A2G40N1700MT3

1700V N-Channel MOSFET

Features

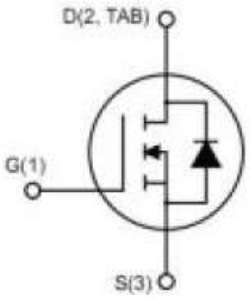
- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low Rds(on)
- Optimized package with separate driver source pin
- Easy to parallel and simple to drive
- ROHS Compliant, Halogen free

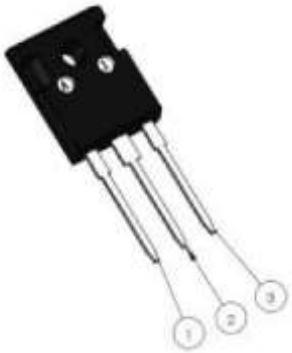
Typical Applications

- EV motor drive
- High Voltage DC/DC Converters
- Switch Mode Poser Supplies
- Solar inverters
- EV charging

Product Summary

V_{CES}	1700V
I_C	40A





Ordering Information

Part Number	Marking	Package	Packaging
A2G40N1700MT3	A2G40N1700MT3	TO-247-3	Tube

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	1700	V
I_D	Drain Current (continuous) at T_C=25°C	40	A
I_D	Drain Current (continuous) at T_C=100°C	28	A
I_{DM}	Drain Current (pulsed)	118	A
V_{GS}	Gate-Source Voltage	-10/+22	V
P_D	Power Dissipation T_C=25°C	242	W
T_J, T_{stg}	Junction and Storage Temperature Range	-55 to +175	°C

Electrical Characteristics (T_J=25°C unless otherwise specified)

Typical Performance-Static

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV_{DS}	Drain-source Breakdown Voltage	I_D=250uA, V_{GS}=0V	1700			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=1700V, V_{GS}=0V, T_J=25°C		5	100	uA
I_{GSS}	Gate-body Leakage Current	V_{DS}=0V, V_{GS}=-10 to 20V		10	150	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=10mA	2	3	4	V
V_{GSon}	Recommended turn-on Voltage	Static		18		V
V_{GSoff}	Recommended turn-off Voltage			-5		V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS}=18V, I_D=20A		72	88	mΩ
		V_{GS}=18V, I_D=20A, T_J=175°C		130		mΩ

Typical Performance-Dynamic

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input Capacitance	V_{DS}=1000V, f=1MHz V_{AC}=25mV		1550		pF
C_{oss}	Output Capacitance			138		pF
C_{rss}	Reverse Transfer Capacitance			20		pF
g_{fs}	Transconductance	V_{DS}=20V, I_D=20A		22		S
E_{OSS}	C_{OSS} Stored Energy	V_{DS}=1000V, f=1MHz		60		μJ
E_{ON}	Turn-On Energy (Body Diode)	V_{DS}=1000V V_{GS}=-5/20V, I_D=25A L=150μH, T_J=175°C		780		uJ
E_{OFF}	Turn-Off Energy (Body Diode)			185		uJ
Q_g	Total Gate Charge	V_{DS}=1000V V_{GS}=-5/20V I_D=25A		100		nC
Q_{gs}	Gate-source Charge			45		nC
Q_{gd}	Gate-Drain Charge			22		nC
$R_{G(int)}$	Internal Gate Resistance	f=1MHz, V_{AC}=25mV		3		Ω
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=1000V V_{GS}=-5/20V, I_D=25A L=150μH, T_J=175°C R_{ext}=4.7Ω		35		ns
t_r	Rise Time			22		ns
$t_{d(off)}$	Turn-off Delay Time			19		ns
t_f	Fall Time			15		ns

Typical Performance-Reverse Diode (T_J=25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{FSD}	Forward Voltage	V_{GS}=0V, I_F=20A, T_J=25°C		4.2	6	V
		V_{GS}=0V, I_F=20A, T_J=175°C		3.0	6	V
I_S	Continuous Diode Forward Current	V_{GS}=0V, T_C=25°C		30.5		A
t_{rr}	Reverse Recovery Time	V_{GS}=-5V, I_F=20A V_R=1000V di/dt=1000A/μs, T_J=175°C		36		ns
Q_{rr}	Reverse Recovery Charge			160		nC
I_{rrm}	Peak Reverse Recovery Current			10.5		A

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.62	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	40	°C/W

The values are based on the junction-to case thermal impedance which is measured with the device mounted to a large heat sink assuming maximum junction temperature of T_j(max)=175°C.

Electrical Characteristics

Fig1. Output characteristics (T_J = 25 °C)

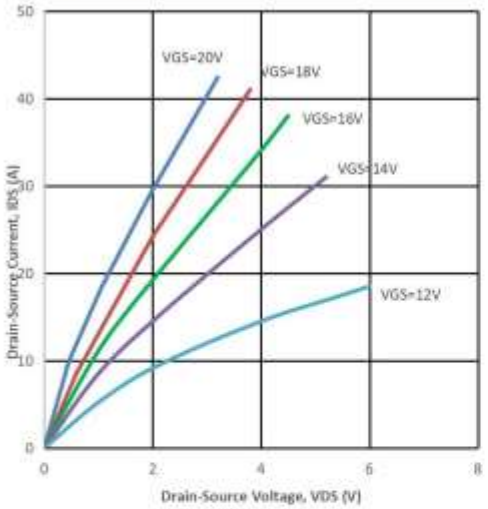


Fig2. Output characteristics (T_J = 175 °C)

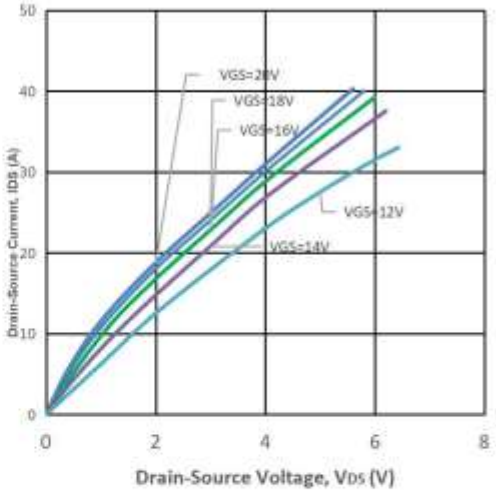


Fig3.Normalized On-Resistance vs. Temperature

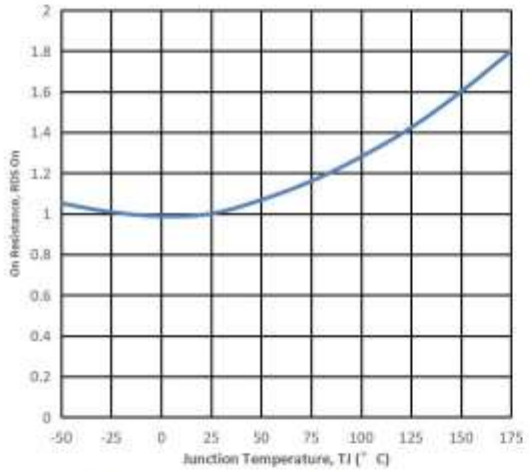


Fig4. On-Resistance vs.Temperature

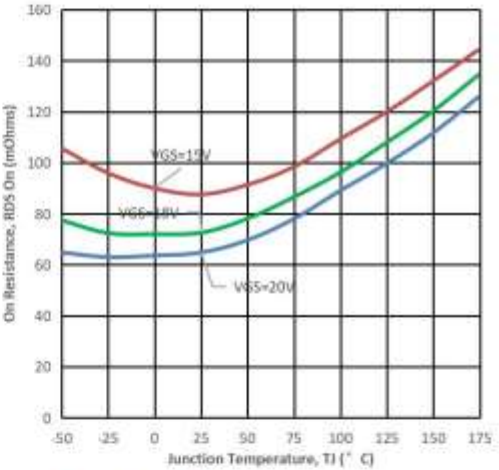


Fig5.Transfer Characteristic

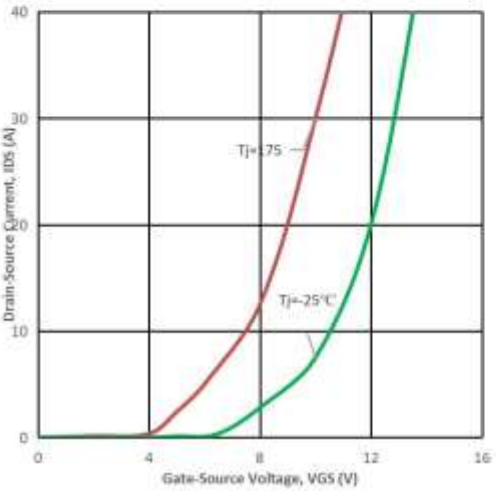


Fig6. Body Diode Characteristic at 25 °C

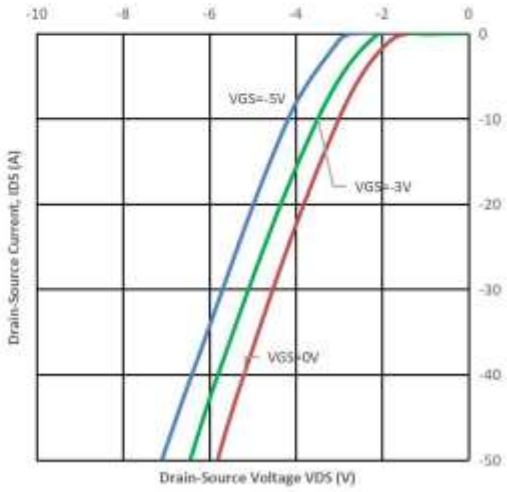


Fig7.Threshold Voltage vs. Temperature

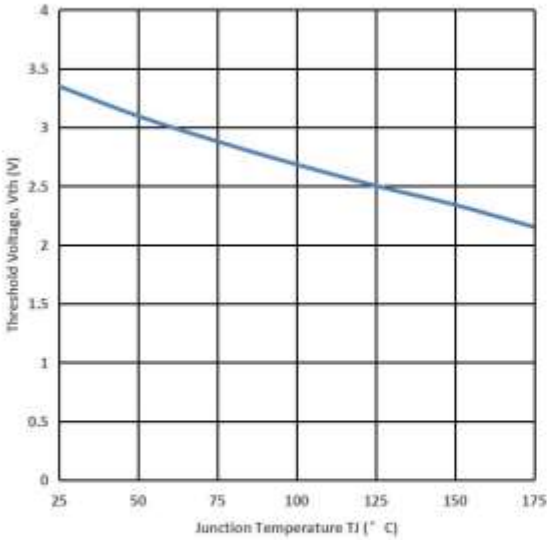


Fig8. Gate Charge Characteristics

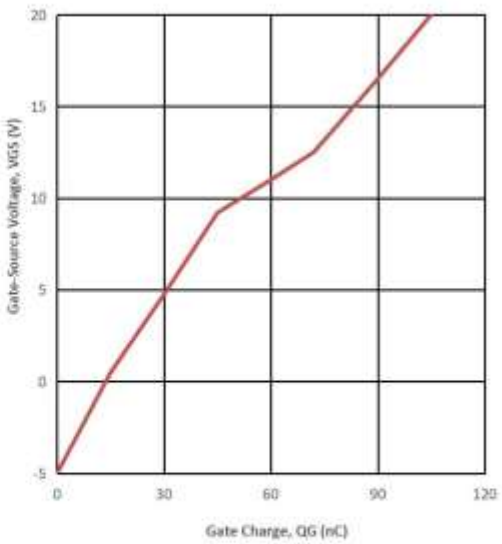


Fig9. 3rd Quadrant Characteristic at 25 °C

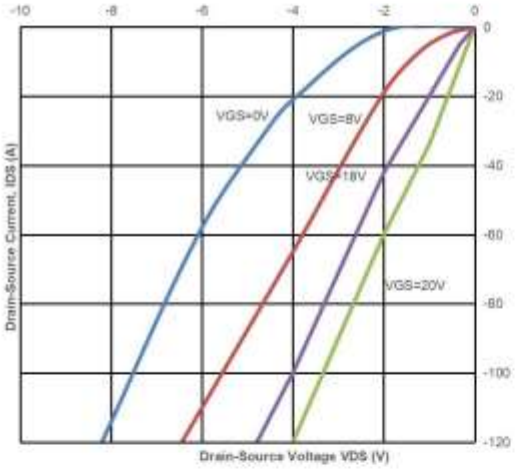


Fig10. Output Capacitor Stored Energy

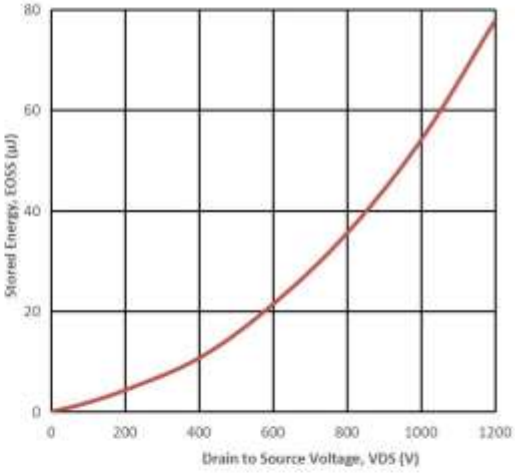


Fig11. Capacitances vs. Drain-Source

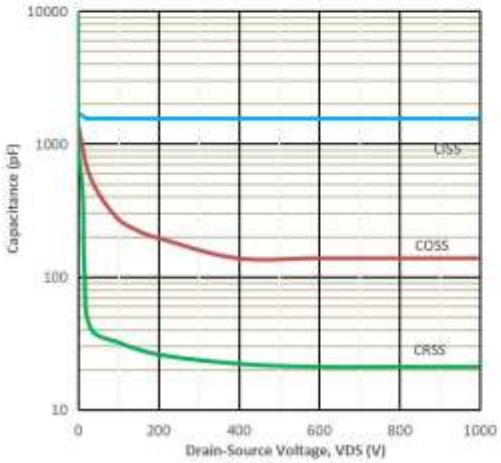


Fig12. Max Power Dissipation Derating Vs Tc

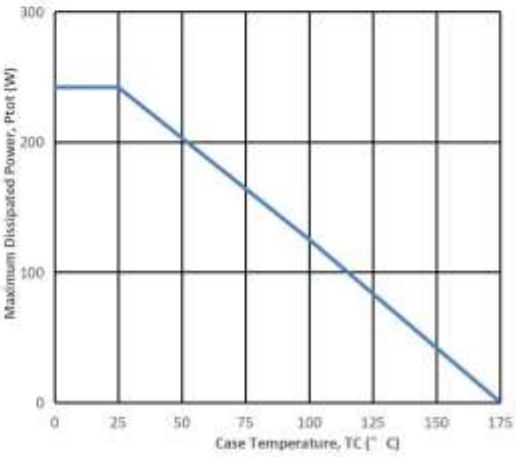


Fig13. Switching Energy vs. Drain Current

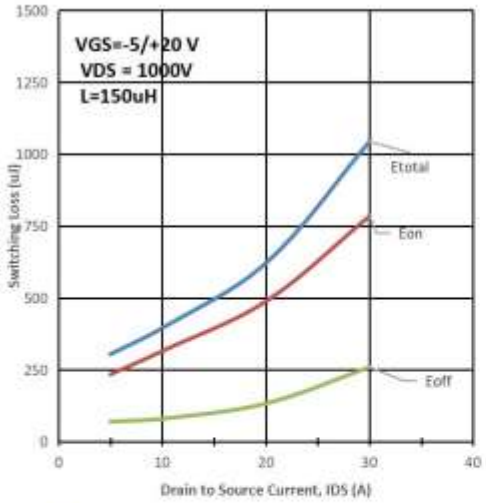


Fig14. Switching Energy vs. RG(ext)

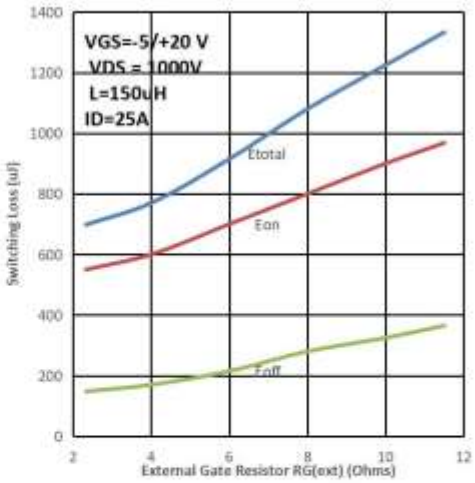


Fig15. Switching Energy vs. Temperature

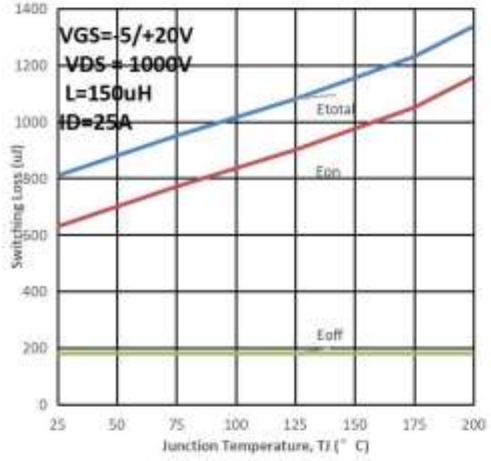


Fig16. Switching Times vs. RG(ext)

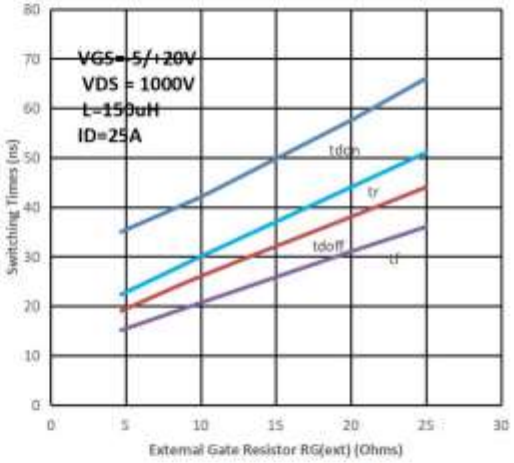


Fig17.Transient Thermal Impedance

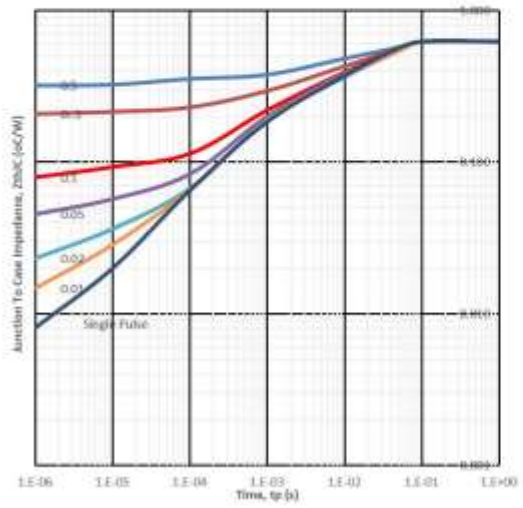
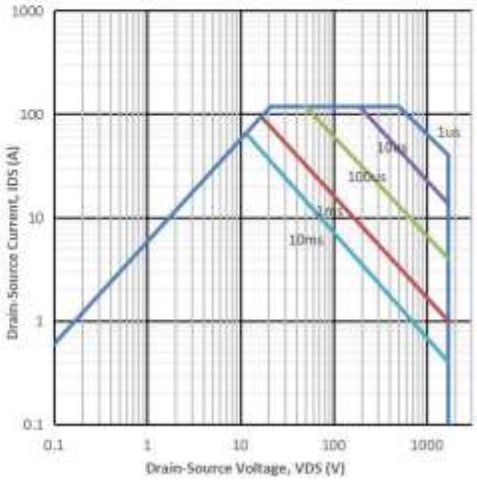
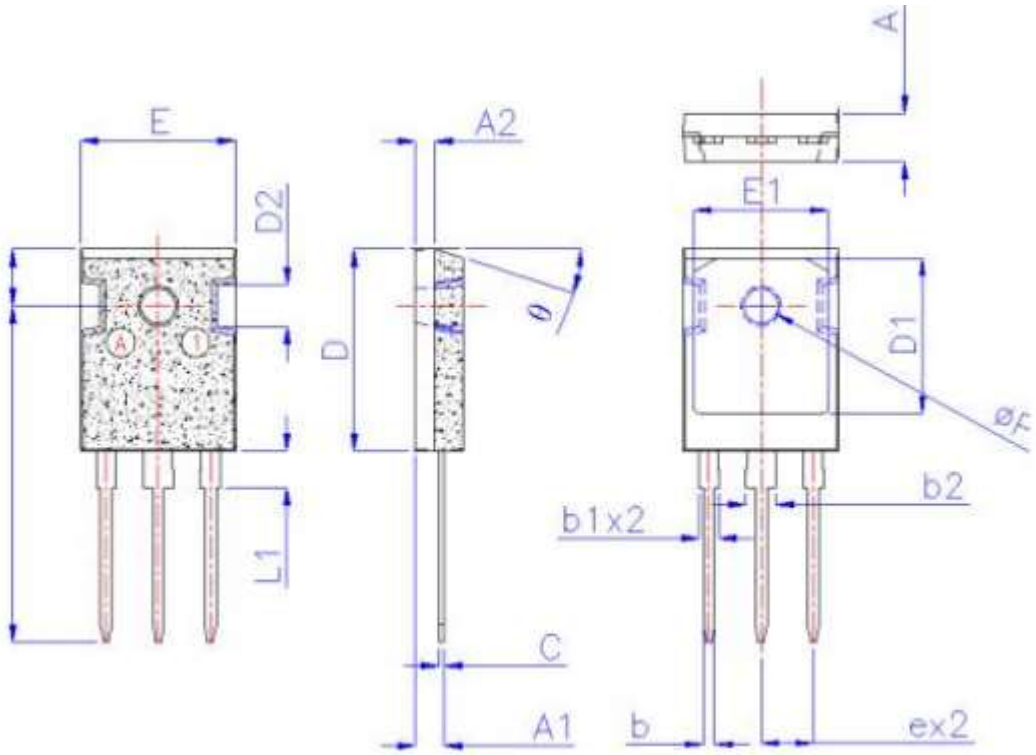


Fig18. Safe Operating Area



Package Drawing



Dimensions (Unit: mm)

Symbols	Dimensions in millimeters			Dimensions in inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	4.80	5.00	5.20	0.189	0.197	0.205
A1	2.85	3.00	3.15	0.112	0.118	0.124
b	1.16	1.22	1.27	0.046	0.048	0.050
b1	2.03	2.06	2.10	0.080	0.081	0.083
b2	3.03	3.06	3.10	0.119	0.120	0.122
C	0.55	0.60	0.65	0.022	0.024	0.026
D	20.80	21.00	21.20	0.819	0.827	0.835
D1	15.94	16.24	16.54	0.628	0.639	0.651
D2	4.30 BSC			0.169 BSC		
e	5.44 BSC			0.214 BSC		
E	15.95	16.15	16.35	0.628	0.636	0.644
E1	13.82	14.02	14.26	0.544	0.552	0.561
L	34.65	35.05	35.45	1.364	1.380	1.396
L1	-	-	3.86	-	-	0.152
Q	5.85	5.97	6.05	0.230	0.234	0.238
ØP	3.45	3.60	3.75	0.136	0.142	0.148
θ	17.5°			0.689°		