = -12A	--	150	--	nC
Q _{gs}	Gate to Source Charge	V _{DS} = -20V	--	33	--	
Q _{gd}	Gate to Drain ("Miller") Charge	V _{GS} = -10V	--	27	--	

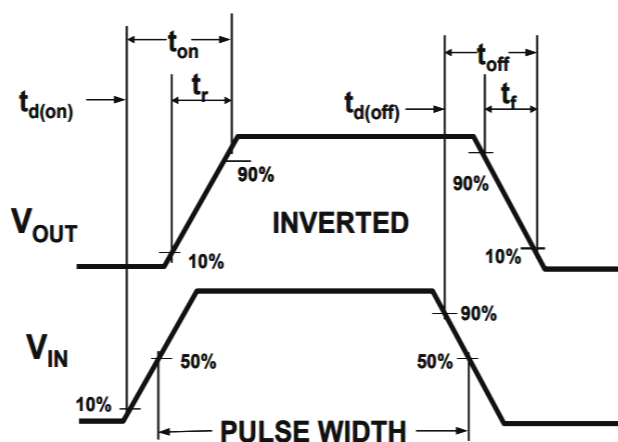
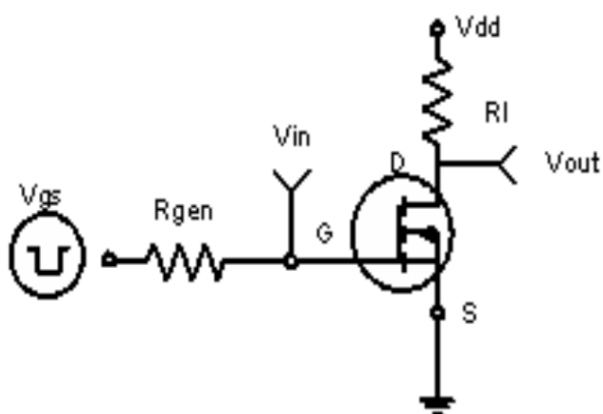
Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Diode Forward Current		--	--	-70	A
V_{SD}	Diode Forward Voltage	$I_S = -12A, V_{GS} = 0V$	--	--	-1.2	V

Symbol	Parameter	Typ.	Units
$R_{\theta JC}$	Junction-to-Case	1.1	$^{\circ}C/W$

^{a1}: Repetitive rating; pulse width limited by maximum junction temperature

^{a2}: EAS condition: $T_j = 25^{\circ}C, V_{DD} = -20V, V_G = -10V, L = 1mH, R_g = 25\Omega$

Characteristics Curve:



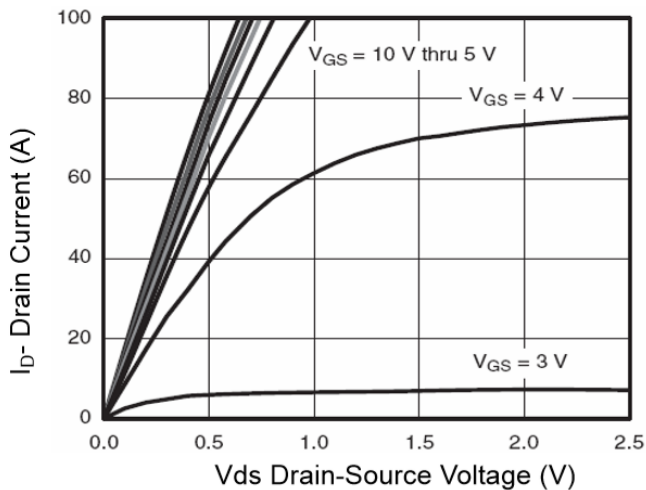


Figure 1 Output Characteristics

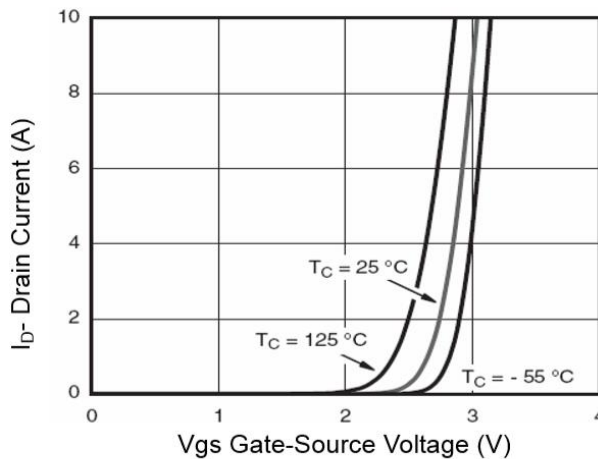


Figure 2 Transfer Characteristics

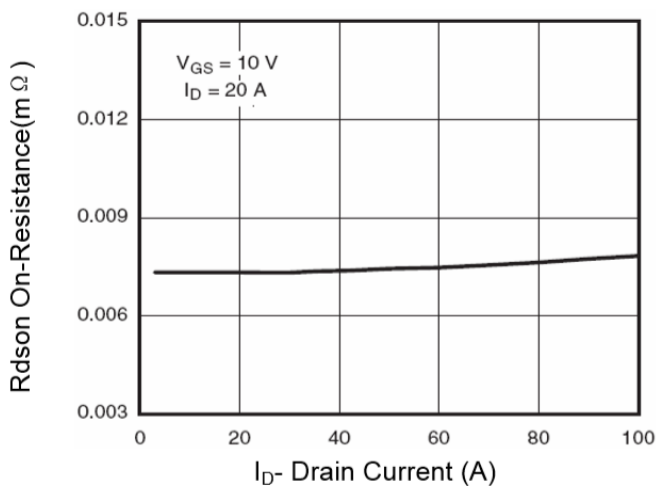


Figure 3 Rdson- Drain Current

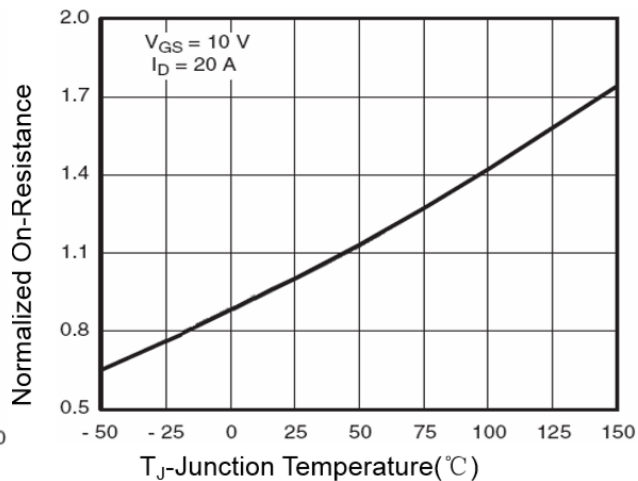


Figure 4 Rdson-Junction Temperature

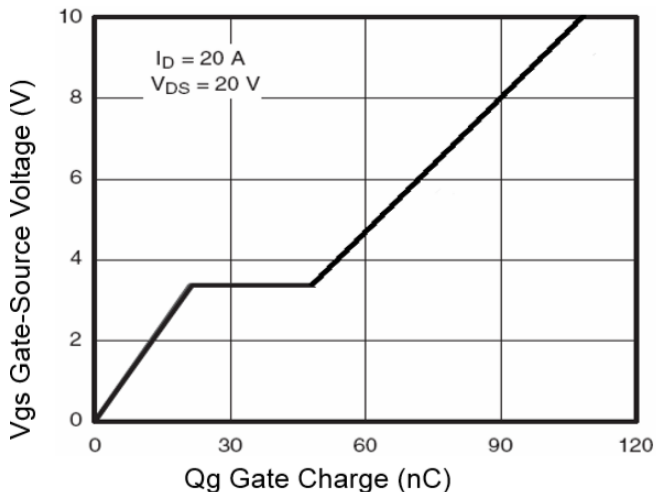


Figure 5 Gate Charge

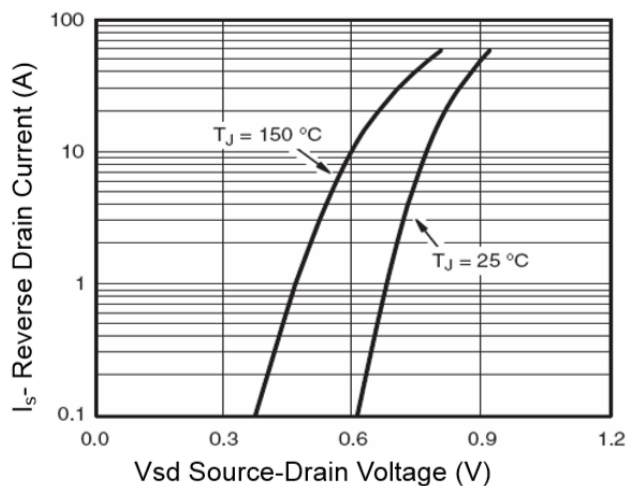


Figure 6 Source- Drain Diode Forward

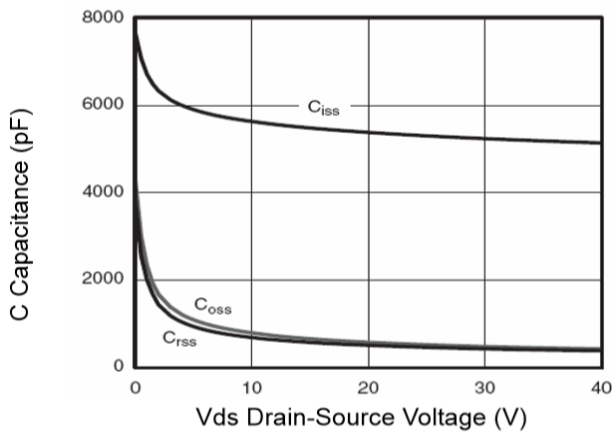


Figure 7 Capacitance vs Vds

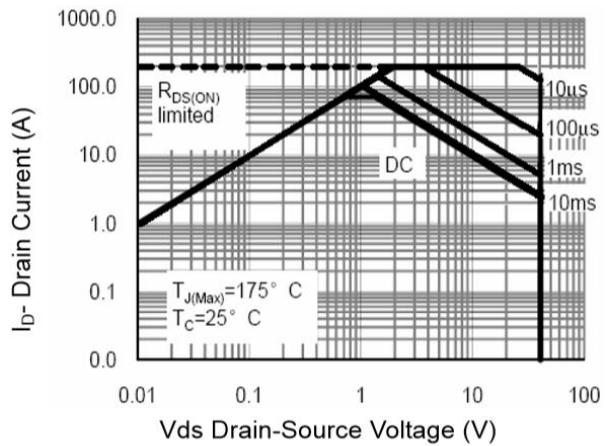


Figure 8 Safe Operation Area

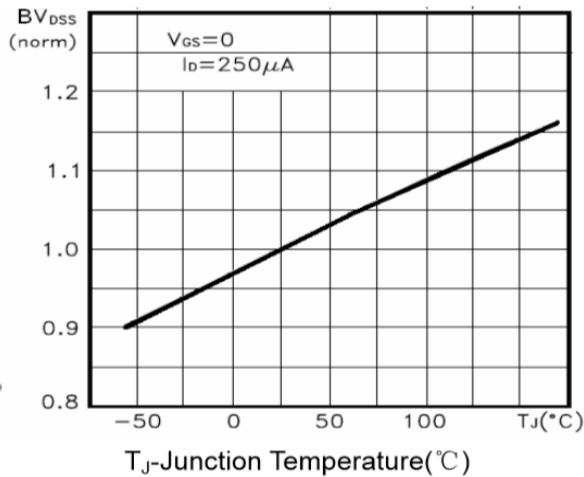


Figure 9 BV_{DSS} vs Junction Temperature

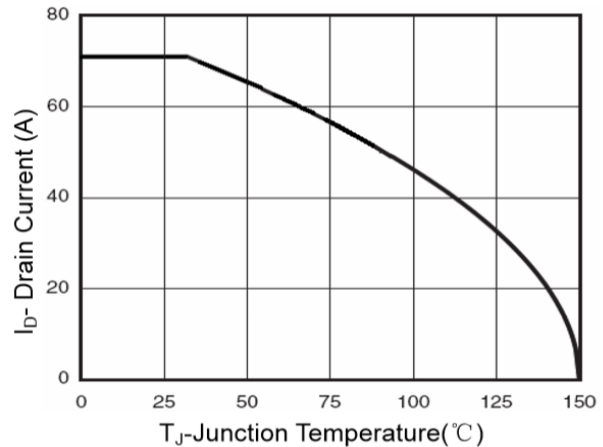


Figure 10 I_D Current Derating vs Junction Temperature

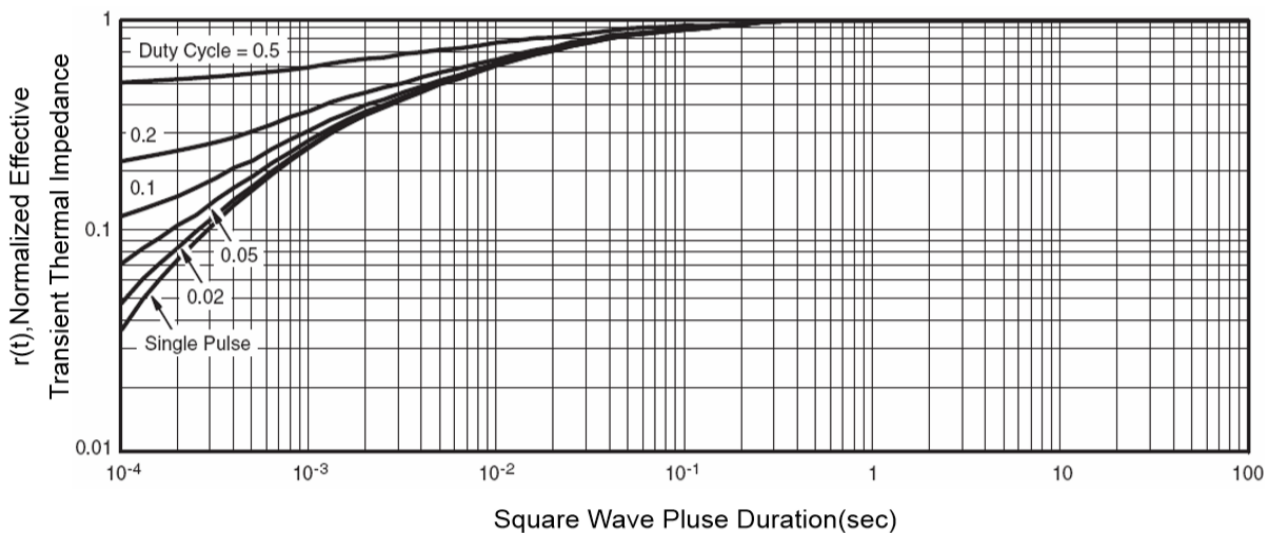
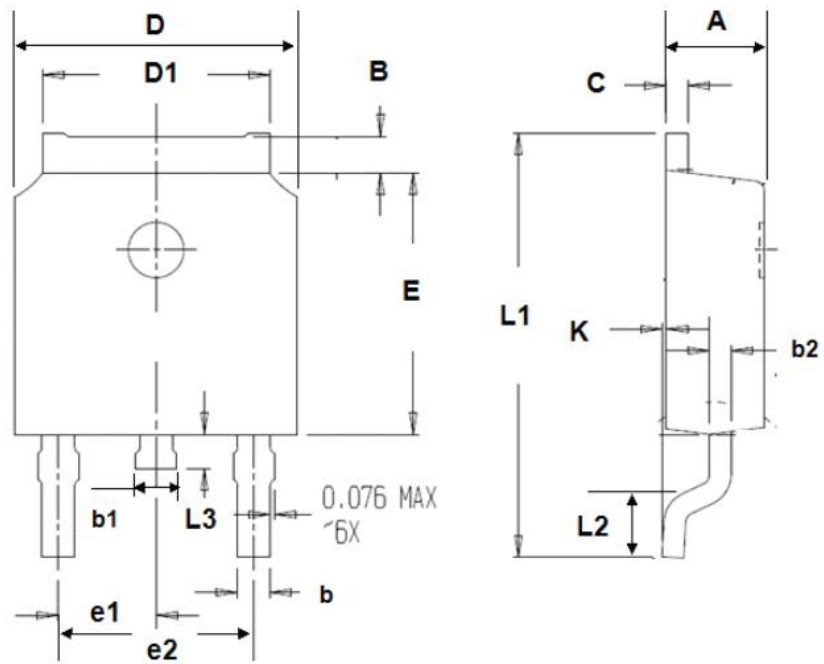


Figure 11 Normalized Maximum Transient Thermal Impedance

•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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