AG38N65S-Q1

N-Channel Super Junction Power MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
650V	109mΩ@10V	38A

Feature

- Optimized body diode reverse recovery performance
- Low on-resistance and low conduction losses
- Small package
- Ultra Low Gate Charge cause lower driving requirements
- Suffix "-Q1" for AEC-Q101

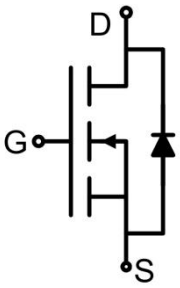
Application

- Power factor correction（PFC）
- Switched mode power supplies(SMPS)
- Uninterruptible Power Supply（UPS）
- LLC Half-bridge

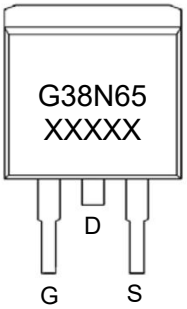
Package

TO-263AB

Circuit diagram



Marking



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Absolute Maximum Ratings (T_C=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	±40	V
Continuous Drain Current	I_D	38	A
Continuous Drain Current(T_C =100℃)	I_D(100℃)	24	A
Pulsed Drain Current[1)]	I_{DM}	152	A
Power Dissipation	P_D	322	W
Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	0.39	℃/W
Single pulse avalanche energy[2)]	E_{AS}	841	mJ
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55 ~ +150	℃

Electrical characteristics (T_A=25 ℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =500μA	650			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =650V,V_{GS} = 0V			3	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±20V, V_{DS} = 0V			±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	2.6	3.5	4.3	V
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =19A		89	109	mΩ
Dynamic characteristics[3)]						
Input Capacitance	C_{iss}	V_{DS} =50V,V_{GS} =0V,f =1MHz		2800		pF
Output Capacitance	C_{oss}			97		
Reverse Transfer Capacitance	C_{rss}			1.5		
Total Gate Charge	Q_g	V_{DS} =480V,V_{GS} =10V,I_D =38A		45		nC
Gate-Source Charge	Q_{gs}			15		
Gate-Drain Charge	Q_{gd}			11.5		
Turn-on delay time	$t_{d(on)}$	V_{DD}=380V,V_{GS}=10V, I_D =19A,R_G=1.7Ω		16		nS
Turn-on rise time	t_r			13		
Turn-off delay time	$t_{d(off)}$			71		
Turn-off fall time	t_f			13		
Source-Drain Diode characteristics						
Diode Forward Current	I_S				38	A
Diode Forward voltage	V_{SD}	V_{GS} =0V, I_S=28A ,T_j =25℃			1.2	V
Reverse Recovery Time	t_{rr}	T_j = 25°C, I_F =19A di/dt = 100A/μs		180		nS
Reverse Recovery Charge	Q_{rr}			1.6		uC
Peak Reverse Recovery Current	I_{rrm}			18		A

Notes:

1) Repetitive Rating: Pulse width limited by maximum junction temperature

2) T_j=25℃,V_{DD}=50V,V_G=10V, R_G=25Ω

3) Guaranteed by design, not subject to production.

Typical Characteristics

Figure1. Safe operating area

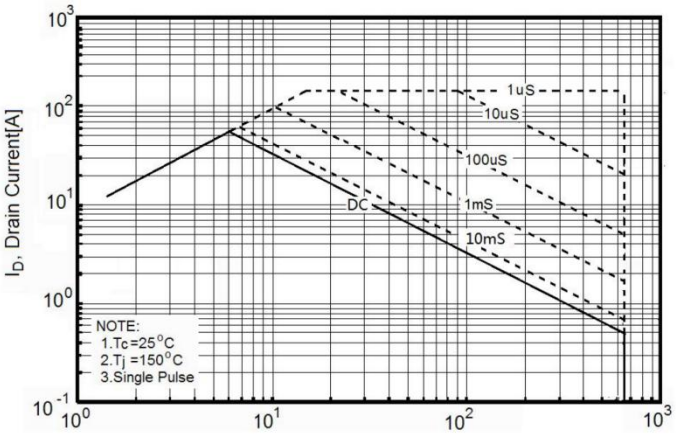


Figure2. Source-Drain Diode Forward Voltage

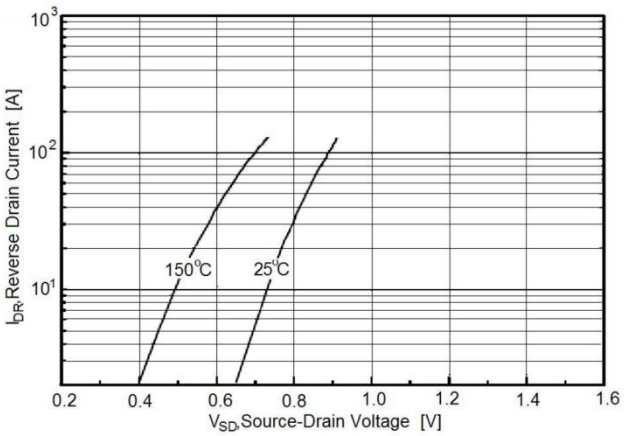
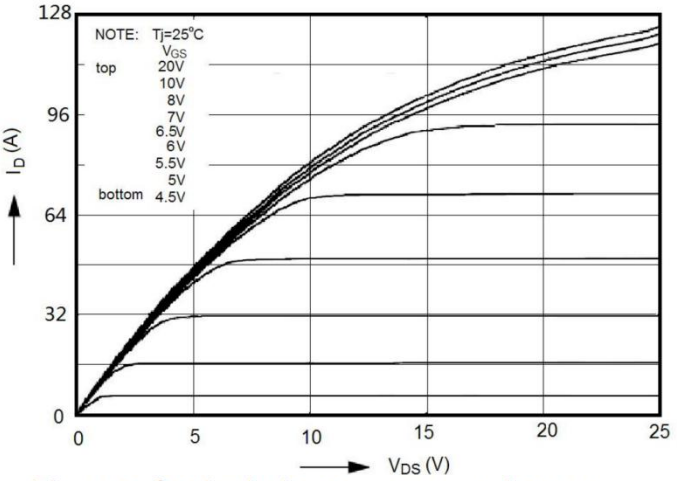


Figure3. Output characteristics

Figure4. Transfer characteristics



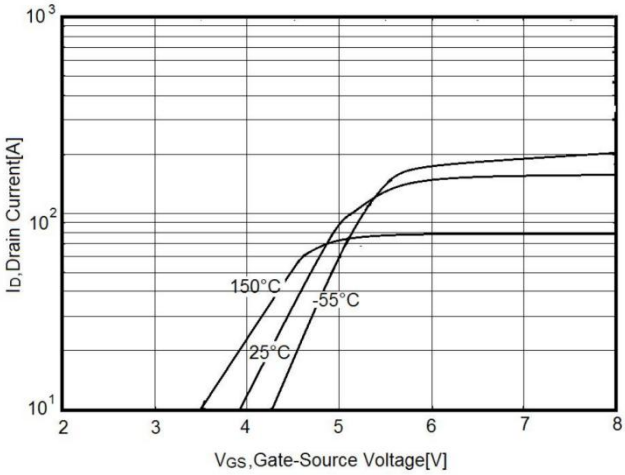
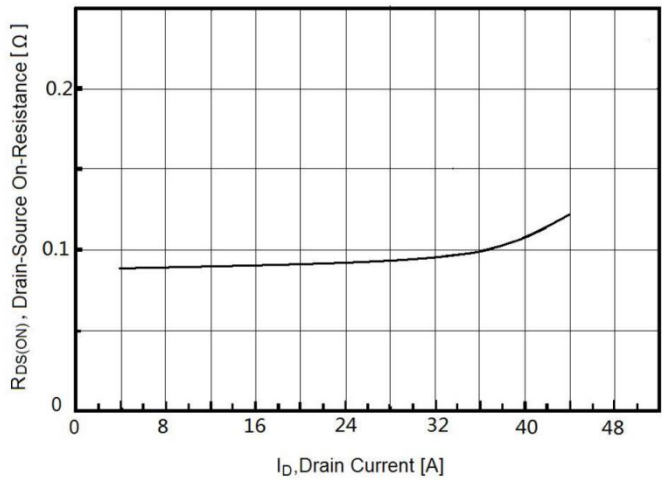
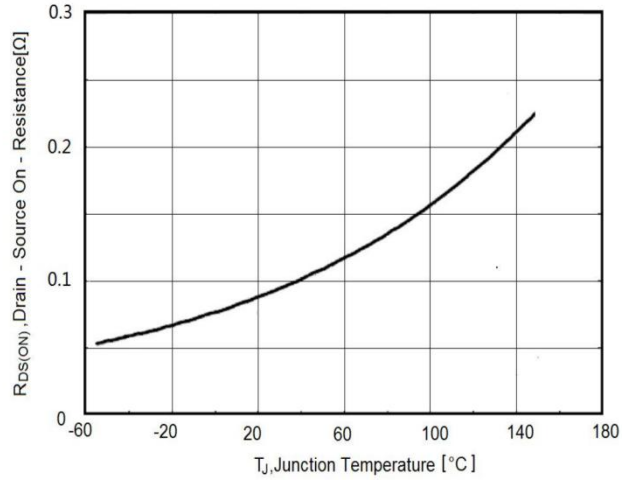


Figure5. Static drain-source on resistance

Figure6. $R_{DS(ON)}$ vs Junction Temperature





Typical Characteristics

Figure7. BV_{DSS} vs Junction Temperature

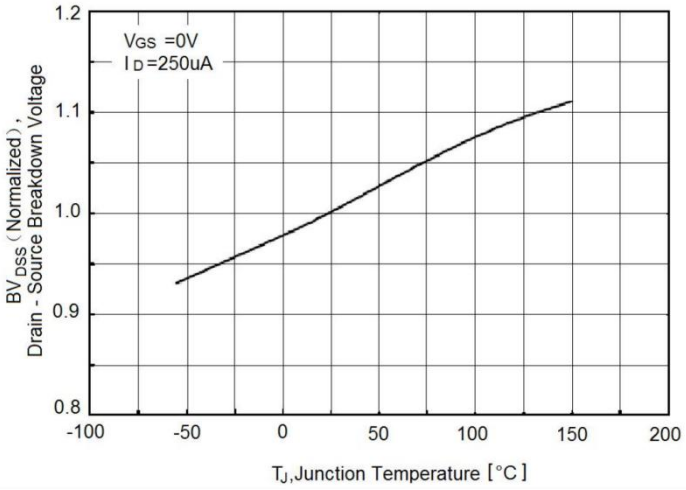


Figure8. Maximum I_D vs Junction Temperature

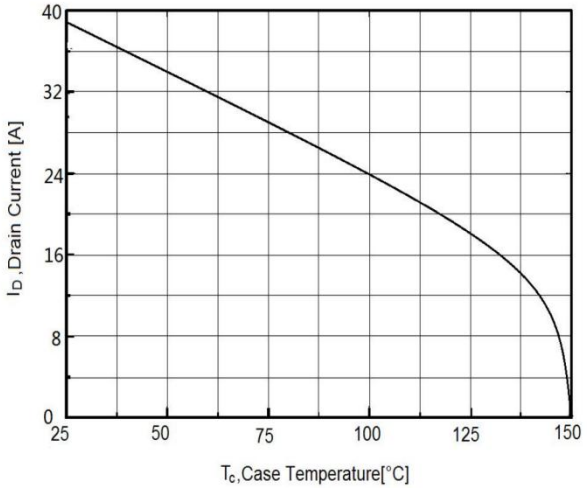


Figure9. Gate charge waveforms

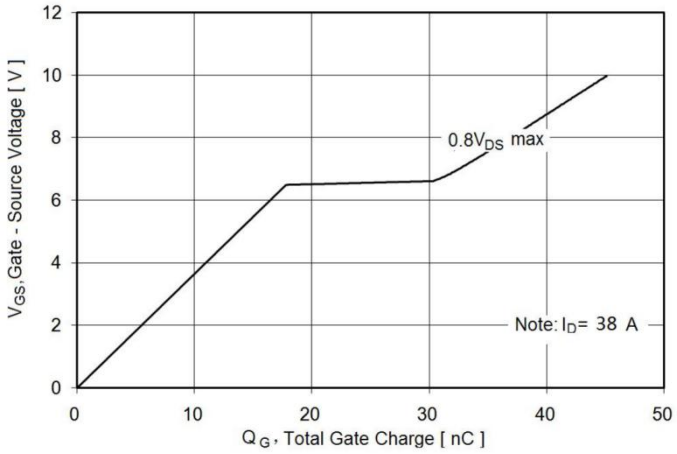
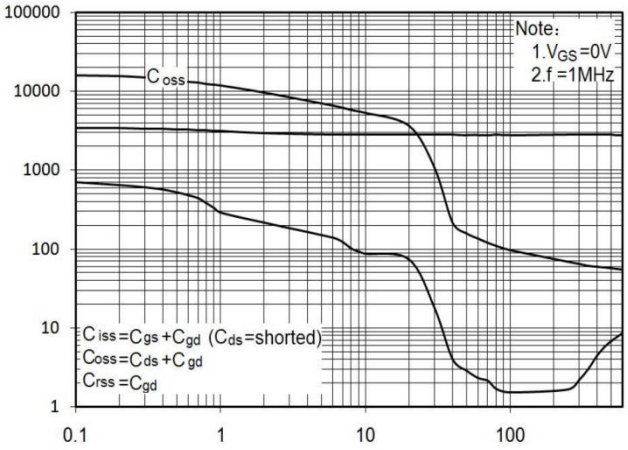
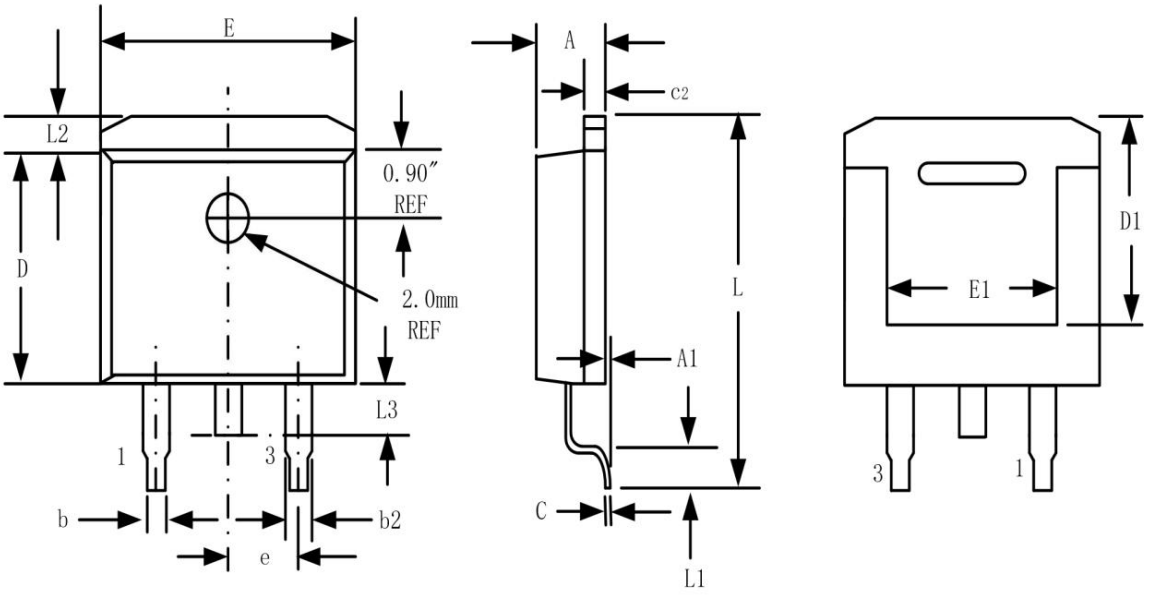


Figure10. Capacitance



TO-263AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.320	4.570	0.170	0.180
A1	0.000	0.250	0.000	0.010
b	0.710	0.940	0.028	0.037
b2	1.150	1.400	0.045	0.055
c	0.460	0.610	0.018	0.024
c2	1.220	1.400	0.048	0.055
D	8.890	9.400	0.350	0.370
D1	8.010	8.230	0.315	0.324
E	10.040	10.280	0.395	0.405
E1	7.880	8.080	0.310	0.318
e	2.540 BSC.		0.100 BSC.	
L	14.730	15.750	0.580	0.620
L1	2.290	2.790	0.090	0.110
L2	1.150	1.390	0.045	0.055
L3	1.270	1.770	0.050	0.070