AFT099N65S-Q1

N-Channel Super Junction Power MOSFET

Product Summary

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

Feature

- New technology for high voltage device
- Ultra low on-resistance and ultra 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

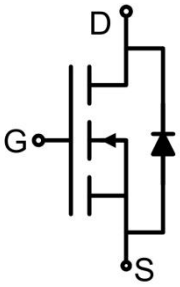
Application

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

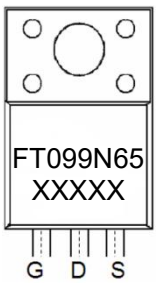
Package

ITO-220AB

Circuit diagram



Marking



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Absolute maximum ratings (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current (T_C =25℃)	I_D	36	A
Continuous Drain Current (T_C =100℃)	I_D(100℃)	25.2	A
Pulsed Drain Current[1)]	I_{DM}	108	A
Power Dissipation (T_C =25℃)	P_D	35	W
Derate above 25℃	-	0.23	W/℃
Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	4.29	℃/W
Single pulse avalanche energy[2)]	E_{AS}	324	mJ
Avalanche current[1)]	I_{AS}	9	A
Repetitive Avalanche energy, t_{AR} limited by T_{jmax}[1)]	E_{AR}	0.39	mJ
Junction Temperature	T_J	175	℃
Storage Temperature	T_{STG}	-55 ~ +175	℃

Electrical characteristics (T_J=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 =1mA	650			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =650V,V_{GS} = 0V,T_C =25℃			10	μA
		V_{DS} =650V,V_{GS} = 0V,T_C =125℃			400	
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		
Gate Resistance	R_g	f =1MHz, open drain		1.5		Ω
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
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_{SD}	T_C =25℃			36	A
Diode Forward Pulse Current	I_{SDM}				108	
Diode Forward voltage	V_{SD}	V_{GS} =0V, I_{SD}=36A			1.2	V
Reverse Recovery Time	t_{rr}	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) Tj=25℃,V_{DD}=50V,V_G=10V,R_g=25Ω.

3) Guaranteed by design, not subject to production testing.

Typical Characteristics

Figure1. Safe operating area

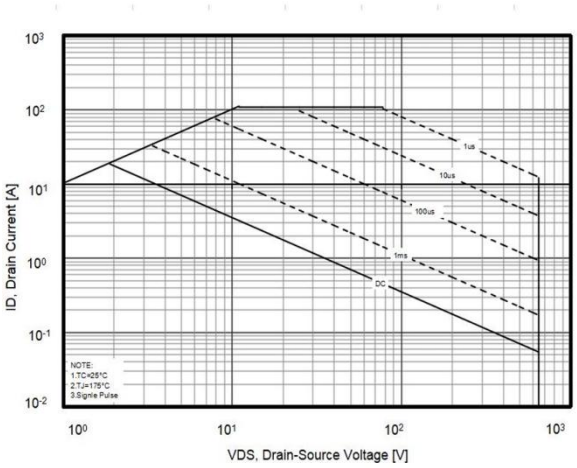


Figure2. Capacitance

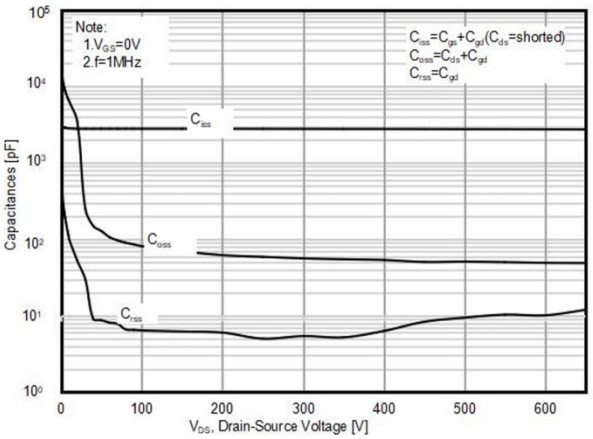


Figure3. Output characteristics

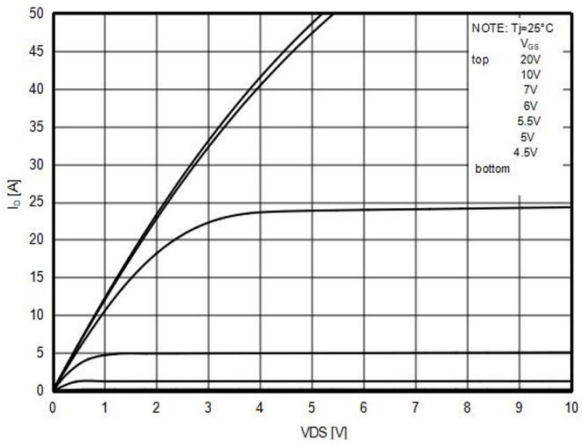


Figure4. Source-Drain Diode Forward Voltage

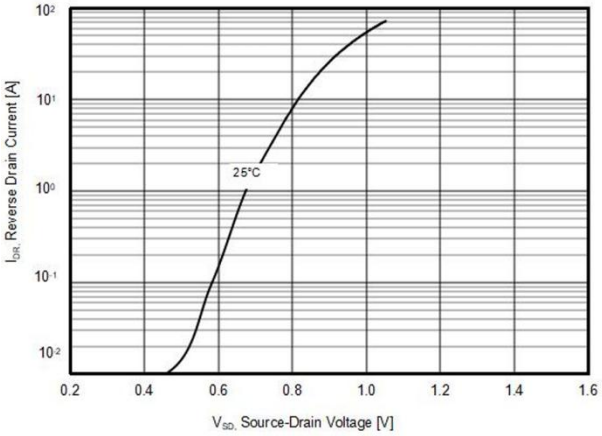


Figure5. Static drain-source on resistance

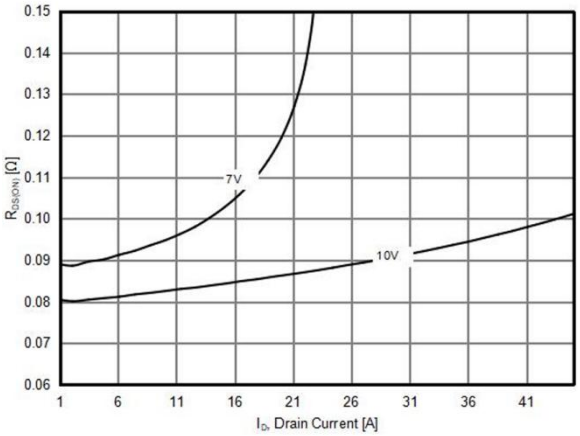
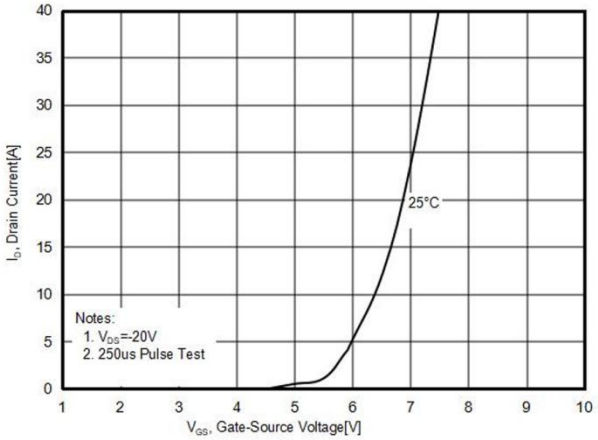


Figure6. Transfer characteristics



Typical Characteristics

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

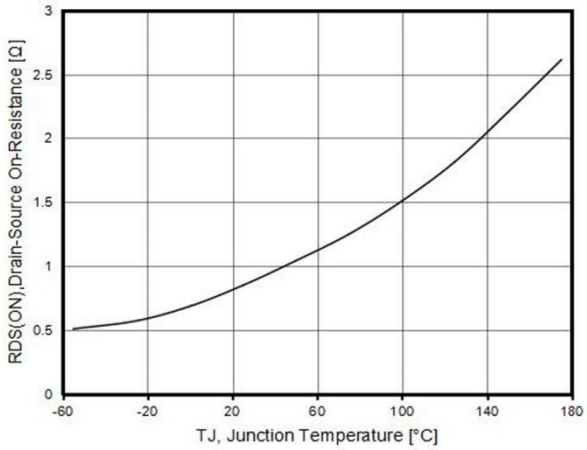


Figure8. BV_{DSS} vs Junction Temperature

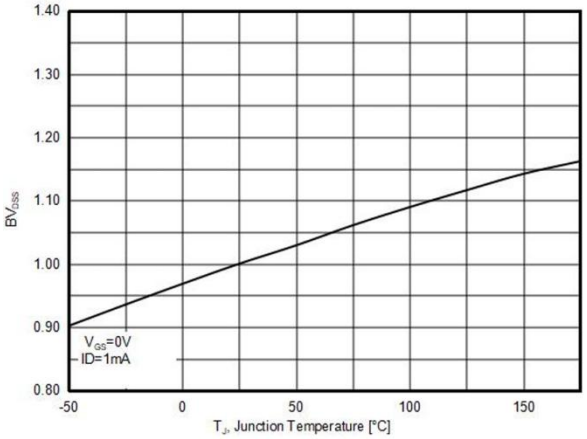


Figure9. Gate charge waveforms

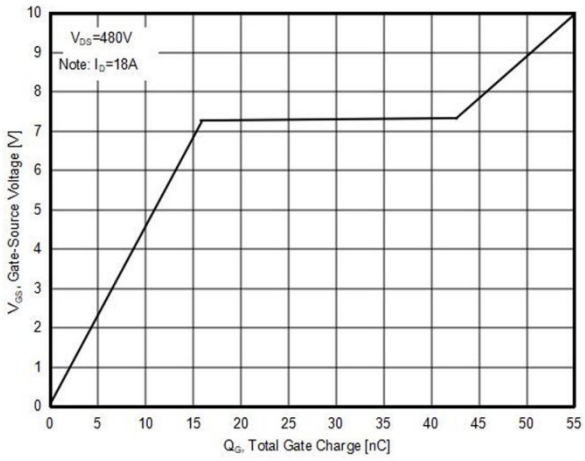
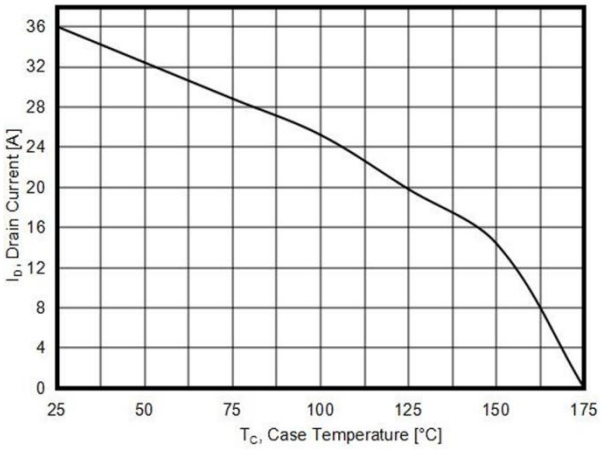
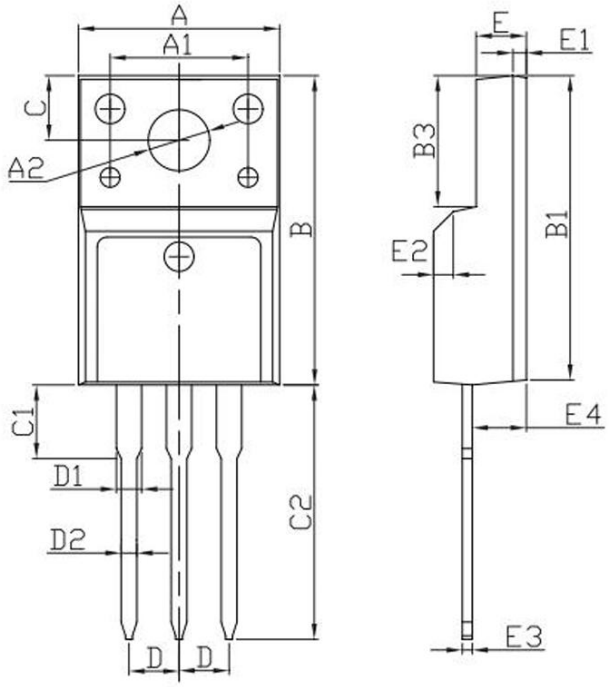


Figure10. Maximum I_D vs Junction Temperature



ITO-220AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	9.860	10.460	0.388	0.412
A1	6.800	7.200	0.268	0.284
A2	2.920	3.320	0.115	0.131
B	15.400	16.400	0.607	0.646
B1	15.100	16.100	0.595	0.634
B3	6.400	7.000	0.252	0.276
C	3.050	3.550	0.120	0.140
C1	2.950	3.550	0.116	0.140
C2	28.200	29.200	1.111	1.150
D	2.54 BSC		0.100 BSC	
D1	-	1.470	-	0.058
D2	0.600	1.000	0.024	0.039
E	2.300	2.800	0.091	0.110
E1	0.450	0.950	0.018	0.037
E2	45°		45°	
E3	0.300	0.700	0.012	0.028
E4	2.450	3.050	0.097	0.120