

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
650V	99mΩ@10V	36A

Feature

- New technology for high voltage device
- Low on-resistance and low conduction losses
- Ultra Low Gate Charge cause lower driving requirements
- Diode reverse recovery speed is super fast
- High reliability
- Suffix "-Q1" for AEC-Q101

Package

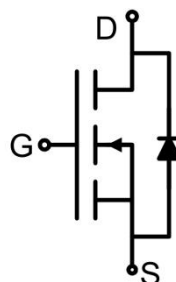


TO-263AB

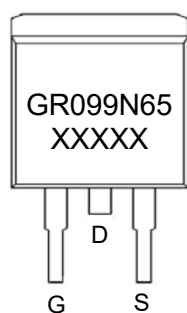
Application

- Power factor correction (PFC)
- Switched mode power supplies(SMPS)
- Uninterruptible Power Supply (UPS)
- On-board charger(OBC)

Circuit diagram



Marking



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	650	V
Gate-Source Voltage(V _{DS} =0V) AC (f>1 Hz)	V _{GS}	±30	V
Gate-Source Voltage (V _{DS} =0V) DC	V _{GS}	±20	V
Continuous Drain Current	I _D	36	A
Continuous Drain Current(T _C =100°C)	I _D (100°C)	25.2	A
Pulsed Drain Current ¹⁾	I _{DM}	108	A
Power Dissipation	P _D	346	W
Thermal Resistance,Junction-to-Case	R _{θJC}	0.43	°C/W
Thermal Resistance,Junction-to-Ambient	R _{θJA}	62	°C/W
Single pulse avalanche energy ²⁾	E _{AS}	324	mJ
Avalanche current ¹⁾	I _{AS}	9	A
Junction Temperature	T _J	175	°C
Storage Temperature	T _{STG}	-55 ~ +175	°C

Electrical characteristics (T_A=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 (T _C =25℃)	I _{DSS}	V _{DS} =650V, V _{GS} = 0V, T _C =25℃			10	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 =500μA	3.5	4.2	5.0	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =18A		85	99	mΩ
Dynamic characteristics ³⁾						
Input Capacitance	C _{iss}	V _{DS} =50V, V _{GS} =0V, f =1MHz		2800		pF
Output Capacitance	C _{oss}			96		
Reverse Transfer Capacitance	C _{rss}			6		
Total Gate Charge	Q _g	V _{DS} =480V, V _{GS} =10V, I _D =18A		55		nC
Gate-Source Charge	Q _{gs}			16.5		
Gate-Drain Charge	Q _{gd}			25.5		
Gate plateau voltage	V _{gp}			7.3		V
Intrinsic gate resistance	R _G	f =1MHz open drain		1.5		Ω
Turn-on delay time	t _{d(on)}	V _{DD} =380V, V _{GS} =10V, I _D =18A, R _G =1.7Ω		15		nS
Turn-on rise time	t _r			14		
Turn-off delay time	t _{d(off)}			72		
Turn-off fall time	t _f			14		
Source-Drain Diode characteristics						
Diode Forward Current	I _S	T _C =25℃			36	A
Pulsed Source-drain current	I _{SDM}				108	A
Diode Forward voltage	V _{SD}	V _{GS} =0V, I _S =36A ,T _j =25℃			1.2	V
Reverse Recovery Time	t _{rr}	T _j = 25℃, I _F =18A di/dt = 100A/μs		160		nS
Reverse Recovery Charge	Q _{rr}			0.96		μC
Peak Reverse Recovery Current	I _{rrm}			12		A

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

Typical Characteristics

Figure1. Safe operating area

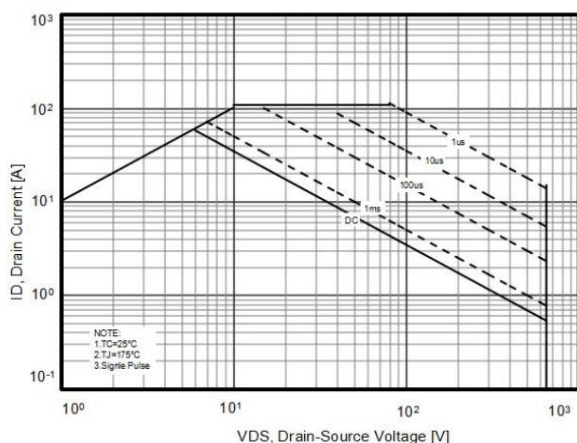


Figure2. Capacitance

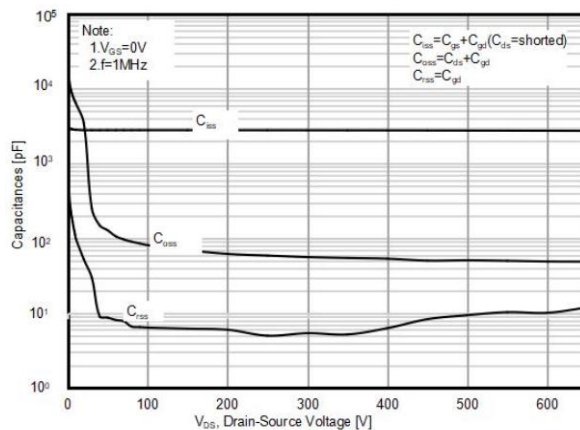


Figure3. Output characteristics

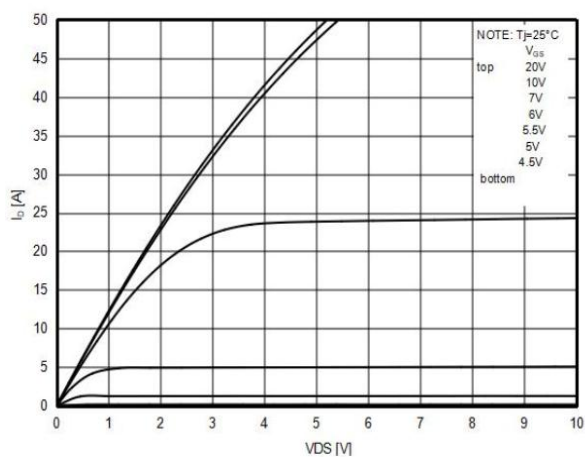


Figure4. Source-Drain Diode Forward Voltage

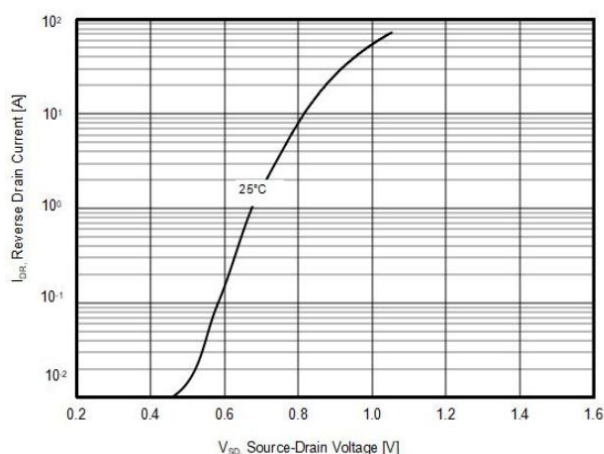


Figure5. Static drain-source on resistance

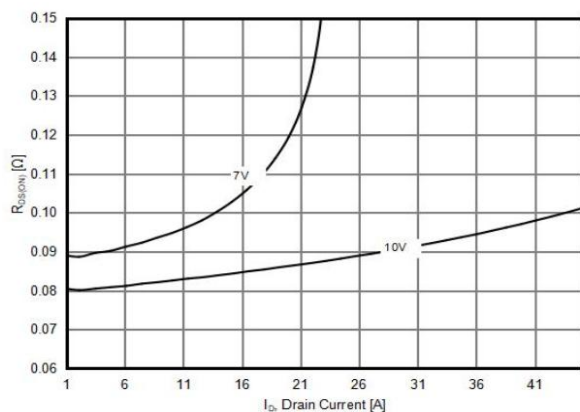
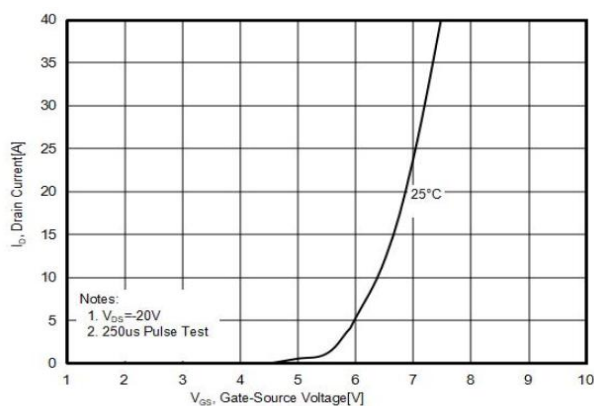


Figure6. Transfer characteristics



Typical Characteristics

Figure7. $R_{DS(ON)}$ vs Junction Temperature

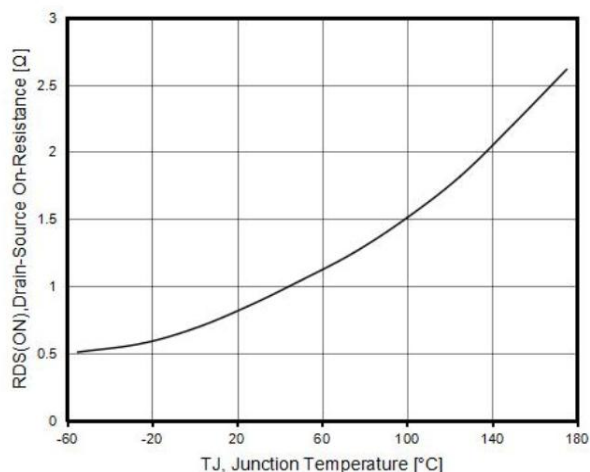


Figure8. BV_{DSS} vs Junction Temperature

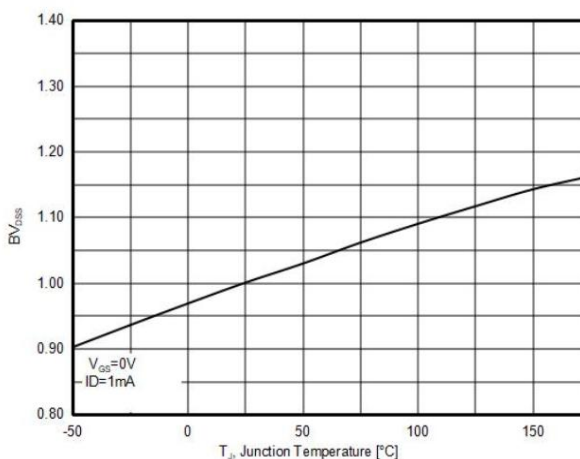


Figure9. Gate charge waveforms

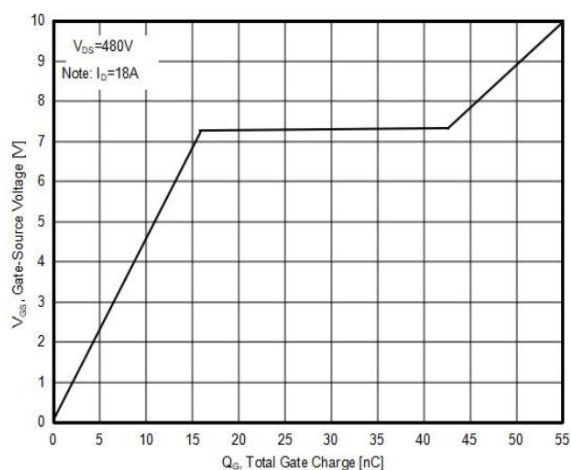
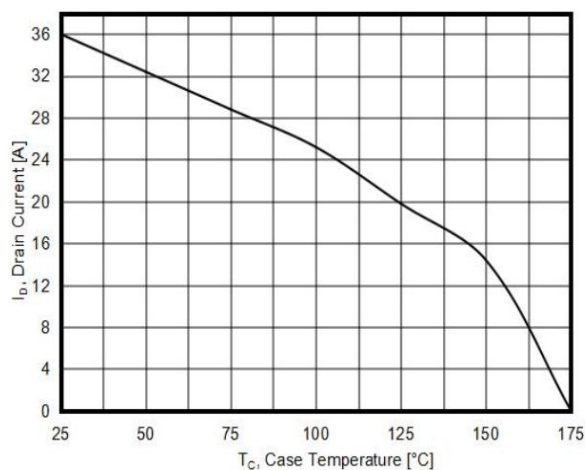
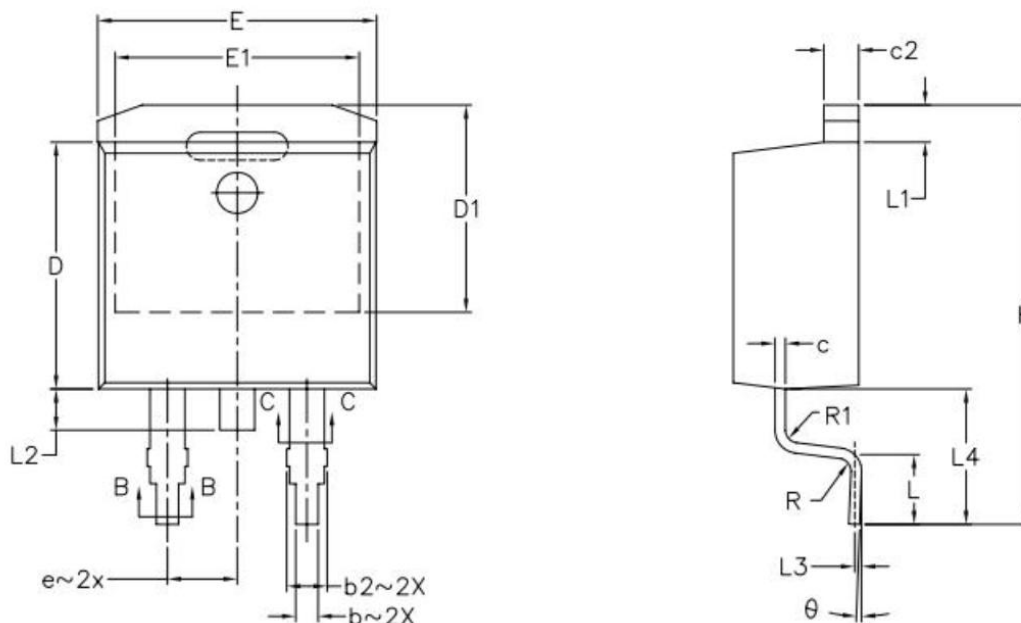


Figure10. Maximum I_D vs Junction Temperature

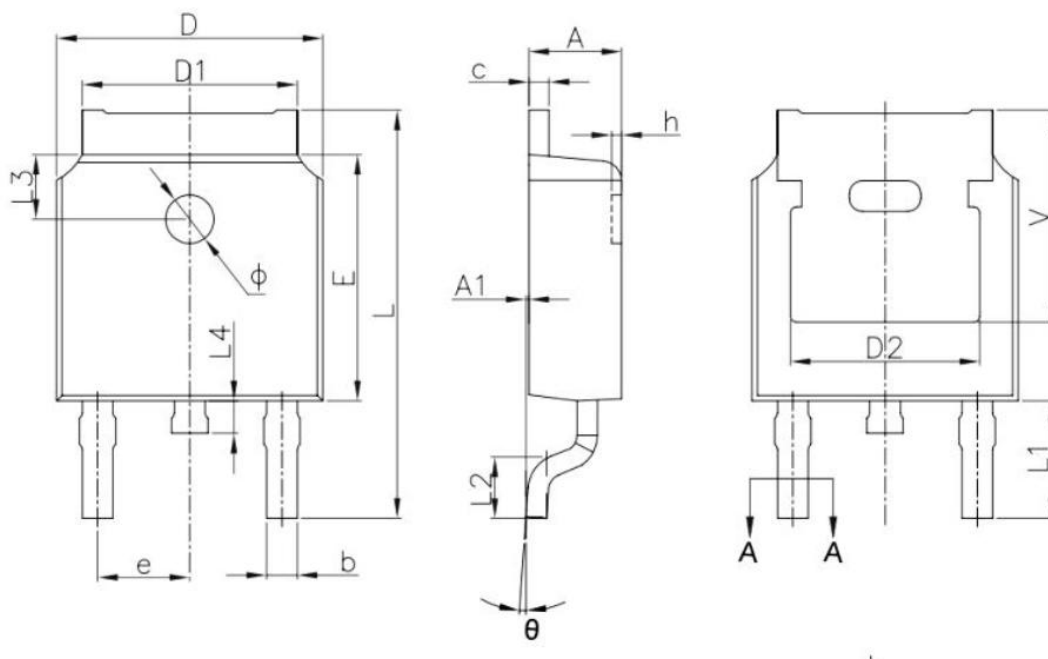


TO-263AB-1 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.060	4.830	0.160	0.190
A1	0.000	0.250	0.000	0.010
b	0.510	0.990	0.020	0.039
b1	0.510	0.890	0.020	0.035
b2	1.140	1.780	0.045	0.070
b3	1.140	1.730	0.045	0.068
C	0.380	0.740	0.015	0.029
c1	0.380	0.580	0.015	0.023
c2	1.140	1.650	0.045	0.065
D	8.380	9.650	0.330	0.380
D1	6.860	-	0.270	-
E	9.650	10.000	0.380	0.394
E1	6.220	-	0.245	-
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	-	1.680	-	0.066
L2	-	1.780	-	0.070
L3	0.250 BSC.		0.101 BSC.	
L4	4.780	5.280	0.188	0.208

TO-263AB-2 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.200	4.600	0.165	0.181
A1	-	0.250	-	0.010
A2	2.200	2.600	0.087	0.102
b	0.700	0.900	0.028	0.035
b2	1.170	1.370	0.046	0.054
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	0.3	0.324
E	10.050	10.450	0.396	0.411
E1	8.350	8.950	0.329	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.		0.053 REF.	
L2	1.300 REF.		0.051 REF.	
L3	0.250 REF.		0.009 REF.	