

### ● General Description

The AGM20N65F 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

- Electronic Ballast
- Electronic Transformer
- Switch Mode Power Supply

### Product Summary

BVDSS	RDSON	ID
650V	0.47Ω	20A

### TO-220F Pin Configuration



### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
AGM20N65F	AGM20N65F	TO-220F	----	----	1000

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

Symbol	Parameter	Value	Unit
VDS	Drain-Source Voltage (VGS=0V)	650	V
VGS	Gate-Source Voltage (VDS=0V)	±30	V
ID	Drain Current-Continuous(Tc=25°C) <b>(Note 1)</b>	20	A
	Drain Current-Continuous(Tc=100°C)	11	A
IDM (pluse)	Drain Current-Continuous@ Current-Pulsed <b>(Note 2)</b>	80	A
PD	Maximum Power Dissipation(Tc=25°C)	62.19	w
	Maximum Power Dissipation(Tc=100°C)	24.88	w
EAS	Avalanche energy <b>(Note 3)</b>	605	mJ
TJ,TSTG	Operating Junction and Storage Temperature Range	-55 To 150	°C

**Table 2. Thermal Characteristic**

Symbol	Parameter	Typ	Max	Unit
RθJA	Thermal Resistance Junction-ambient (Steady State) <sup>1</sup>	---	39.7	°C/W
RθJC	Thermal Resistance Junction-Case <sup>1</sup>	---	2.01	°C/W

**Table 3. Electrical Characteristics (TC=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	650	--	--	V
IDSS	Zero Gate Voltage Drain Current	VDS=650V,VGS=0V	--	--	1	μA
IGSS	Gate-Body Leakage Current	VGS=±30V,VDS=0V	--	--	±100	nA
VGS(th)	Gate Threshold Voltage	VDS=VGS,ID=250μA	3.0	--	4.0	V
gFS	Forward Transconductance	VDS=15V,ID=10A	--	--	--	S
RDS(on)	Drain-Source On-State Resistance	VGS=10V, ID=10A	--	0.47	0.53	Ω
		VGS=4.5V, ID=10A	--	--	--	Ω
<b>Dynamic Characteristics</b>						
Ciss	Input Capacitance	VDS=25V,VGS=0V, F=1MHZ	--	2701	--	pF
Coss	Output Capacitance		--	250	--	pF
Crss	Reverse Transfer Capacitance		--	25	--	pF
Rg	Gate resistance	VGS=0V, VDS=0V,f=1.0MHz	--	--	--	Ω
<b>Switching Times</b>						
td(on)	Turn-on Delay Time	VDD=325V, ID=20A,RGEN=25Ω	--	54	--	nS
tr	Turn-on Rise Time		--	50	--	nS
td(off)	Turn-Off Delay Time		--	400	--	nS
tf	Turn-Off Fall Time		--	120	--	nS
Qg	Total Gate Charge	VGS=10V, VDS=520V, ID=20A	--	136	--	nC
Qgs	Gate-Source Charge		--	11	--	nC
Qgd	Gate-Drain Charge		--	36	--	nC
<b>Source-Drain Diode Characteristics</b>						
ISD	Source-Drain Current(Body Diode)		--	--	20	A
VSD	Forward on Voltage	VGS=0V,ISD=10A	--	--	1.4	V
trr	Reverse Recovery Time	VDD=325V,IF=20A , dl/dt=100A/μs , TJ=25°C	--	440	--	ns
Qrr	Reverse Recovery Charge		--	7.9	--	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

Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

Figure 1. Output Characteristics ( $T_J = 25^\circ\text{C}$ )

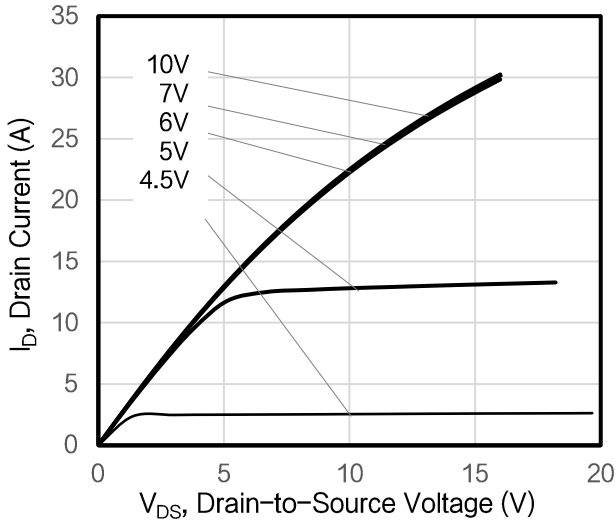


Figure 2. Body Diode Forward Voltage

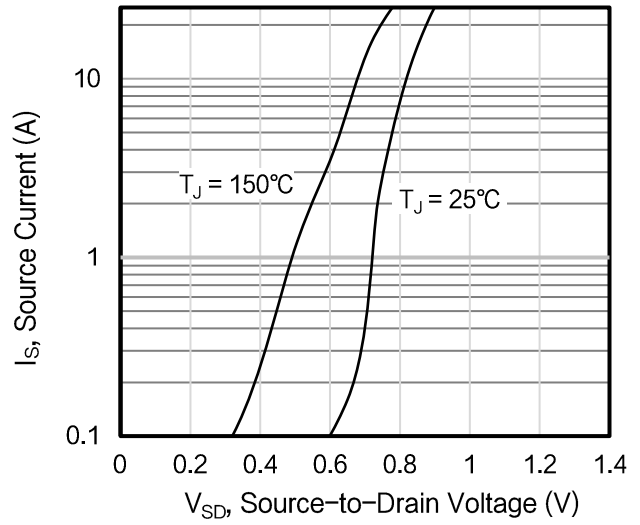


Figure 3. Drain Current vs. Temperature

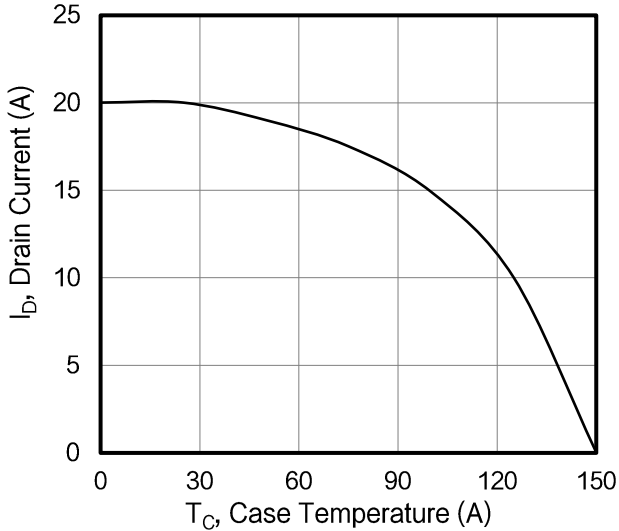


Figure 4.  $BV_{DSS}$  Variation vs. Temperature

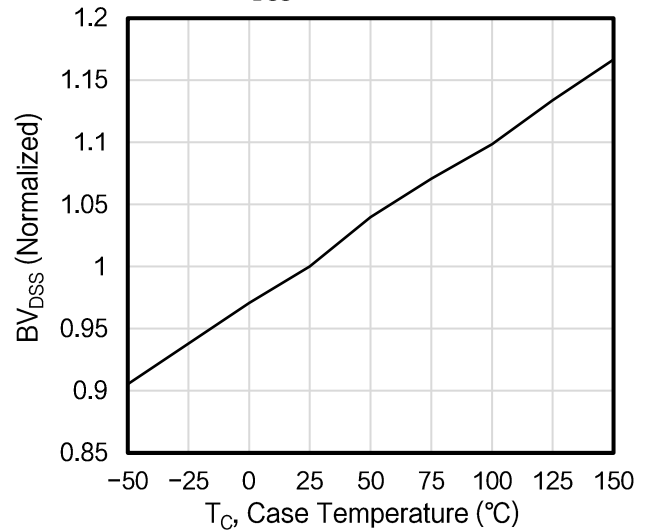


Figure 5. Transfer Characteristics

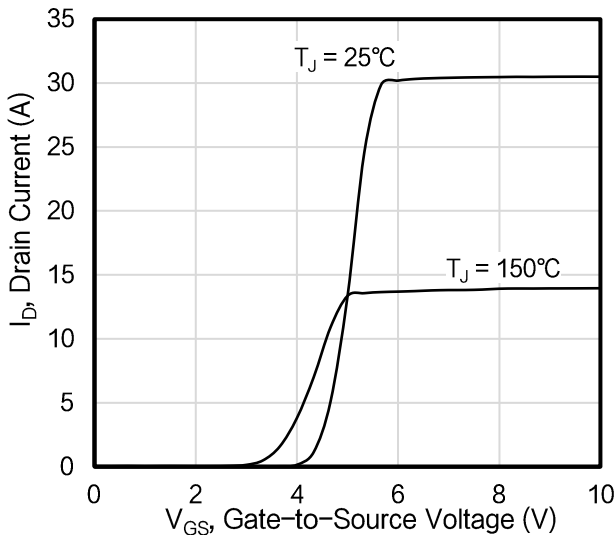
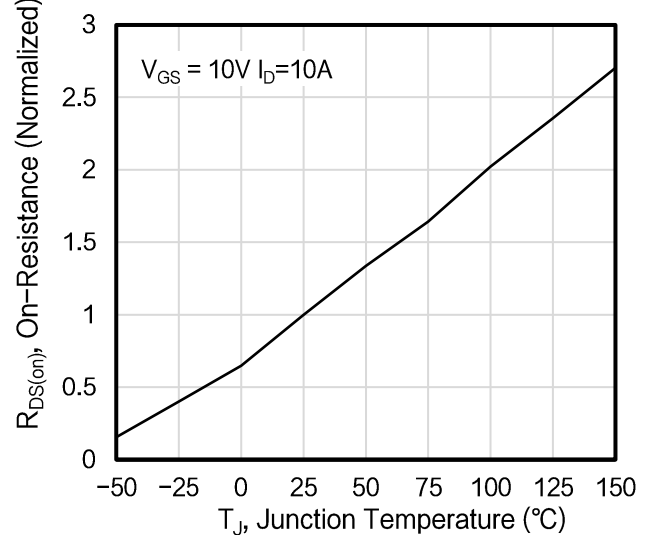


Figure 6. On-Resistance vs. Temperature



Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

Figure 7. Capacitance

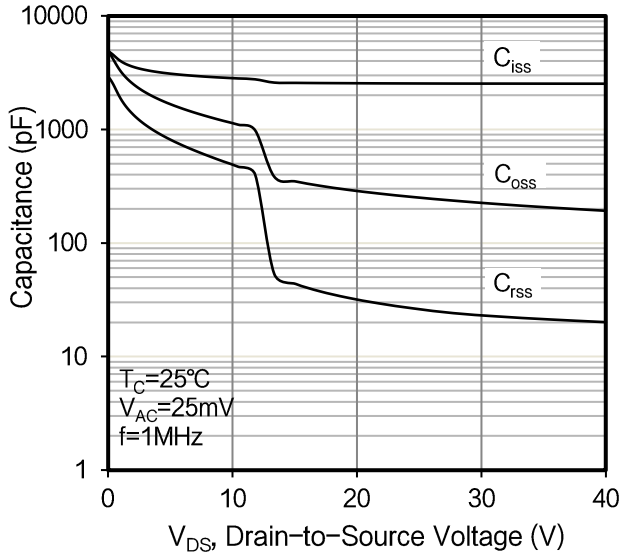


Figure 8. Gate Charge

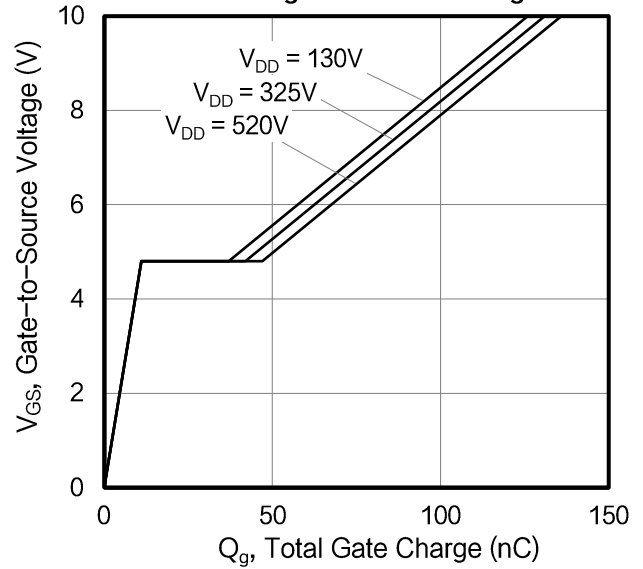


Figure 9. Transient Thermal Impedance

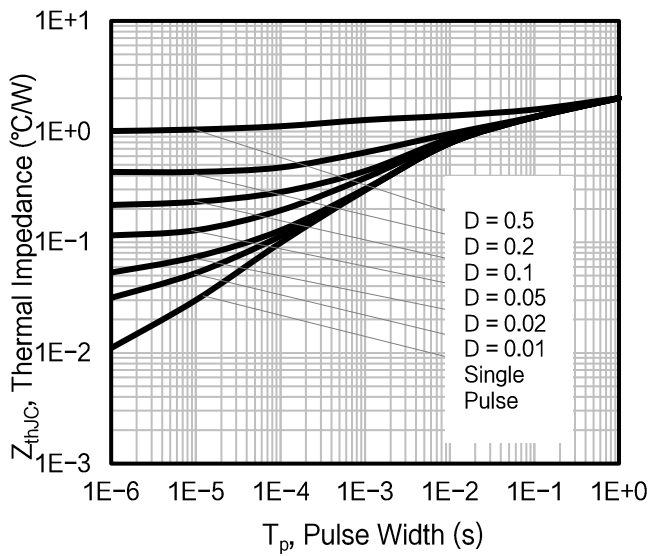


Figure A: Gate Charge Test Circuit and Waveform

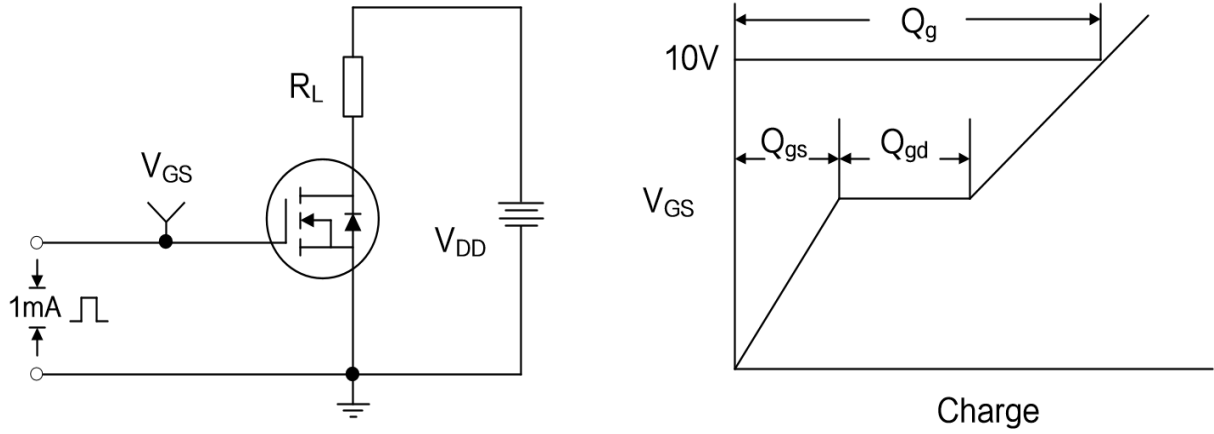


Figure B: Resistive Switching Test Circuit and Waveform

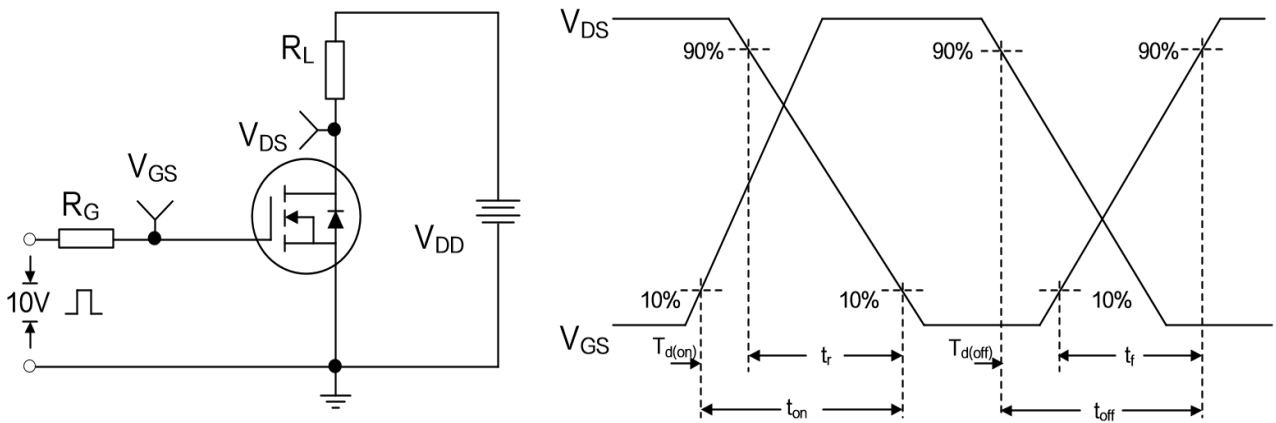
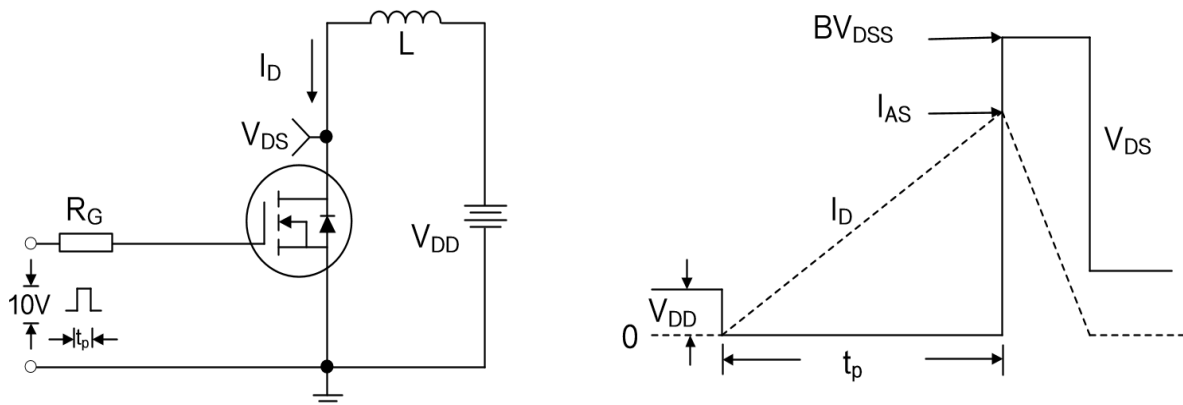
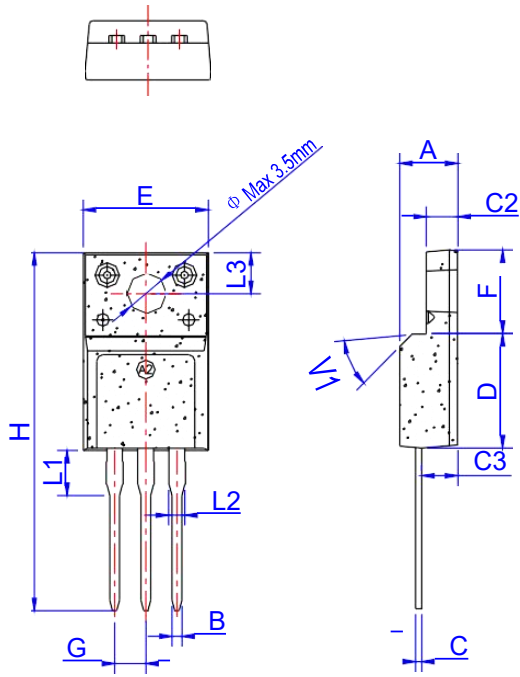


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



## TO-220F Package Mechanical Data



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.50		4.90	0.177		0.193
B	0.74	0.80	0.83	0.029	0.031	0.033
C	0.47		0.65	0.019		0.026
C2	2.45		2.75	0.096		0.108
C3	2.60		3.00	0.102		0.118
D	8.80		9.30	0.346		0.366
E	9.80		10.4	0.386		0.410
F	6.40		6.80	0.252		0.268
G		2.54			0.1	
H	28.0		29.8	1.102		1.173
L1		3.63			0.143	
L2	1.14		1.70	0.045		0.067
L3		3.30			0.130	
V1		45°			45°	


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