650V Super-junction Power MOSFET

DESCRIPTION：

·Very low FOM $R_{DS(on)}$×Qg

·100% avalanche tested

·Easy to use/drive

·RoHS compliant

V_{DSS}	650V
I_D	7A
$R_{DS(ON)_Typ.}$ @V_{GS}=10V	0.53Ω



ITO-220AB

TYPICAL APPLICATIONS：

·Switch Mode Power Supply (SMPS)

·Uninterruptible Power Supply (UPS)

·Power Factor Correction (PFC)

·Charger

MAXIMUM RATINGS (at T_C = 25 °C, unless otherwise specified)

Characteristic	Condition	Symbol	Value	Unit
Continuous Drain Current	Tc=25℃ Tc=100℃	I_D	7 4.2	A
Pulsed Drain Current (1)		$I_{D\ pulse}$	21	A
Gate-Source Voltage		V_{GS}	±30	V
Single Pulsed Avalanche Energy (2)		E_{AS}	142	mJ
Repetitive Avalanche Energy (2)		E_{AR}	0.21	mJ
Avalanche Current		I_{AR}	1.3	A
Power dissipation		P_D	28	W
Continuous Diode Forward Current		I_S	6	A
Diode Pulsed Current (1)		$I_{S\ pulse}$	21	A
Reverse Diode dv/dt		dv/dt	15	V/ns
Maximum Diode Commutation Speed		di_f/dt	500	A/us
Junction & Storage temperature Range		T_J, T_{STG}	-55~+150	℃

Notes： 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

2. I_{AS} = 5.2A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C

ELECTRICAL CHARATERISTICS (at T_J = 25 °C, unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage VGS = 0V, ID = 250uA	$V_{(BR)DSS}$	650			V
Zero Gate Voltage Drain Current VDS = 650 V, VGS = 0 V ,Tj=25℃ VDS = 650 V, VGS = 0 V ,Tj=150℃	I_{DSS}			1 100	uA
Gate-Source Leakage Current VGS = ±30V, VDS = 0V	I_{GSS}			±100	nA
Gate-Source threshold voltage VDS = VGS, ID = 250uA	$V_{GS(th)}$	2.5		4.5	V
Drain-Source On-State Resistance VGS = 10V, ID = 3.5A	$R_{DS(on)}$		0.53	0.6	Ω
Gate Resistance f=1MHz	Rg		7		Ω
Input capacitance f=1MHz, VDS=100 V, VGS=0 V	C_{iss}		509		pF
Output capacitance f=1MHz, VDS=100 V, VGS=0 V	C_{oss}		23		pF
Reverse transfer capacitance f=1MHz, VDS=100 V, VGS=0 V	C_{rss}		1.5		pF
Total Gate Charge VDS= 520V, ID= 7A,VGS= 10V	Q_G		13		nC
Gate to Source Charge VDS= 520V, ID= 7A,VGS= 10V	Q_{GS}		2.8		nC
Gate to Drain Charge VDS= 520V, ID= 7A,VGS= 10V	Q_{GD}		5.6		nC
Turn-on delay time VDD=400 V, ID=7A, R_{GEN}=25Ω	td (ON)		55		ns
Rise time VDD=400 V, ID=7A, R_{GEN}=25Ω	tr		61		ns
Turn-off delay time VDD=400 V, ID=7A, R_{GEN}=25Ω	td (OFF)		117		ns
Fall time VDD=400 V, ID=7A, R_{GEN}=25Ω	tf		42		ns
Diode Forward Voltage VGS = 0V, I_S =3.5A	V_{SD}		0.9	1.2	V
Revers Recovery Time V_R=400V,I_F=7A, di_F/dt = 100A/us	Trr		321		ns
Revers Recovery Charge V_R=400V,I_F=7A, di_F/dt = 100A/us	Qrr		3.4		nC
Peak Reverse Recovery Current V_R=400V,I_F=7A, di_F/dt = 100A/us	Irrm		21.2		A

THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Value	Unit
Thermal resistance,	Junction to Ambient Junction to Case	$R_{\theta JA}$ $R_{\theta JC}$	62 4.5	℃/W

Typical Performance Characteristics

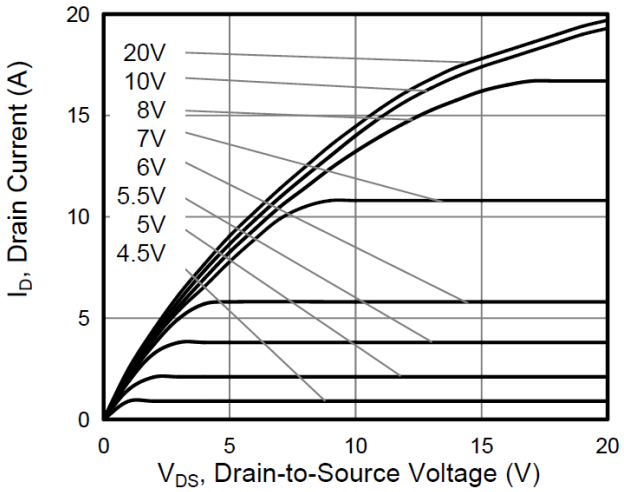


Figure 1. Output Characteristics

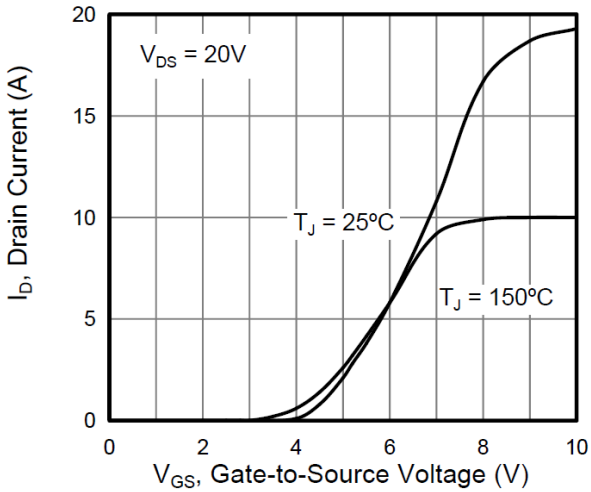


Figure 2. Transfer Characteristics

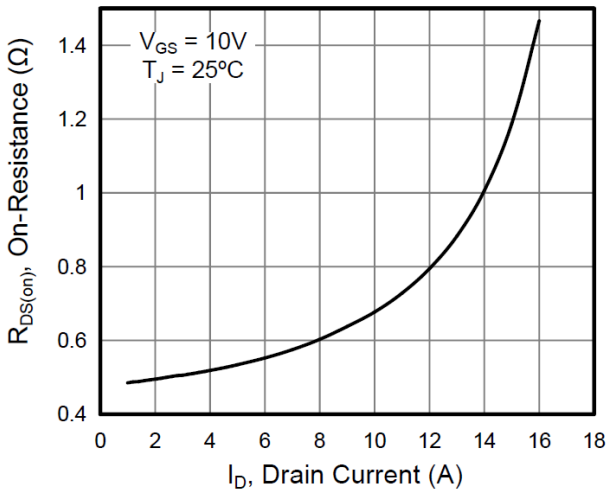


Figure 3. On-Resistance vs. Drain Current

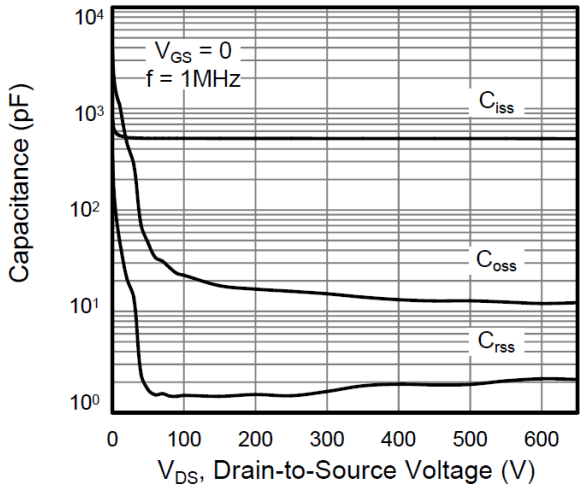


Figure 4. Capacitance

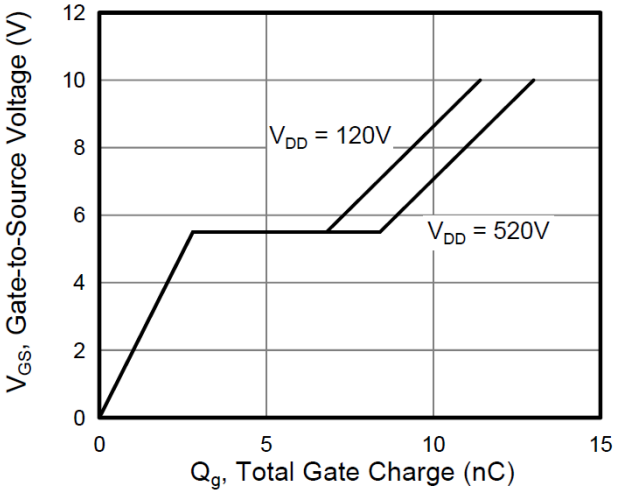


Figure 5. Gate Charge

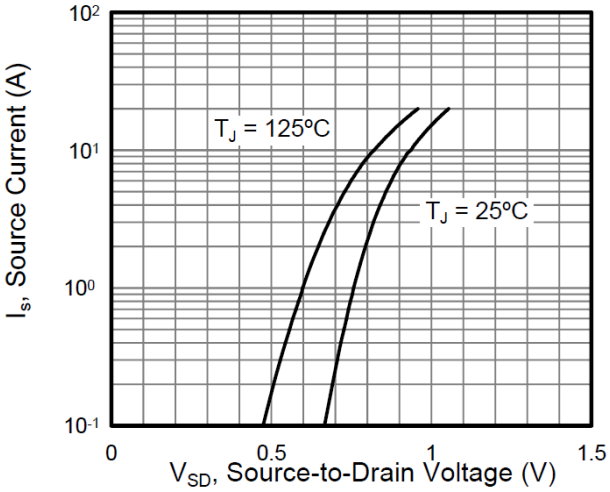


Figure 6. Body Diode Forward Voltage

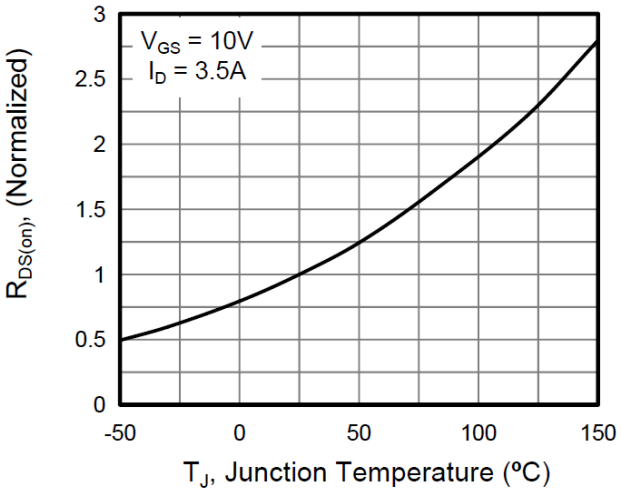


Figure 7. On-Resistance vs.Temperature

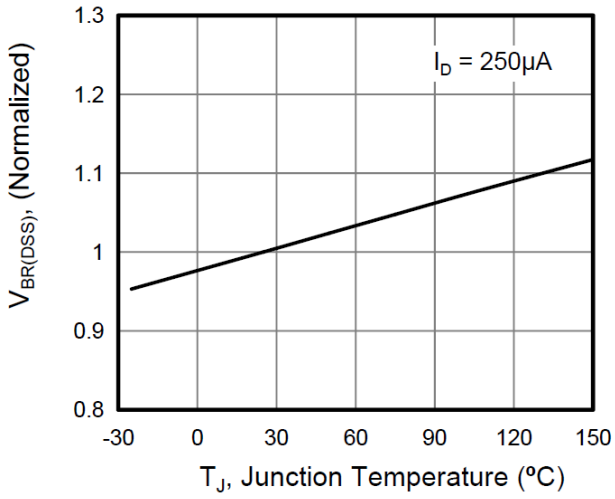


Figure8. Breakdown voltage vs.Junction Temperature

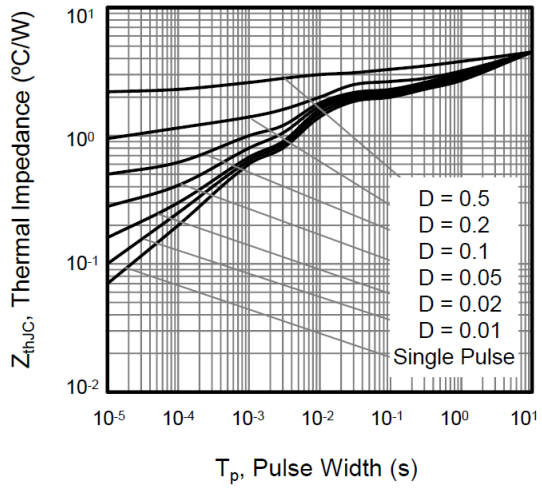


Figure 9. Transient Thermal Impedance

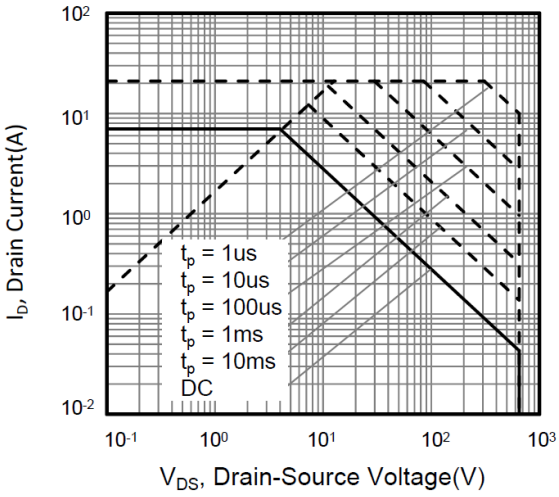


Figure 10. Safe Operation Area

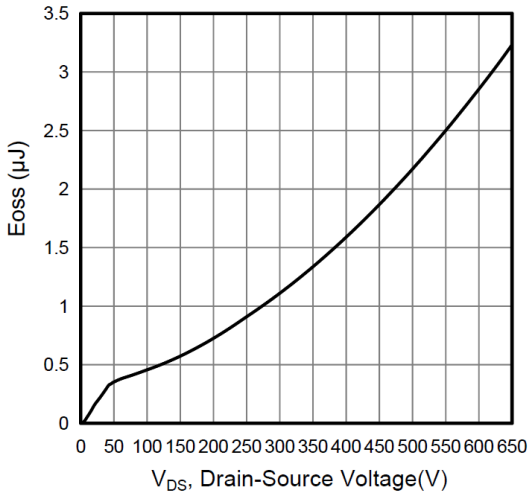
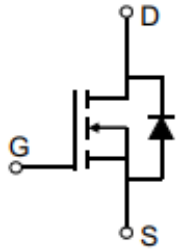
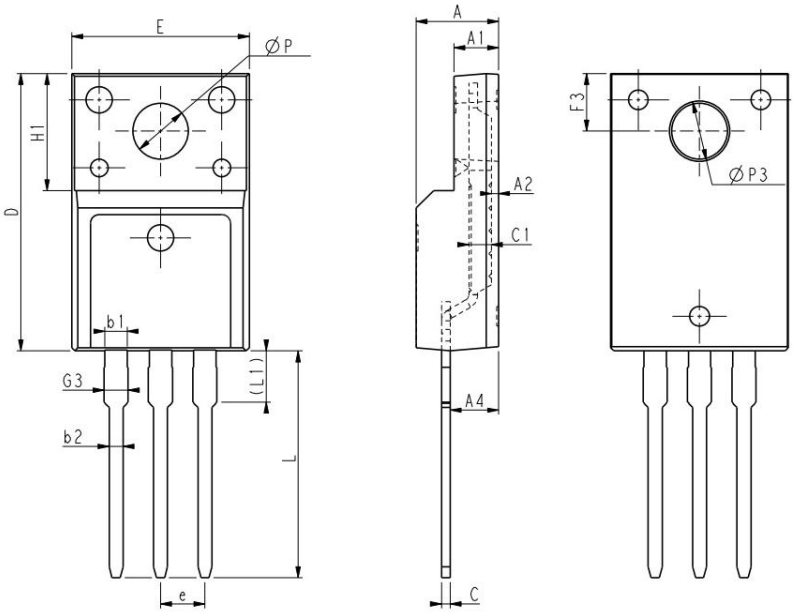


Figure 11. Typ. Coss Stored Energy

·Circuit diagram



·Package outlines : Dimensions in (mm)



Unit:mm			
Symbol	Min.	Nom	Max.
E	9.96	10.16	10.36
A	4.50	4.70	4.90
A1	2.34	2.54	2.74
A2	0.30	0.45	0.60
A4	2.56	2.76	2.96
c	0.40	0.50	0.65
c1	1.20	1.30	1.35
D	15.57	15.87	16.17
H1	6.70REF		

Unit:mm			
Symbol	Min.	Nom	Max.
e	2.54BSC		
L	12.68	12.98	13.28
L1	2.93	3.03	3.13
ΦP	3.03	3.18	3.38
ΦP3	3.15	3.45	3.65
F3	3.15	3.30	3.45
G3	1.25	1.35	1.55
b1	1.18	1.28	1.43
b2	0.70	0.80	0.95

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