

### Product Summary

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

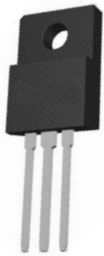
### Feature

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

### Application

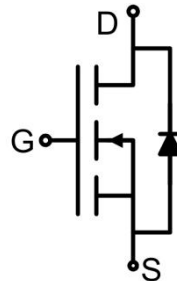
- Power factor correction (PFC)
- Switched mode power supplies(SMPS)
- Uninterruptible Power Supply (UPS)
- LLC Half-bridge

### Package

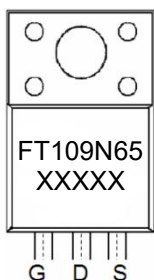


ITO-220AB

### 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(T <sub>C</sub> =25°C)	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(T <sub>C</sub> =25°C)	P <sub>D</sub>	36	W
Thermal Resistance,Junction-to-Case	R <sub>θJC</sub>	3.47	°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			3.0	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, R <sub>G</sub> =1.7Ω, I <sub>D</sub> =19A		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>	T <sub>C</sub> =25°C			38	A
Diode Forward voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>SD</sub> =28A, T <sub>J</sub> =25°C		0.9	1.2	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> =19A, di/dt=100A/μs, T <sub>J</sub> =25°C		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 testing.

### Typical Characteristics

Figure1. Safe operating area

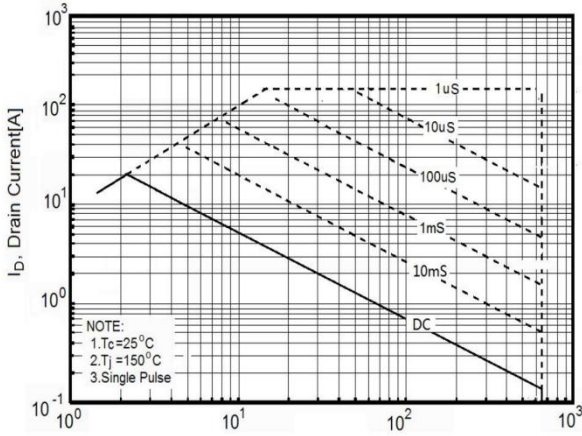


Figure2. Source-Drain Diode Forward Voltage

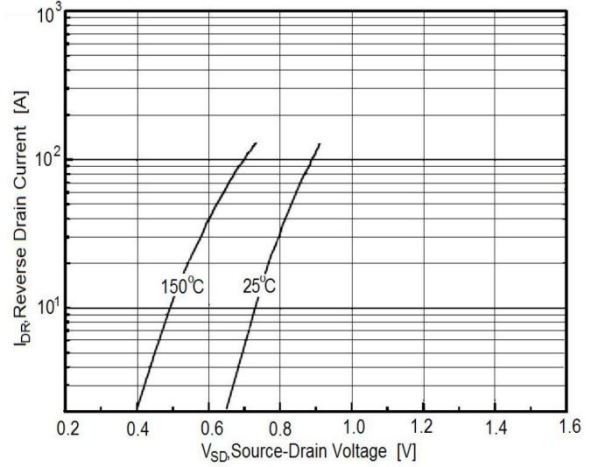


Figure3. Output characteristics

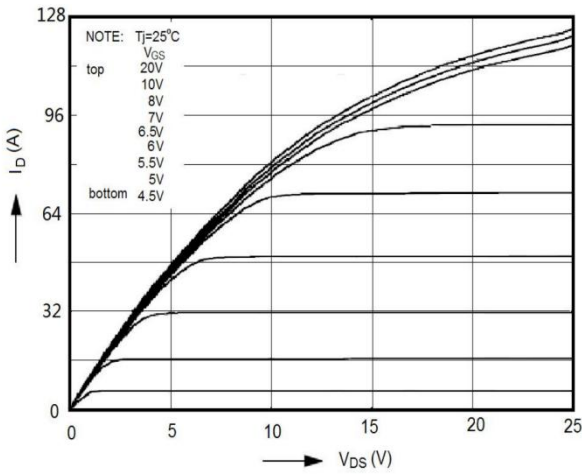


Figure4. Transfer characteristics

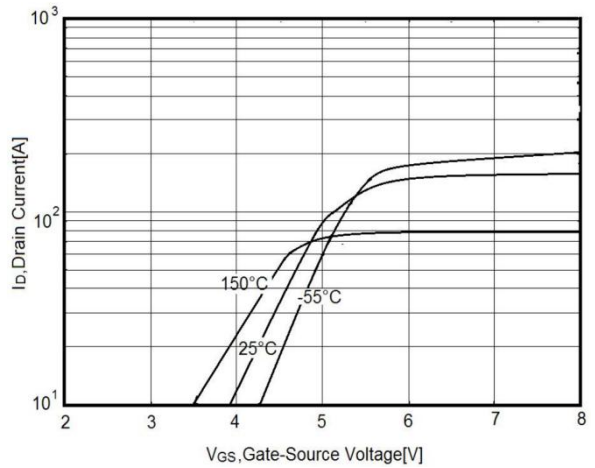


Figure5. Static drain-source on resistance

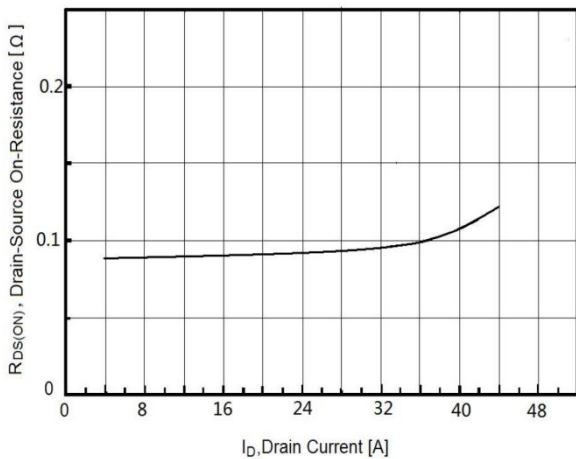
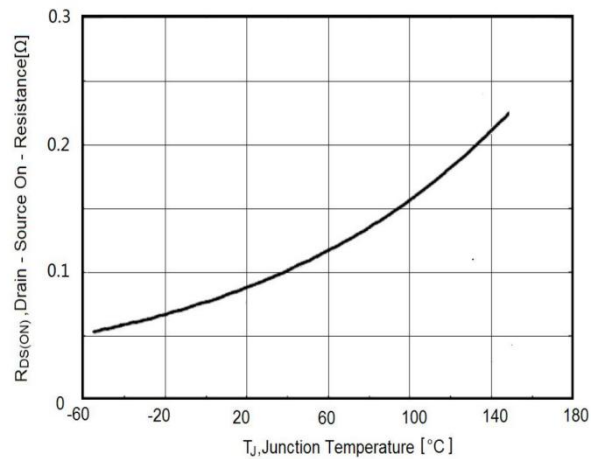


Figure6. RDS(ON) vs Junction Temperature



### Typical Characteristics

Figure7.  $BV_{DSS}$  vs Junction Temperature

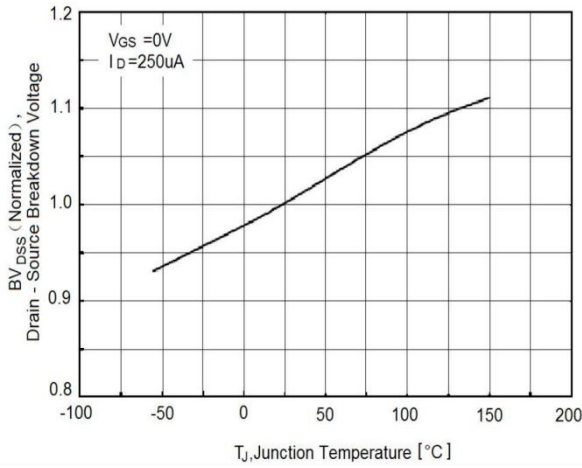


Figure8. Maximum  $I_D$  vs Junction Temperature

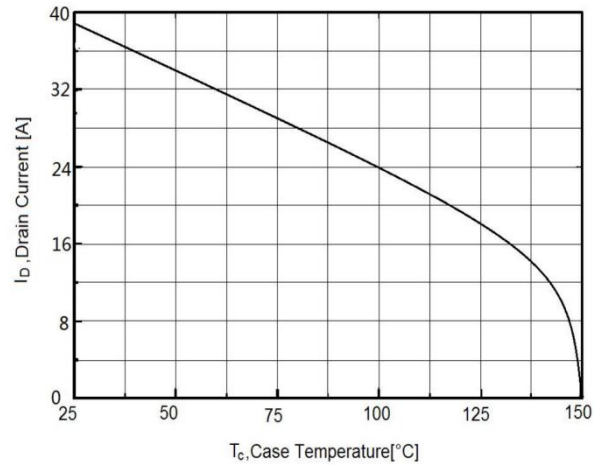


Figure9. Gate charge waveforms

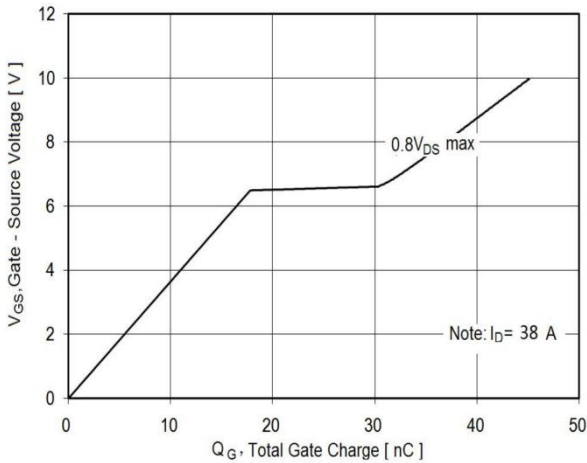
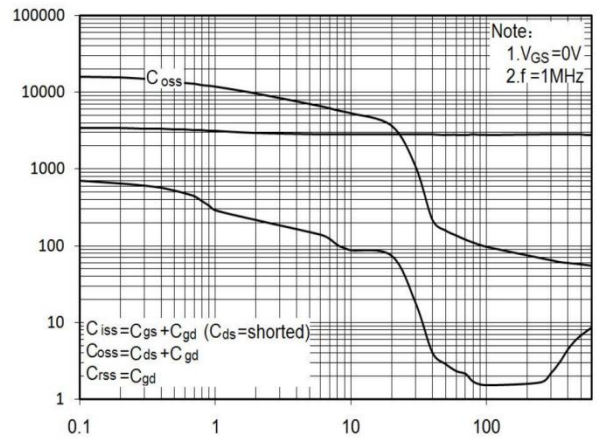
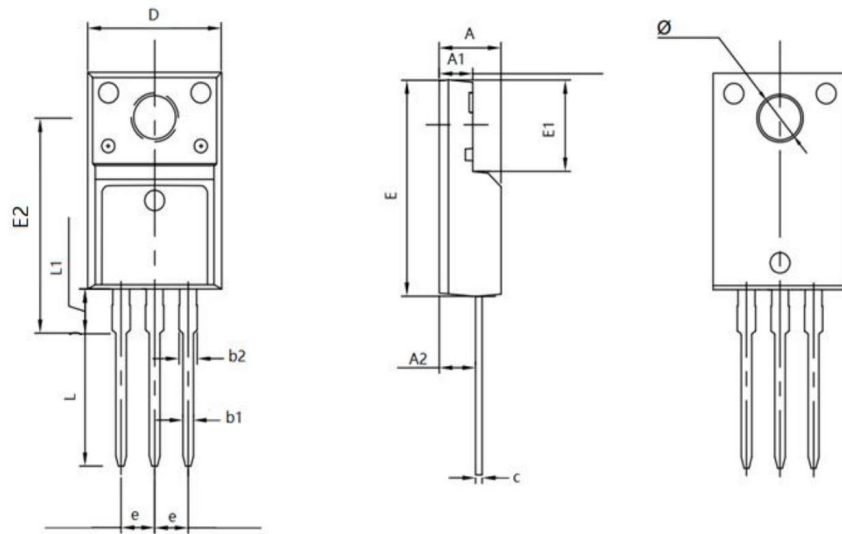


Figure10. Capacitance



### ITO-220AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.500	4.900	0.177	0.193
A1	2.340	2.740	0.092	0.108
A2	2.560	2.960	0.101	0.117
b1	0.700	0.900	0.028	0.035
b2	1.180	1.580	0.046	0.062
c	0.400	0.600	0.016	0.024
D	9.960	10.360	0.392	0.408
E	15.670	15.970	0.617	0.629
E1	6.500	6.900	0.256	0.272
E2	15.500	16.100	0.610	0.634
e	2.540 TYP		0.100 TYP	
Φ	3.080	3.280	0.121	0.129
L	12.640	13.240	0.498	0.521
L1	3.030	3.430	0.119	0.135