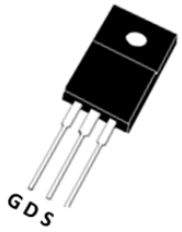
650V N-Channel Power MOSFET

DESCRIPTION：
- Excellent $R_{DS(ON)}$
- Low Gate Charge
- 100% UIS Tested, 100% △Vds Tested
- Pb-Free Lead Plating
- RoHS compliant
- Halogen Free

V_{DSS}	650V
I_D @V_{GS}=10V	7.4A
$R_{DS(ON)\_Typ.}$ @V_{GS}=10V	311mΩ

TYPICAL APPLICATIONS：
- SMPS with PFC
- Flyback and LLC topologies
- Silver ATX, adapter, TV, lighting, Telecom



ITO-220AB

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

Characteristic	Condition	Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	650	V
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Current	Tc=25℃ Tc=100℃	I_D	7.4 4.7	A
Pulsed Drain Current (1)		I_{DM}	Refer to Fig4	A
Single Pulsed Avalanche Energy (2)		E_{AS}	45	mJ
Power dissipation	Tc=25℃ Tc=100℃	P_D	51 20	W
Junction & Storage temperature Range		T_J, T_{STG}	-55~+150	℃

Notes： 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. EAS condition: Starting TJ=25C, VDD=75V, VG=10V, RG=25ohm, L=10mH, IAS=3A, VDD=0V during time in avalanche.

THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Value	Unit
Thermal resistance,	Junction to Ambient Junction to Case	$R_{\theta JA}$ $R_{\theta JC}$	58 2.5	℃/W

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	I_{DSS}			1	uA
Gate-Source Leakage Current VGS = ±30V, VDS = 0V	I_{GSS}			±100	nA
Gate-Source threshold voltage VDS = VGS, ID = 250uA	$V_{GS(th)}$	2.4	3.4	4.4	V
Drain-Source On-State Resistance VGS = 10V, ID = 5.5A	$R_{DS(on)}$		311	360	mΩ
Gate Resistance f=1MHz	R_g		17		Ω
Input capacitance f=1MHz, VDS=325 V, VGS=0 V	C_{iss}		782	1056	pF
Output capacitance f=1MHz, VDS=325 V, VGS=0 V	C_{oss}		26	35	pF
Reverse transfer capacitance f=1MHz, VDS=325 V, VGS=0 V	C_{rss}		5.6		pF
Total Gate Charge VDS= 325V, ID= 5.5A,VGS= 0 to 10V	Q_G		19	26	nC
Gate to Source Charge VDS= 325V, ID= 5.5A,VGS= 0 to 10V	Q_{GS}		4.8		nC
Gate to Drain Charge VDS= 325V, ID= 5.5A,VGS= 0 to 10V	Q_{GD}		7		nC
Turn-on delay time VDD=330 V, VGS= 10V, ID= 5.5A, R_{GEN}=24Ω	$td_{(ON)}$		24		ns
Rise time VDD=330 V, VGS= 10V, ID= 5.5A, R_{GEN}=24Ω	tr		29		ns
Turn-off delay time VDD=330 V, VGS= 10V, ID= 5.5A, R_{GEN}=24Ω	$td_{(OFF)}$		99		ns
Fall time VDD=330 V, VGS= 10V, ID= 5.5A, R_{GEN}=24Ω	tf		31		ns

Body Diode

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

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Diode Forward Voltage VGS = 0V, I_S = 5.5A	V_{SD}			1.2	V
Maximum Continuous Body Diode Forward Current	I_S			7	A
Maximum Pulsed Body Diode Forward Current	I_{SM}			30	A
Revers Recovery Time IF=5.5A, di/dt = 100A/us	Trr		256	346	ns
Revers Recovery Charge IF=5.5A, di/dt = 100A/us	Qrr		2.5		nC

Typical Performance Characteristics

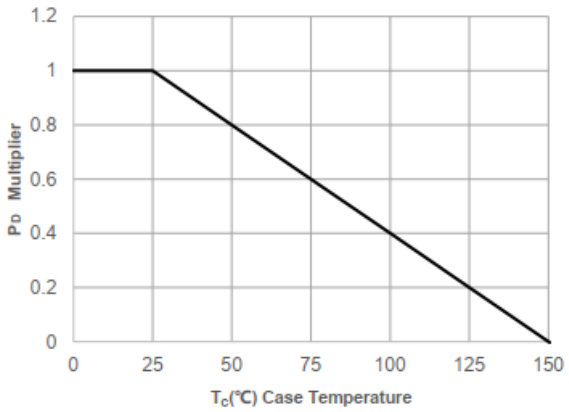


Figure 1. Power De-rating

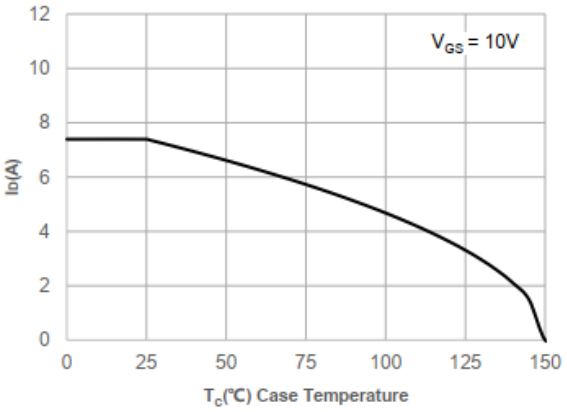


Figure 2. Current De-rating

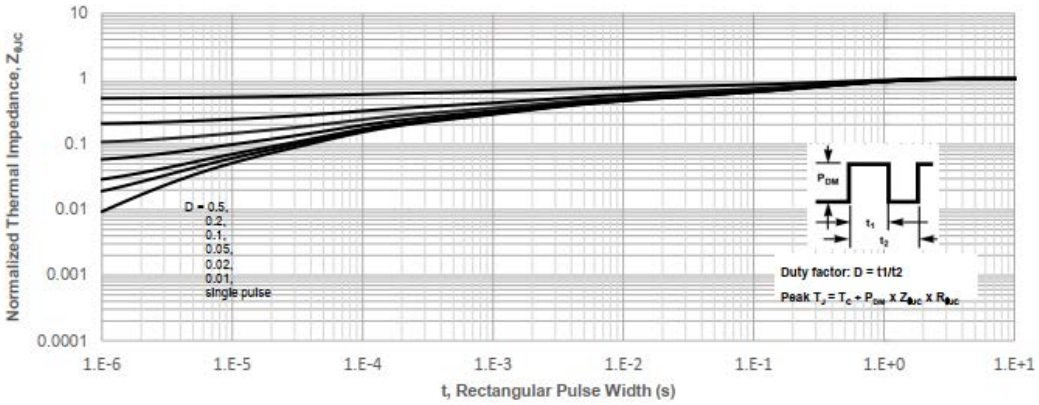


Figure 3. Normalized Maximum Transient Thermal Impedance

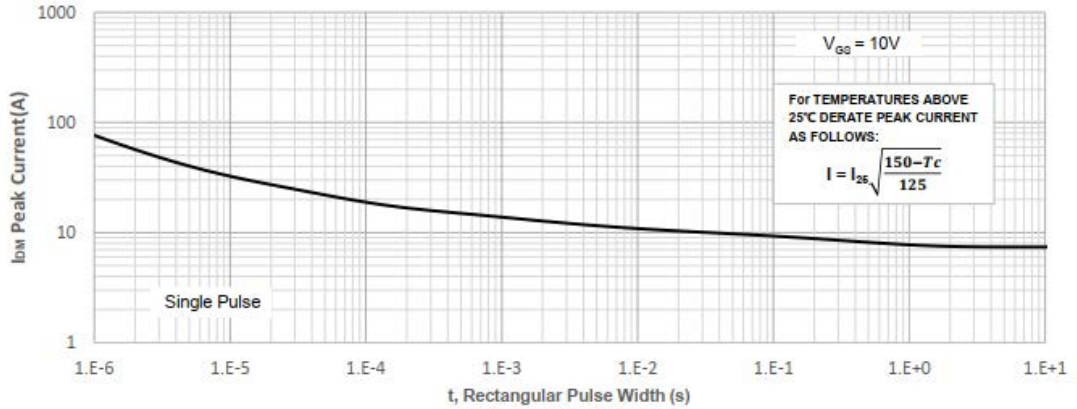


Figure 4. Peak Current Capacity

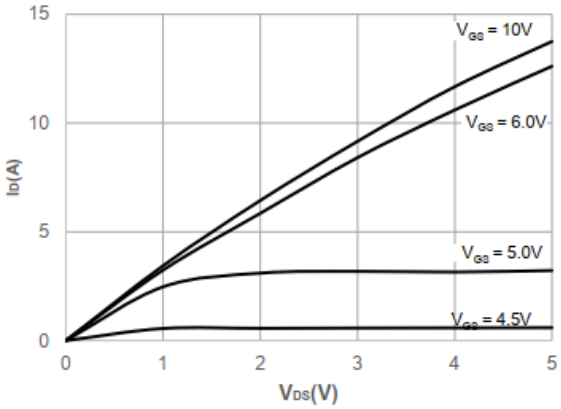


Figure 5. Output Characteristics

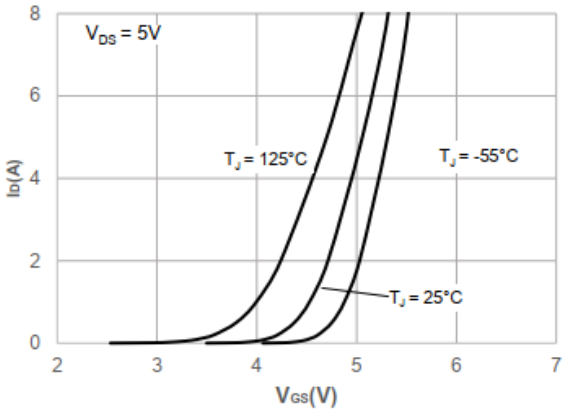


Figure 6. Typical Transfer Characteristics

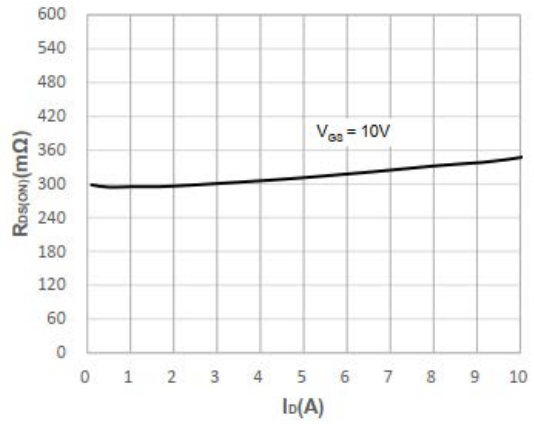


Figure 7. On-resistance vs. Drain Current

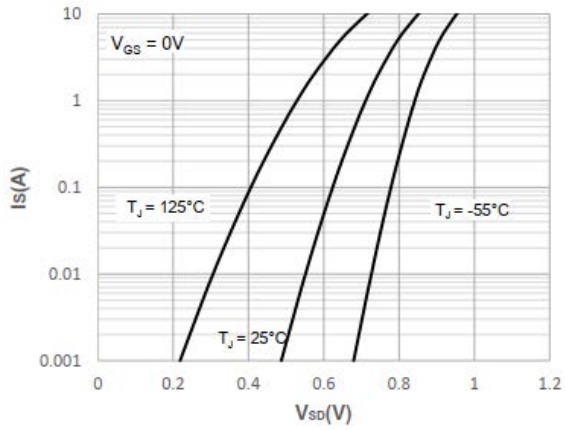


Figure 8. Body Diode Characteristics

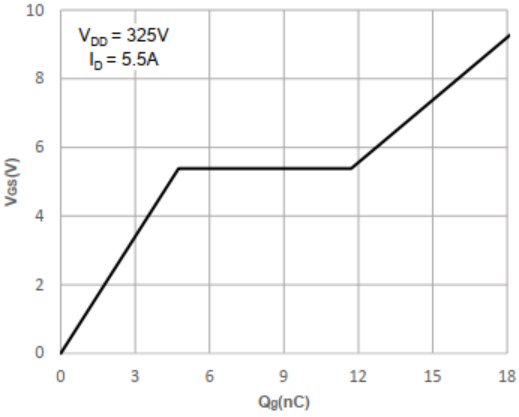


Figure 9. Gate Charge Characteristics

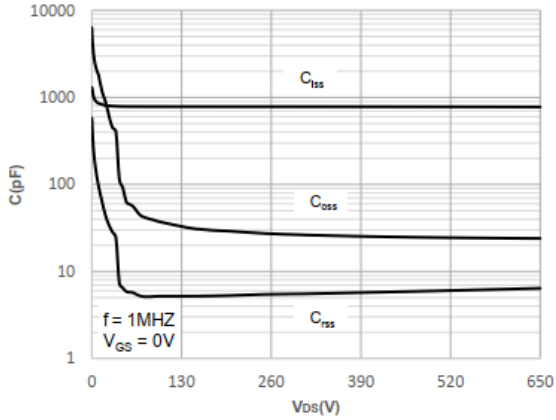


Figure 10. Capacitance Characteristics

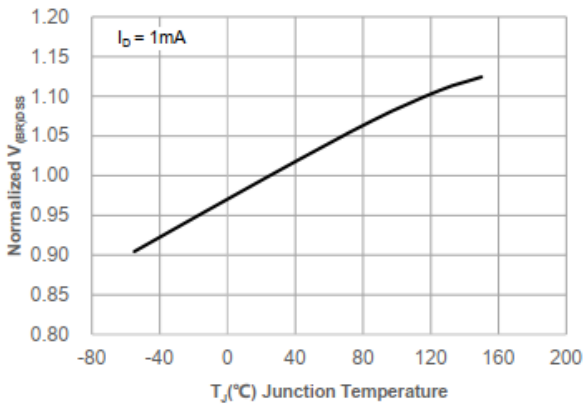


Figure 11. Normalized Breakdown voltage vs. Junction Temperature

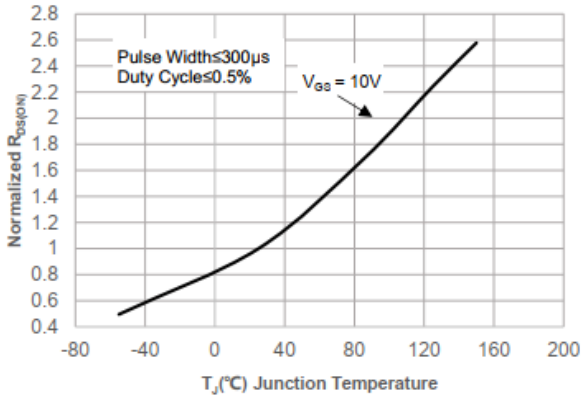


Figure 12. Normalized on Resistance vs. Junction Temperature

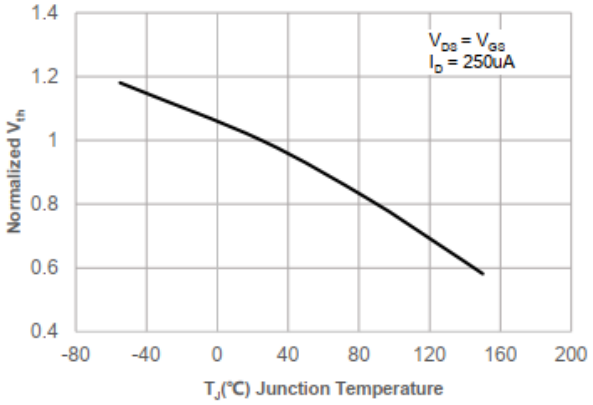


Figure 13. Normalized Threshold Voltage vs. Junction Temperature

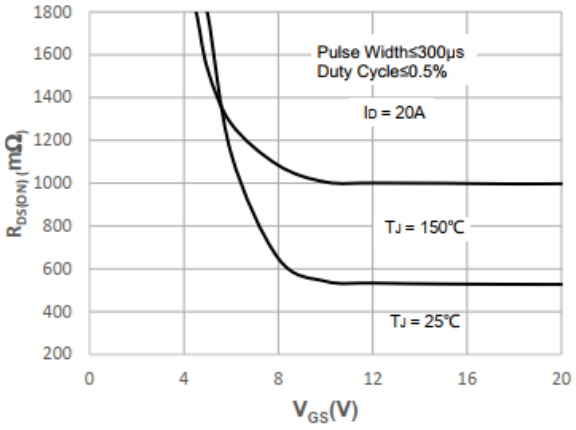


Figure 14. RDS(ON) vs. VGS

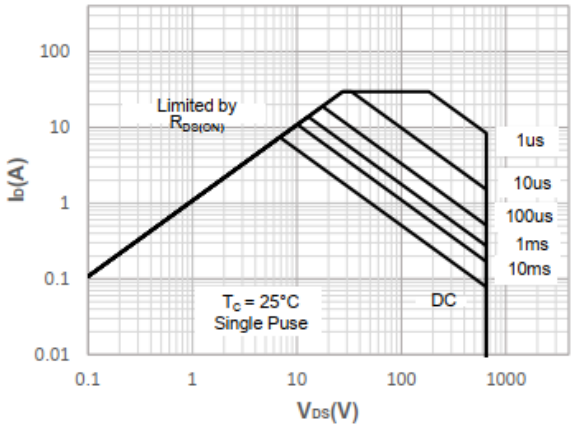
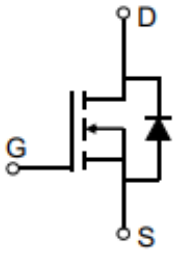
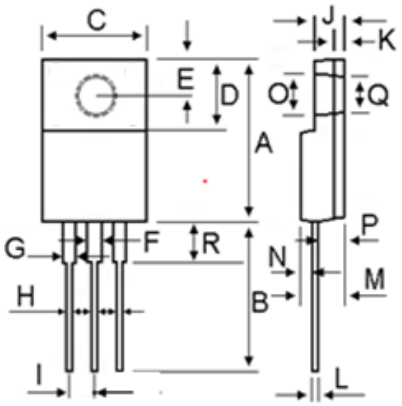


Figure 15. Maximum Safe Operating Area

・Circuit diagram



・Package outlines :



DIM	MILLIMETERS	
	MIN	MAX
A	14.80	16.10
B	12.65	14.40
C	9.70	10.36
D	4.60	6.80
E	2.50	3.50
F	0.90	1.55
G	0.90	1.55
H	0.50	0.90
I	2.40	2.70
J	2.34	3.30
K	0.55	1.30
L	0.36	0.80
M	4.20	4.90
N	1.10	1.80
O	2.90	3.50
P	2.30	3.15
Q	2.90	3.50
R	2.80	4.85

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