100V 3.3mΩ N-Channel Power MOSFET

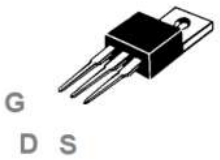
DESCRIPTION：

- Ultra-low $R_{DS(ON)}$
- Low Gate Charge
- 100% UIS Tested, 100% Rg Tested
- Pb-Free Lead Plating
- RoHS compliant

V_{DS}	100V
$V_{GS(th)\_Typ}$	3.2V
I_D @ V_{GS}=10V	175 A
$R_{DS(on)\_Typ}$ @ V_{GS}=10V	3.3 mΩ

TYPICAL APPLICATIONS：

- Power Management in Telecom., Industrial Automation, CE
- Current Switching in DC/DC & AC/DC (SR) Sub-systems
- Motor Driving in Power Tool, E-vehicle, Robotics



TO-220

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

Characteristic	Condition	Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current (1)	Tc=25℃ Tc=100℃	I_D	175 110	A
Pulsed Drain Current (2)		I_{DM}	700	A
Avalanche Energy (3)		E_{AS}	600	mJ
Power dissipation (4)	Tc=25℃ Tc=100℃	P_D	250 100	W
Junction & Storage temperature Range		T_J, T_{STG}	-55~+150	℃

Notes： 1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous current depends on the thermal & electro-mechanical application board design..
2. This single-pulse measurement was taken under T_{J_Max} = 150°C.
3. E_{AS} of 600mJ is based on starting T_J = 25°C, L = 0.5mH, I_{AS} = 49.7A, V_{GS} = 10V, V_{DD} = 50V; 100% test at L = 0.1mH, I_{AS} =69.6A.
4. The power dissipation PD is based on T_{J_Max} = 150°C.

THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Typ.	Unit
Thermal resistance,	Junction – Ambient Junction - Case	$R_{\theta(j-A)}$ $R_{\theta(j-C)}$	59 0.42	℃/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	$V_{(BR)DSS}$	100			V
Zero Gate Voltage Drain Current VDS = 80 V, VGS = 0 V Tj=25℃ VDS = 80 V, VGS = 0 V Tj=55℃	I_{DSS}			1 5	uA
Gate-Source Leakage Current VGS = ±20V, VDS = 0V	I_{GSS}			±100	nA
Gate-Source threshold voltage VDS = VGS, ID = 250uA	$V_{GS(th)}$	2.0	3.2	4.0	V
Drain-Source On-State Resistance VGS = 10V, ID = 20A	$R_{DS(on)}$		3.3	4.0	mΩ
Forward Transconductance VDS = 5V, ID = 20A	g_{FS}		47.8		S
Input capacitance f=1MHz, VDS=50 V, VGS=0 V	C_{iss}		7168		pF
Output capacitance f=1MHz, VDS=50 V, VGS=0 V	C_{oss}		1067		pF
Reverse transfer capacitance f=1MHz, VDS=50 V, VGS=0 V	C_{rss}		36		pF
Gate Resistance f=1MHz, VDS=0 V, VGS=0 V	R_g		2.7		Ω
Total Gate Charge VDS= 50V, ID= 20A,VGS= 10V VDS= 50V, ID= 20A,VGS= 6V	Q_G		104 66		nC
Gate to Source Charge VDS= 50V, ID= 20A,VGS= 0 to 10V	Q_{GS}		39		nC
Gate to Drain Charge VDS= 50V, ID= 20A,VGS= 0 to 10V	Q_{GD}		21		nC
Turn-on delay time VDS=50 V, VGS= 10V, R_L=2.5Ω, R_{GEN}=3Ω	$td_{(ON)}$		22		ns
Rise time VDS=50 V, VGS= 10V, R_L=2.5Ω, R_{GEN}=3Ω	tr		32		ns
Turn-off delay time VDS=50 V, VGS= 10V, R_L=2.5Ω, R_{GEN}=3Ω	$td_{(OFF)}$		62		ns
Fall time VDS=50 V, VGS= 10V, R_L=2.5Ω, R_{GEN}=3Ω	tf		36		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 = 1A	V_{SD}		0.70	1.0	V
Diode Continuous Current, Tc=25℃	I_S			175	V
Revers Recovery Time IF=15A, dIF/dt = 100A/us	Trr		95		ns
Revers Recovery Charge IF=15A, dIF/dt = 100A/us	Qrr		299		nC

Typical Electrical & Thermal Characteristics

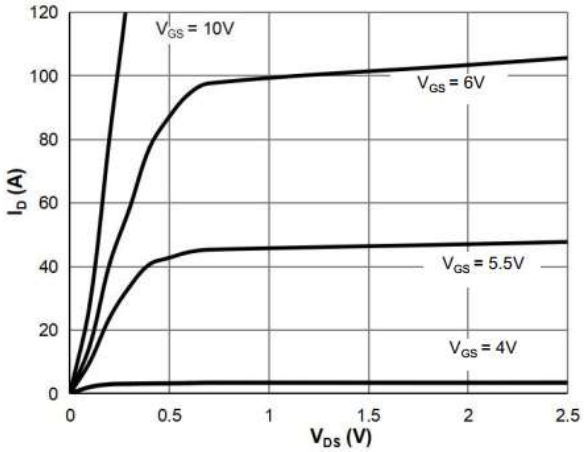


Figure 1. Saturation Characteristics

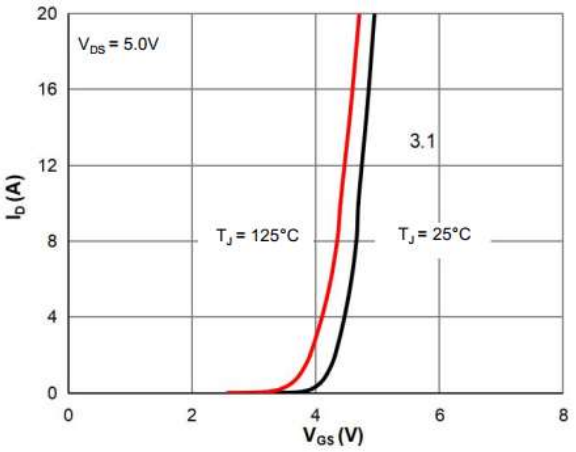


Figure 2. Transfer Characteristics

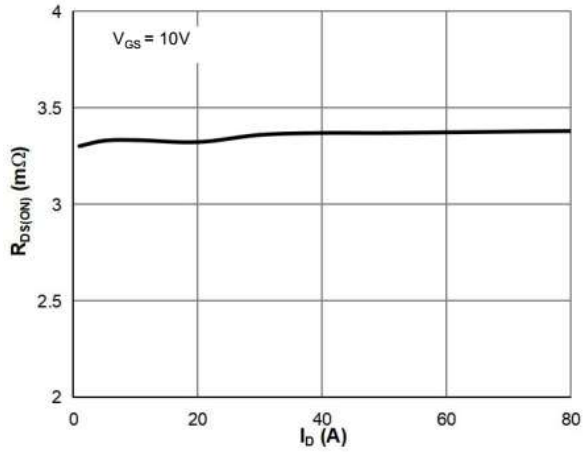


Figure 3. $R_{DS(ON)}$ vs. Drain Current

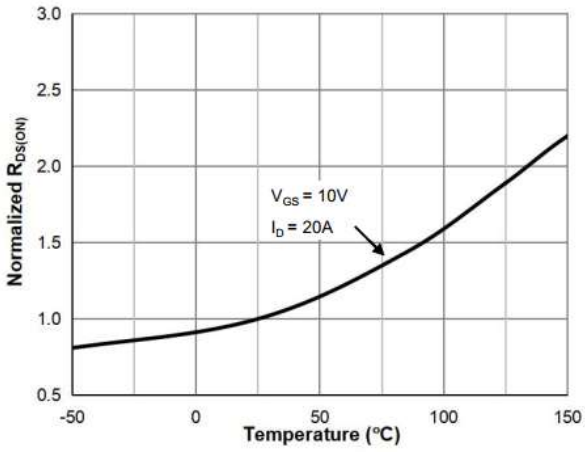


Figure 4. $R_{DS(ON)}$ vs. Junction Temperature

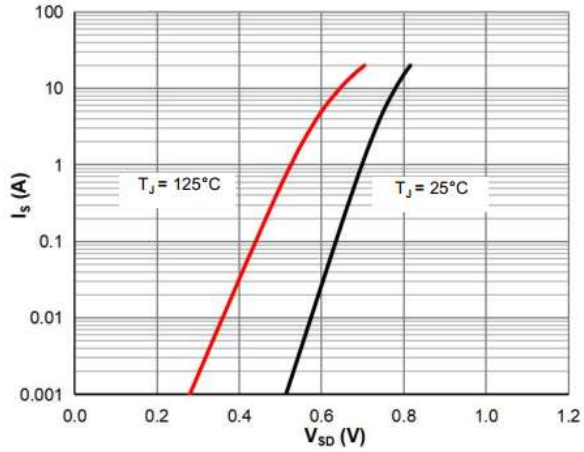


Figure 5. Body-Diode Characteristics

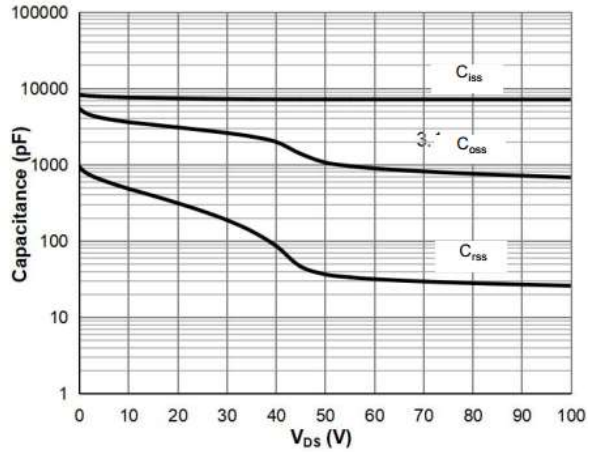


Figure 6. Capacitance Characteristics

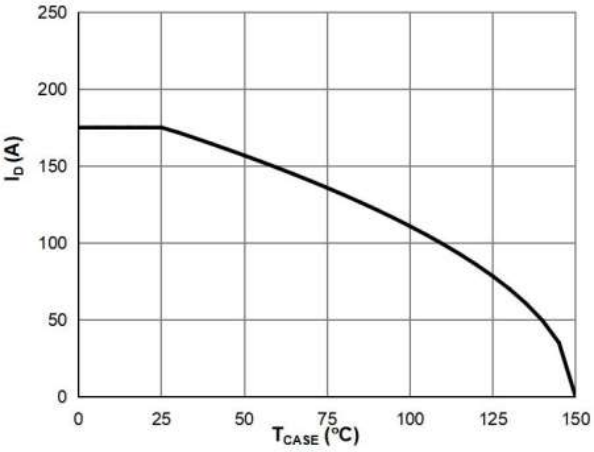


Figure 7. Current De-rating

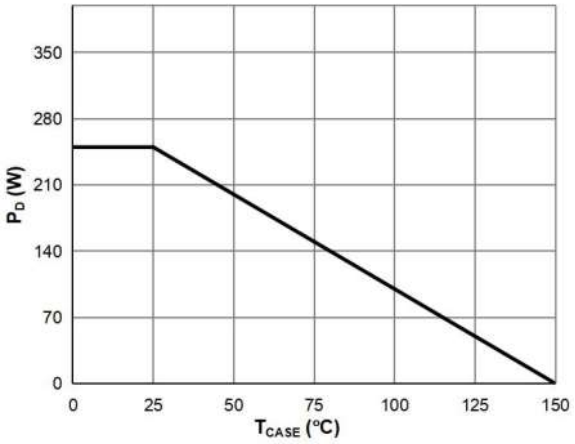


Figure 8. Power De-rating

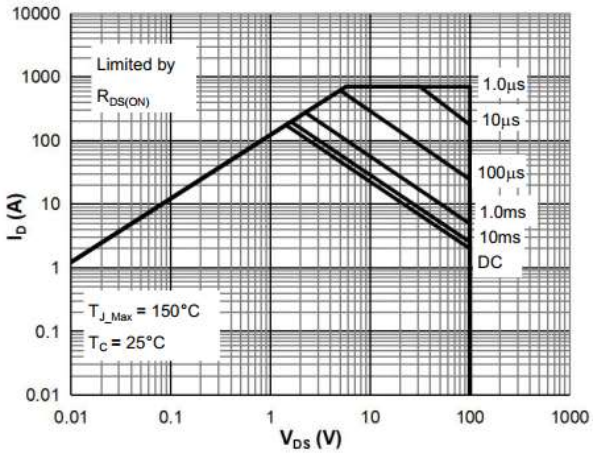


Figure 9. Maximum Safe Operating

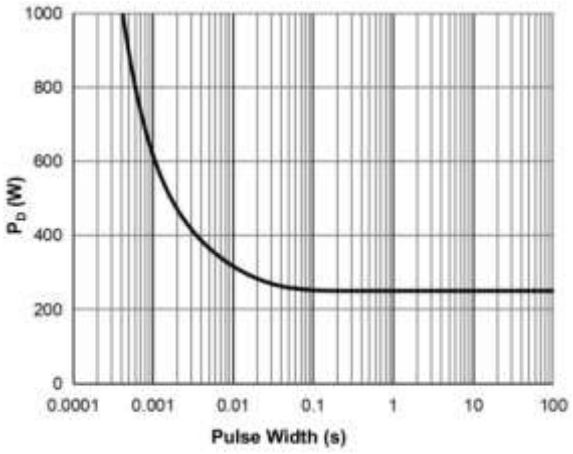


Figure 10. Single Pulse Power Rating, Junction-to-Case

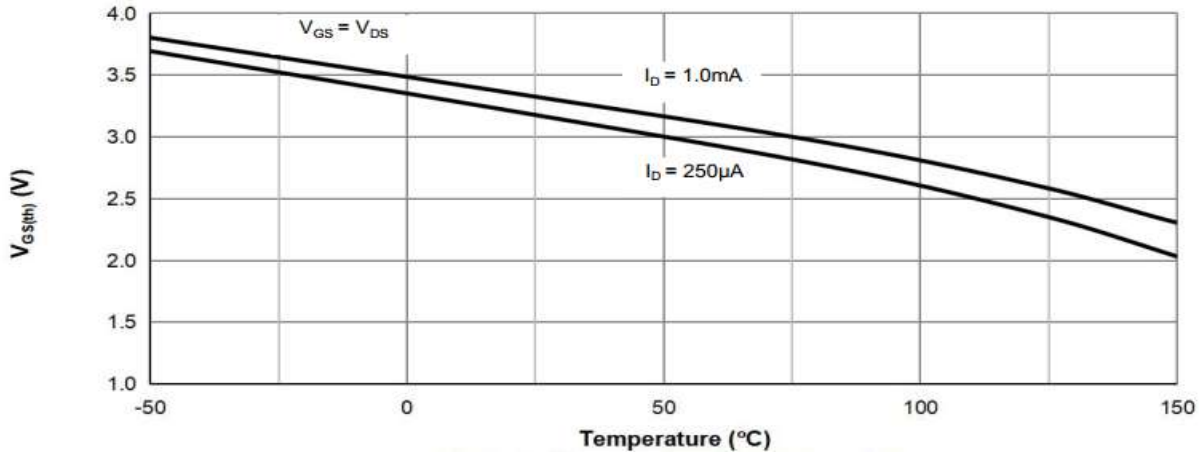


Figure 11. $V_{GS(th)}$ vs. Junction Temperature

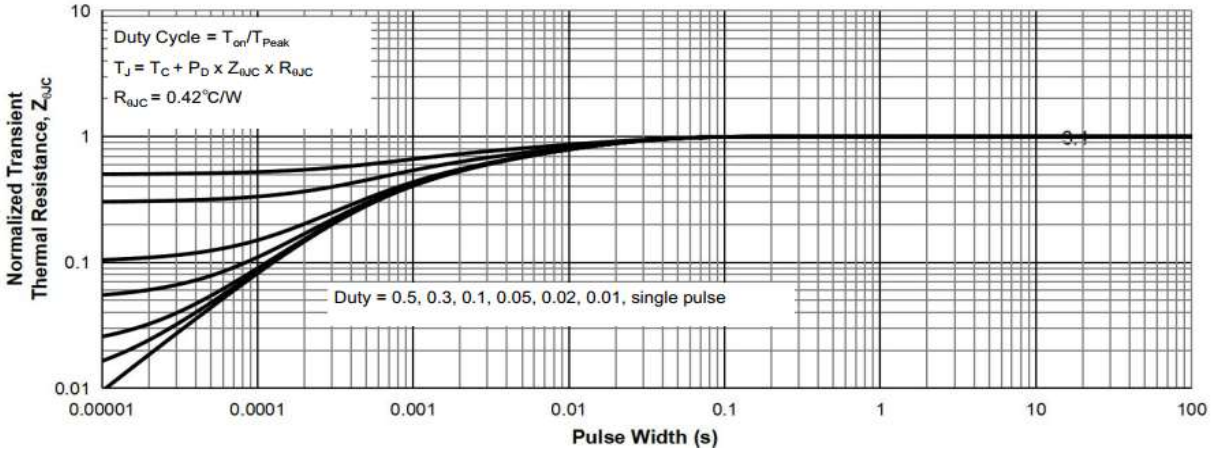
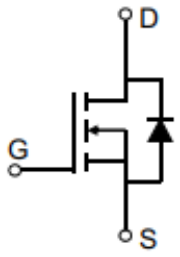
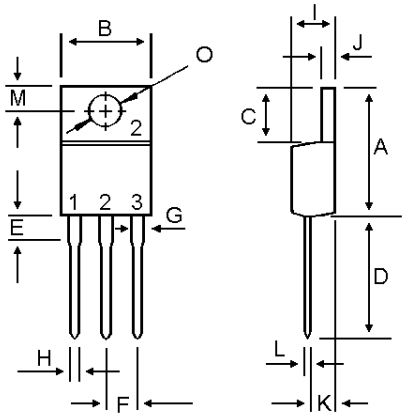


Figure 11. Normalized Maximum Transient Thermal Impedance

• Circuit diagram



• TO-220AB Package outlines : Dimensions in (mm)



DIM	MILLIMETERS	
	MIN	MAX
A	14.68	16.20
B	9.78	10.42
C	5.02	6.60
D	13.00	14.62
E	3.10	4.19
F	2.41	2.67
G	1.10	1.67
H	0.69	1.01
I	4.22	4.98
J	1.14	1.40
K	2.20	3.30
L	0.28	0.61
M	2.48	3.00
O	3.40	4.00

Notice

MOSPEC reserves the rights to make changes of the content herein the document anytime without notification. MOSPEC or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies. Please refer to MOSPEC website for the last document.

MOSPEC disclaims any and all liability arising out of the application or use of any product including damages incidentally and consequentially incurred.

Application shown on the herein document are examples of standard use and operation. Customers are responsible for comprehending suitable use in particular applications. MOSPEC makes no representation or warranty that such application will be suitable for the specified use without further testing or modification.

The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by MOSPEC for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of MOSPEC or others.

These MOSPEC products are intended for usage in general electronic equipment. Please make sure to consult with MOSPEC before you use these MOSPEC products in equipment which require specialized quality and/or reliability, and in equipment which could have major impact to the welfare of human life (atomic energy control, aeronautics , traffic control, combustion control, safety devices etc.)