

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
650V	68mΩ@10V	45A

Feature

- Optimized body diode reverse recovery performance
- Low on-resistance and low conduction losses
- Ultra Low Gate Charge cause lower driving requirements

Application

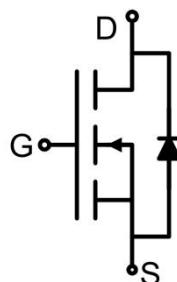
- Power factor correction (PFC)
- Switched mode power supplies (SMPS)
- Uninterruptible Power Supply (UPS)
- LLC Half-bridge

Package

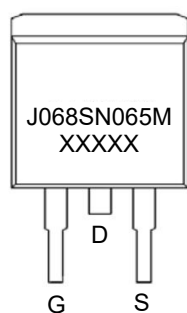


TO-263AB

Circuit diagram



Marking



Absolute Maximum Ratings (T_J=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage (V _{DS} =0V)	V _{DS}	650	V
Gate-Source Voltage (V _{DS} =0V) AC (f>1Hz)	V _{GS}	±30	V
Gate-Source Voltage (V _{DS} =0V) DC	V _{GS}	±20	V
Continuous Drain Current (T _C =25°C)	I _D	45	A
Continuous Drain Current (T _C =100°C)	I _D (100°C)	31.5	A
Pulsed Drain Current ¹⁾	I _{DM}	135	A
Single Pulse Avalanche Energy ²⁾	E _{AS}	400	mJ
Power Dissipation (T _C =25°C)	P _D	371	W
Thermal Resistance Junction to Case	R _{θJC}	0.40	°C/W
Operating Junction Temperature	T _J	-55 ~ +175	°C
Storage Temperature	T _{STG}	-55 ~ +175	°C

Electrical characteristics (T_J=25°C 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 =1mA	650			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =650V, V _{GS} =0V, T _C =25°C			10	μA
Gate-body leakage current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =500μA	3.5	4.2	5	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =23A		60	68	mΩ
Dynamic characteristics ³⁾						
Input Capacitance	C _{iss}	V _{DS} =50V, V _{GS} =0V, f =1MHz		3900		pF
Output Capacitance	C _{oss}			132		
Reverse Transfer Capacitance	C _{rss}			14		
Total Gate Charge	Q _g	V _{DS} =480V, V _{GS} =10V, I _D =23A		65		nC
Gate-Source Charge	Q _{gs}			21		
Gate-Drain Charge	Q _{gd}			17		
Turn-on delay time	t _{d(on)}	V _{DS} =380V, V _{GS} =10V, I _D =23A R _G =1.7Ω		42		nS
Turn-on rise time	t _r			14		
Turn-off delay time	t _{d(off)}			90		
Turn-off fall time	t _f			12		
Source-Drain Diode characteristics						
Diode Forward Current	I _S	T _C =25°C			45	A
Diode Forward voltage	V _{SD}	V _{GS} =0V, I _S =45A, T _J =25°C			1.2	V
Reverse Recovery Time	T _{rr}	I _F =23A, di/dt =100A/μs, T _J =25°C		173		nS
Reverse Recovery Charge	Q _{rr}			1.13		μC

Notes:

- 1) Repetitive Rating: Pulse width limited by maximum junction temperature.
- 2) T_J=25°C, V_{DD} =50V, V_G =10V, R_G=25Ω.
- 3) Guaranteed by design, not subject to production testing.

Typical Characteristics

Figure1. Safe operating area

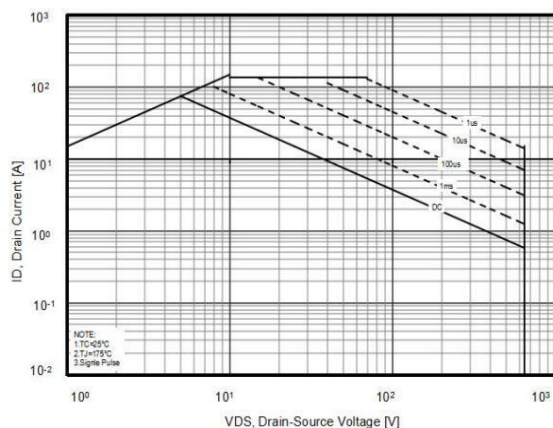


Figure2. Capacitance

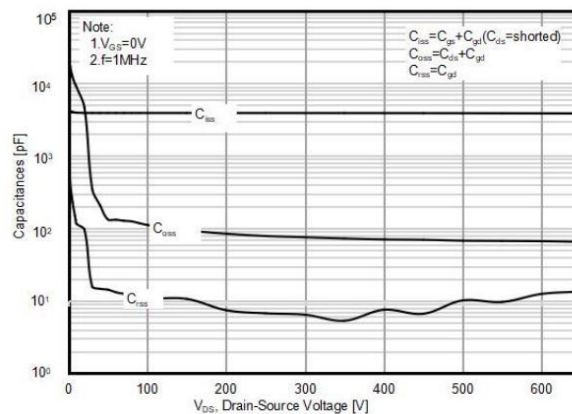


Figure3. Source-Drain Diode Forward Voltage

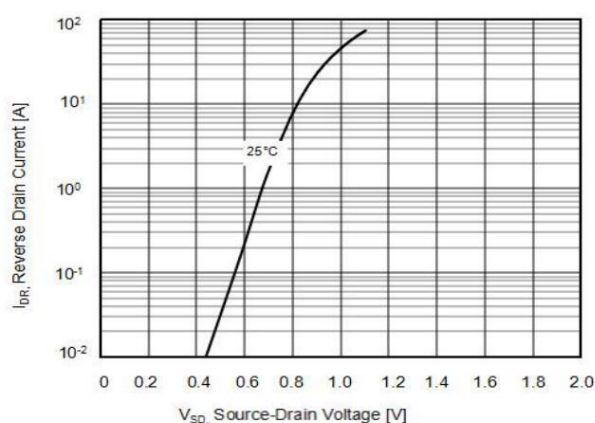


Figure4. Output characteristics

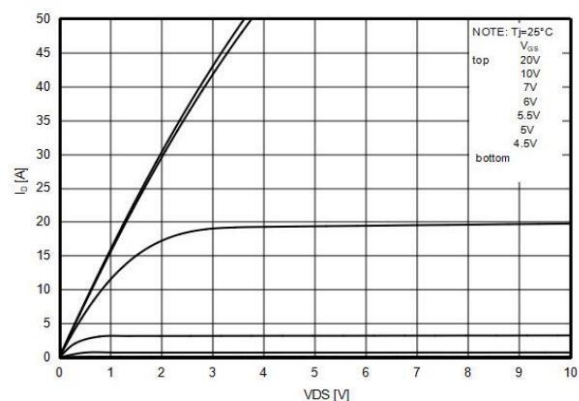


Figure5. $R_{DS(ON)}$ vs Junction Temperature

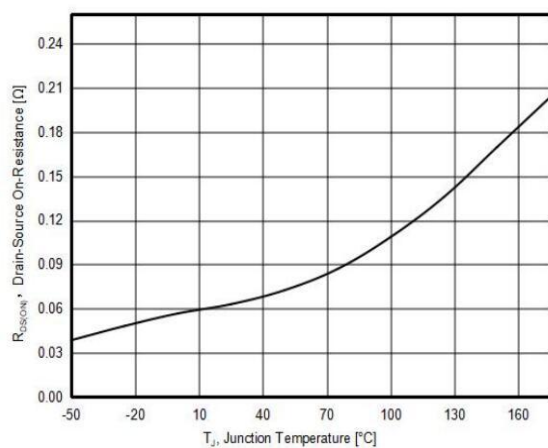
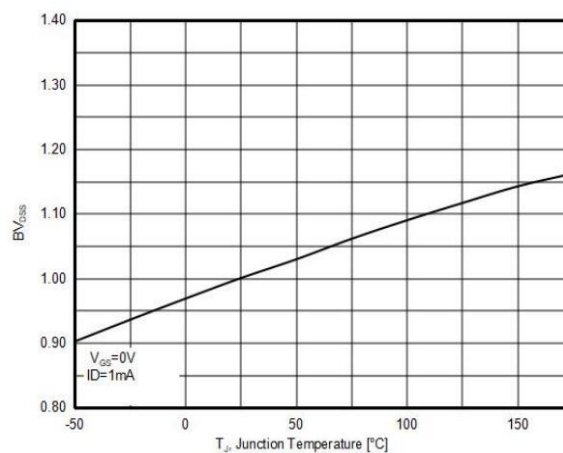


Figure6. BV_{DSS} vs Junction Temperature



Typical Characteristics

Figure7. Maximum I_D vs Junction Temperature

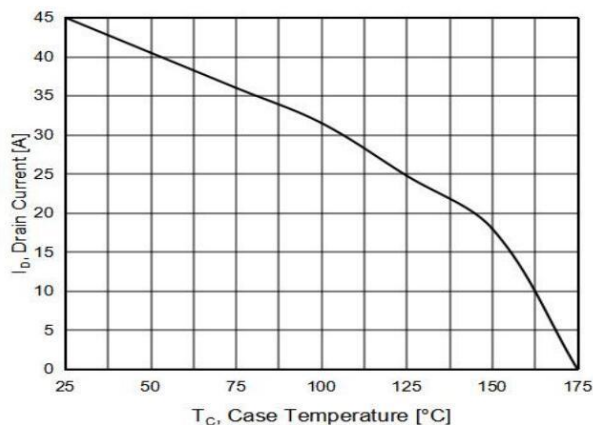


Figure8. Gate charge waveforms

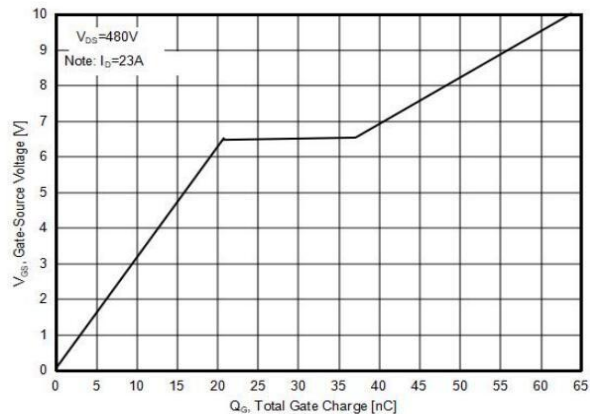


Figure9. Static drain-source on resistance

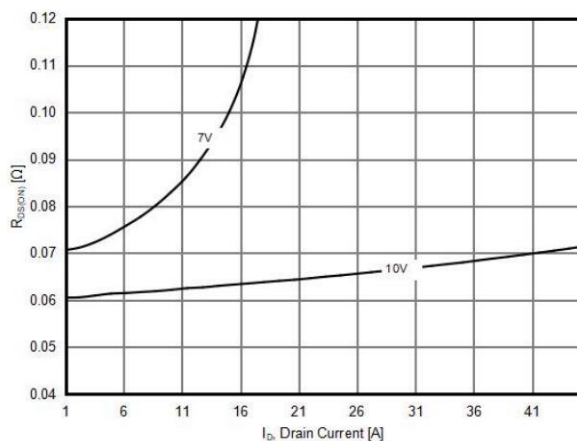
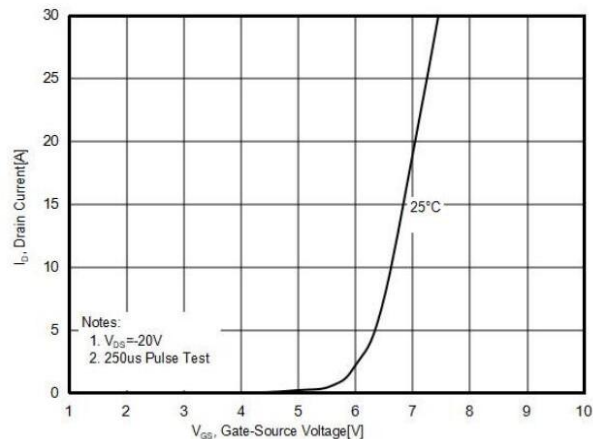
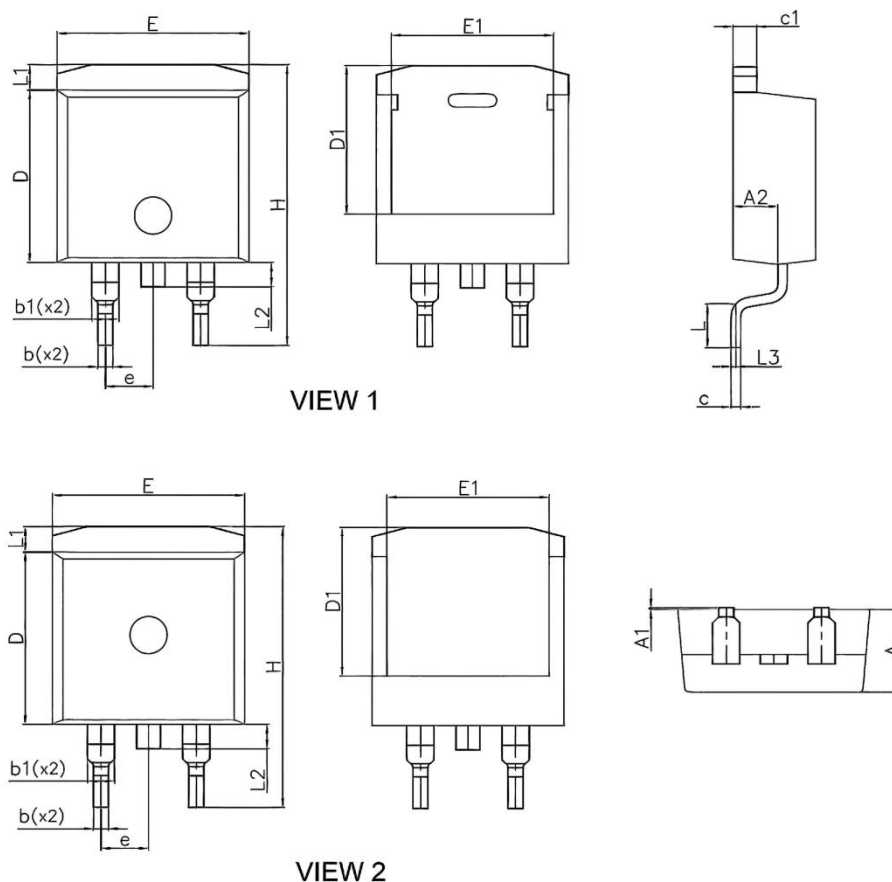


Figure10. Transfer characteristics



TO-263AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.200	4.600	0.165	0.181
A1	0.000	0.250	0.000	0.010
A2	2.200	2.600	0.087	0.102
b	0.700	0.900	0.028	0.035
b1	1.200	1.750	0.047	0.069
c	0.400	0.600	0.016	0.024
c1	1.150	1.400	0.045	0.055
D	9.100	9.300	0.358	0.366
D1	7.630	8.230	0.300	0.324
E	9.800	10.450	0.386	0.411
E1	7.800	8.950	0.307	0.352
e	2.540 BSC.		0.100 BSC.	
H	14.610	15.880	0.575	0.625
L	1.780	2.790	0.070	0.110
L1	1.360 REF.		0.054 REF.	
L2	1.300 REF.		0.051 REF.	
L3	0.250 REF.		0.010 REF.	