

### 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

### Application

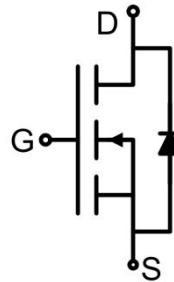
- Power factor correction (PFC)
- Switched mode power supplies(SMPS)
- Uninterruptible Power Supply (UPS)
- LLC Half-bridge

### Package

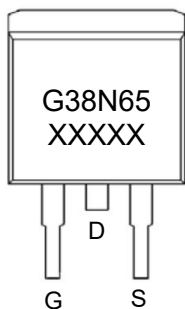


TO-263AB

### Circuit diagram



### Marking



### Absolute Maximum Ratings (T<sub>C</sub>=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DS</sub>	650	V
Gate-Source Voltage	V <sub>GS</sub>	±40	V
Continuous Drain Current	I <sub>D</sub>	38	A
Continuous Drain Current(T <sub>C</sub> =100°C)	I <sub>D</sub> (100°C)	24	A
Pulsed Drain Current <sup>1)</sup>	I <sub>DM</sub>	152	A
Power Dissipation	P <sub>D</sub>	322	W
Thermal Resistance,Junction-to-Case	R <sub>θJC</sub>	0.39	°C/W
Single pulse avalanche energy <sup>2)</sup>	E <sub>AS</sub>	841	mJ
Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature	T <sub>STG</sub>	-55 ~ +150	°C

### Electrical characteristics (T<sub>A</sub>=25 °C unless otherwise noted)

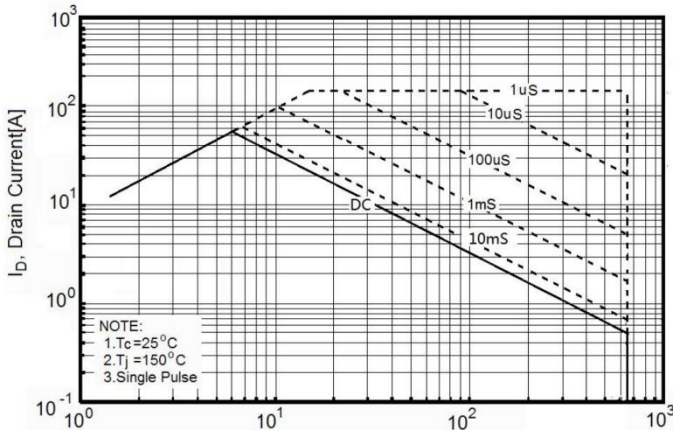
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =500μA	650			V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =650V,V <sub>GS</sub> = 0V			3	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> = 0V			±100	nA
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.6	3.5	4.3	V
Drain-source on-resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =19A		89	109	mΩ
<b>Dynamic characteristics<sup>3)</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =50V,V <sub>GS</sub> =0V,f =1MHz		2800		pF
Output Capacitance	C <sub>oss</sub>			97		
Reverse Transfer Capacitance	C <sub>rss</sub>			1.5		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =480V,V <sub>GS</sub> =10V,I <sub>D</sub> =38A		45		nC
Gate-Source Charge	Q <sub>gs</sub>			15		
Gate-Drain Charge	Q <sub>gd</sub>			11.5		
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =380V,V <sub>GS</sub> =10V, I <sub>D</sub> =19A,R <sub>G</sub> =1.7Ω		16		nS
Turn-on rise time	t <sub>r</sub>			13		
Turn-off delay time	t <sub>d(off)</sub>			71		
Turn-off fall time	t <sub>f</sub>			13		
<b>Source-Drain Diode characteristics</b>						
Diode Forward Current	I <sub>S</sub>				38	A
Diode Forward voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =28A ,T <sub>J</sub> =25°C			1.2	V
Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> = 25°C, I <sub>F</sub> =19A di/dt = 100A/μs		180		nS
Reverse Recovery Charge	Q <sub>rr</sub>			1.6		uC
Peak Reverse Recovery Current	I <sub>rrm</sub>			18		A

Notes:

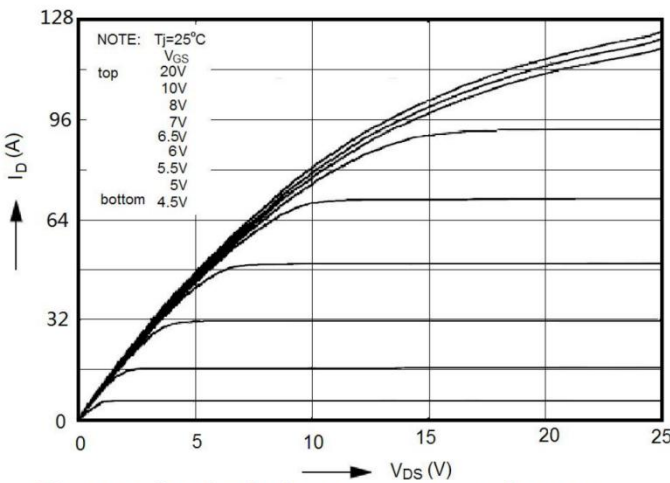
- 1) Repetitive Rating: Pulse width limited by maximum junction temperature
- 2) T<sub>J</sub>=25°C, V<sub>DS</sub>=50V, V<sub>GS</sub>=10V, R<sub>G</sub>=25Ω
- 3) Guaranteed by design, not subject to production.

## Typical Characteristics

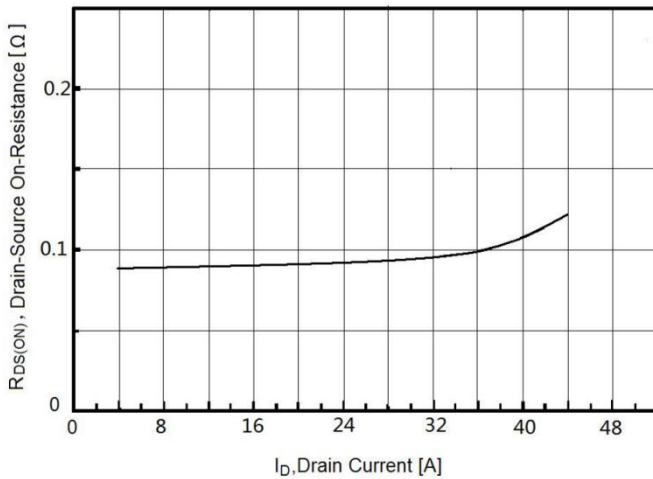
**Figure1. Safe operating area**



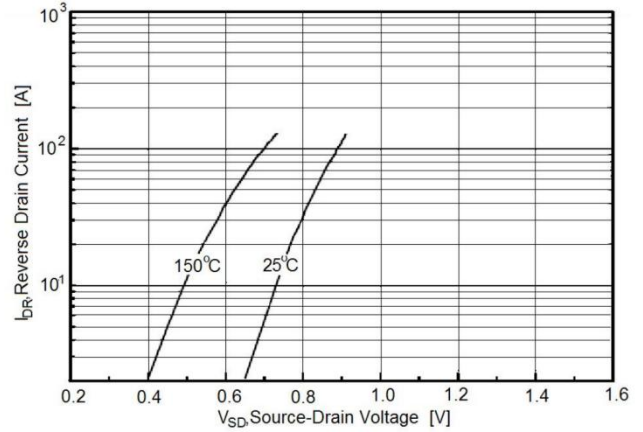
**Figure3. Output characteristics**



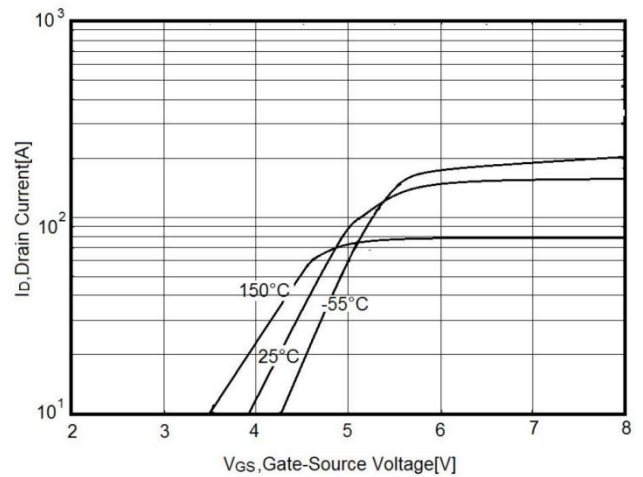
**Figure5. Static drain-source on resistance**



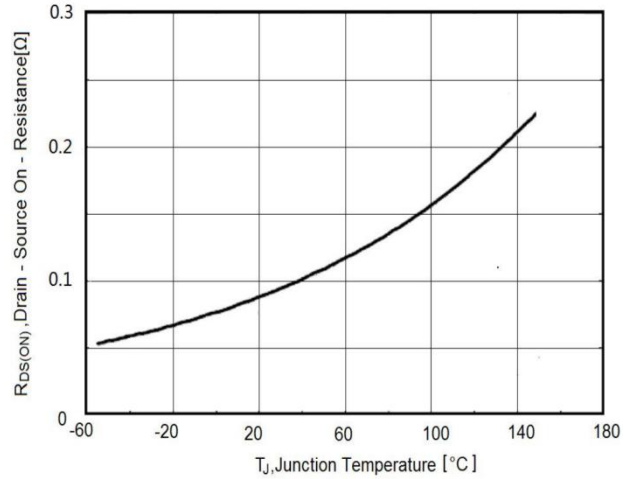
**Figure2. Source-Drain Diode Forward Voltage**



**Figure4. Transfer characteristics**

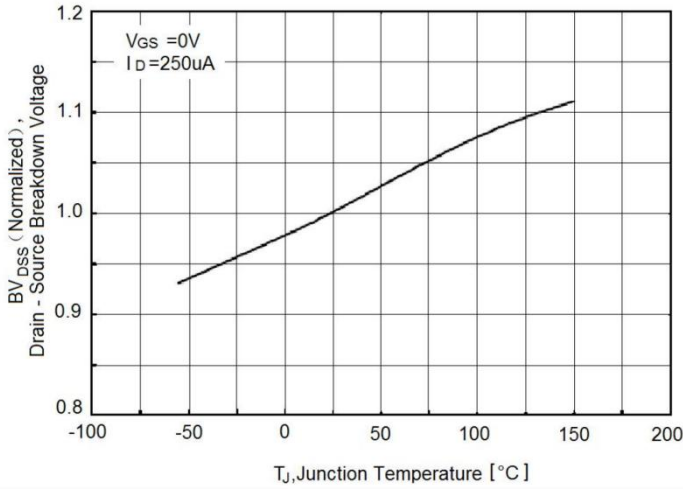


**Figure6. Rds(ON) vs Junction Temperature**

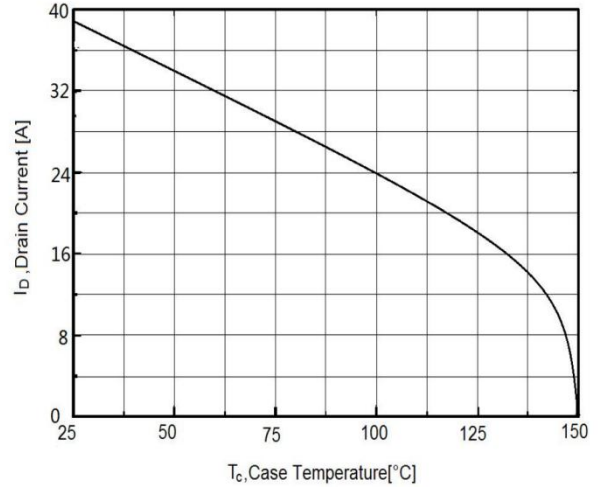


## Typical Characteristics

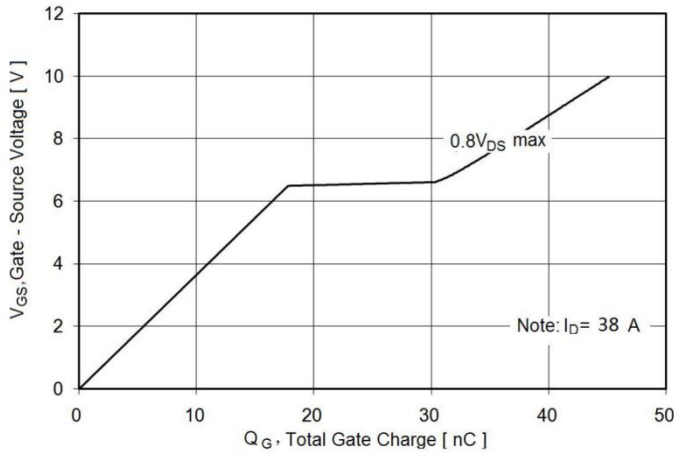
**Figure7.  $BV_{DSS}$  vs Junction Temperature**



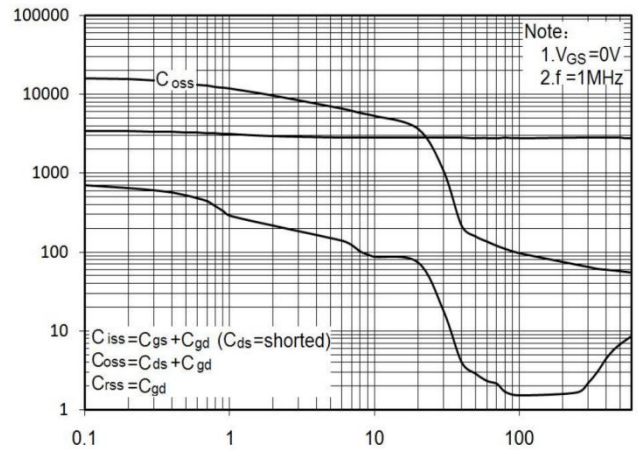
**Figure8. Maximum  $I_D$  vs Junction Temperature**



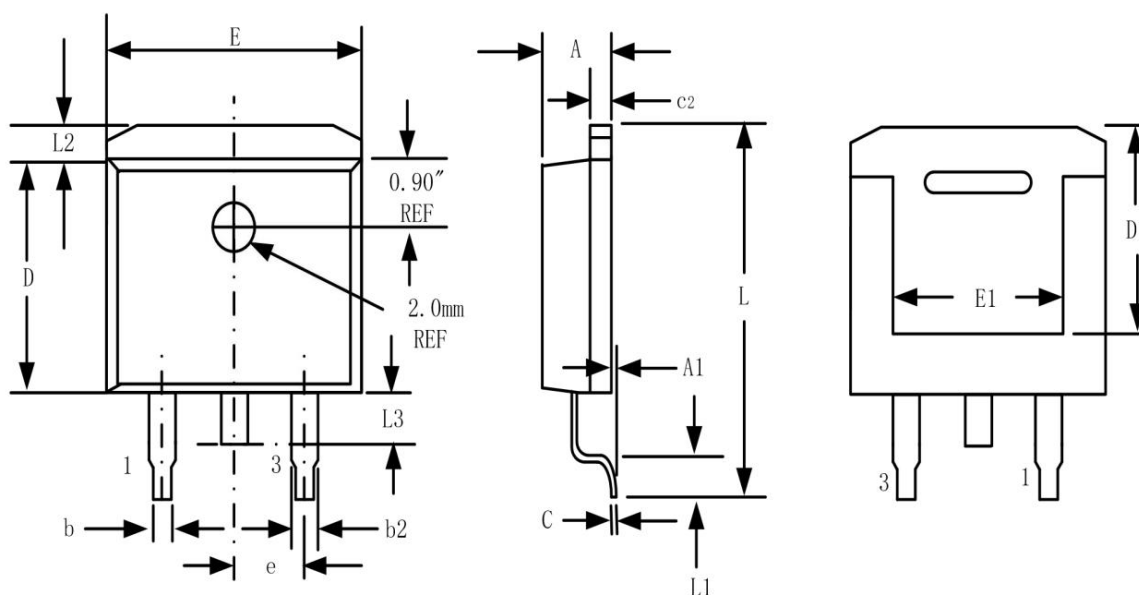
**Figure9. Gate charge waveforms**



**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