

N-Ch 16V Fast Switching MOSFETs

- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

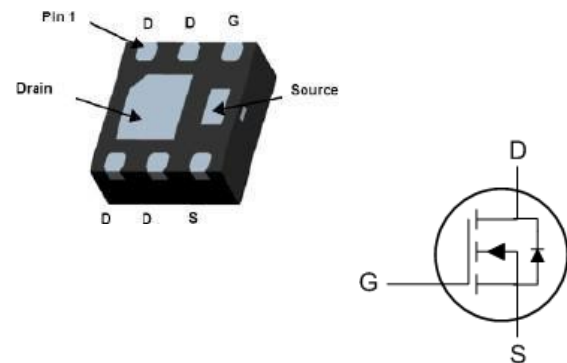
Product Summary


BVDSS	RDSON	ID
16V	5.8mΩ	20A

Description

The XR20N01M is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The XR20N01M meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

DFN2020-6L Pin Configuration

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	16	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	20	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	16.6	A
I_{DM}	Pulsed Drain Current ²	120	A
EAS	Single Pulse Avalanche Energy ³	36	mJ
I_{AS}	Avalanche Current	---	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation ⁴	10	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	$^\circ\text{C/W}$

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Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	16	---	---	V
$\Delta BV_{DSS} / \Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=1\text{mA}$	---	---	---	$V/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=4.5V, I_D=1A$	---	5.8	7.6	m Ω
		$V_{GS}=2.5V, I_D=1A$	---	7.8	10	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	0.4	0.7	1.1	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	---	---	$\text{mV}/^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=20V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=20V, V_{GS}=0V, T_J=100^\circ\text{C}$	---	---	100	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=5V, I_D=15A$	---	---	---	S
R_g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	1.2	---	Ω
Q_g	Total Gate Charge	$V_{DS}=10V, V_{GS}=4.5V, I_D=37A$	---	19	---	nC
Q_{gs}	Gate-Source Charge		---	3	---	
Q_{gd}	Gate-Drain Charge		---	6.4	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{GS}=4.5V, V_{DD}=10V, R_G=3\Omega, I_D=15A$	---	10	---	ns
T_r	Rise Time		---	21	---	
$T_{d(off)}$	Turn-Off Delay Time		---	39	---	
T_f	Fall Time		---	19	---	
C_{iss}	Input Capacitance	$V_{DS}=10V, V_{GS}=0V, f=1\text{MHz}$	---	1458	---	pF
C_{oss}	Output Capacitance		---	238	---	
C_{rss}	Reverse Transfer Capacitance		---	212	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,4}	$V_G=V_D=0V$, Force Current	---	---	20	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=45A, T_J=25^\circ\text{C}$	---	---	1.2	V
t_{rr}	Reverse Recovery Time	$I_F=30A, di/dt=100A/\mu s, T_J=25^\circ\text{C}$	---	25	---	nS
Q_{rr}	Reverse Recovery Charge		---	20	---	nC

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

2. EAS condition: $T_J=25^\circ\text{C}$, $V_{DD}=10V$, $V_G=4.5V$, $L=0.5\text{mH}$, $R_G=25\Omega$, $I_{AS}=12A$

3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

Typical Characteristics

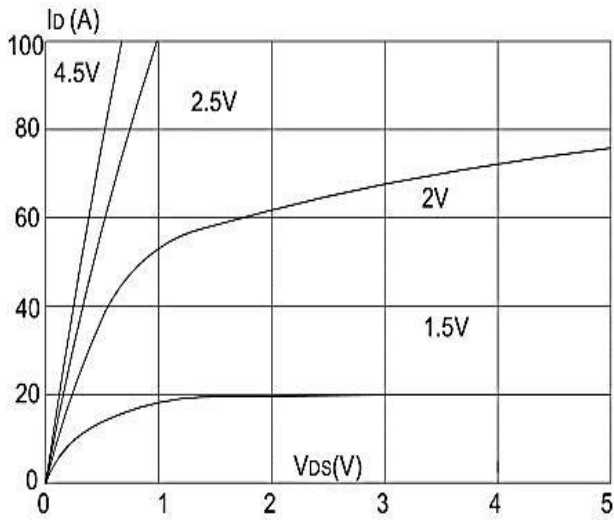


Figure 1: Output Characteristics

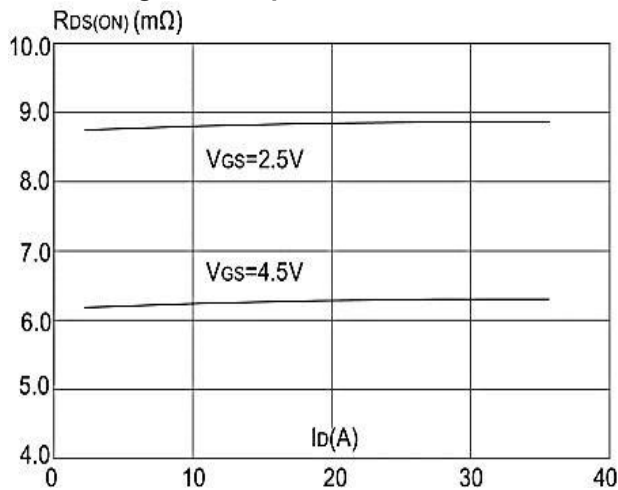


Figure 3: On-resistance vs. Drain Current

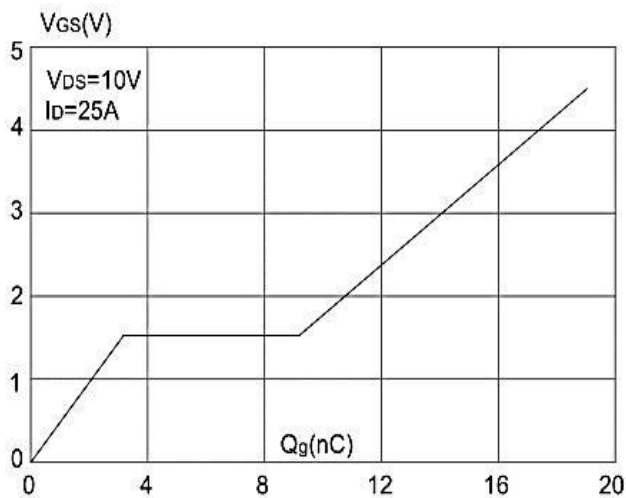


Figure 5: Gate Charge Characteristics

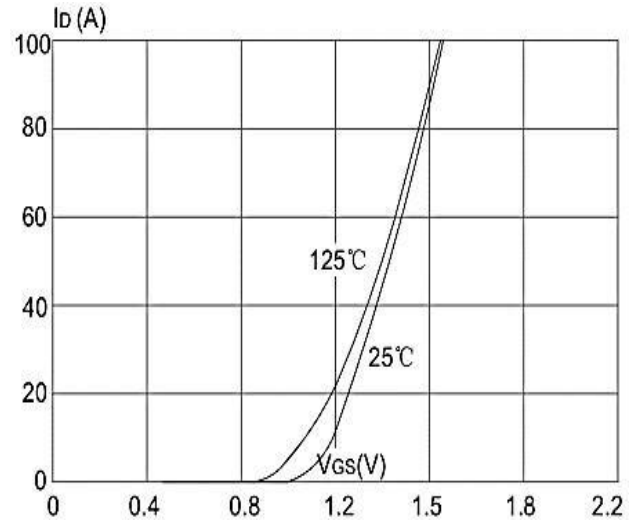


Figure 2: Typical Transfer Characteristics

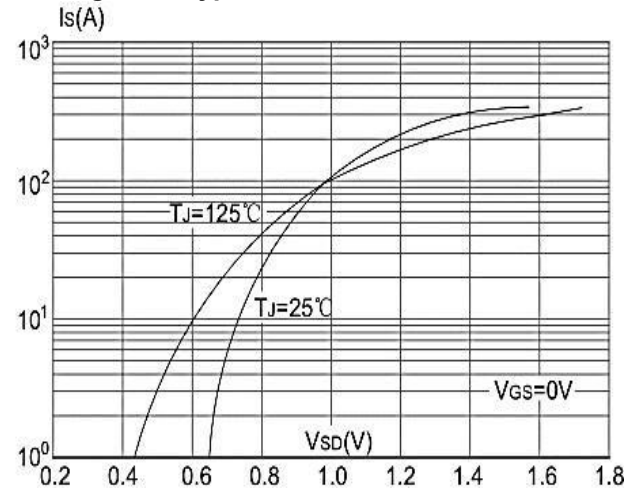


Figure 4: Body Diode Characteristics

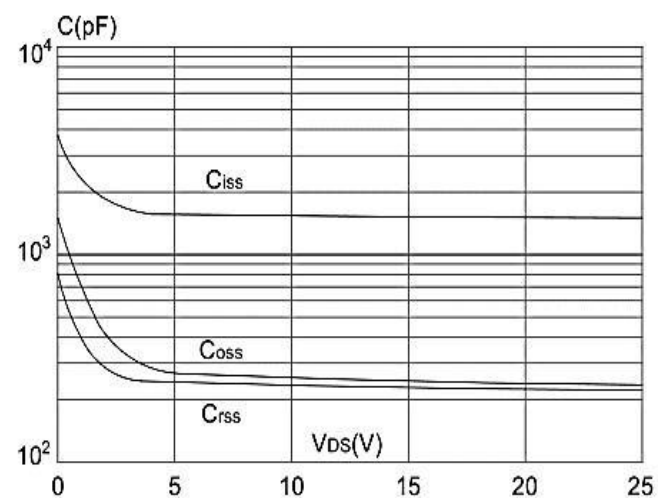


Figure 6: Capacitance Characteristics

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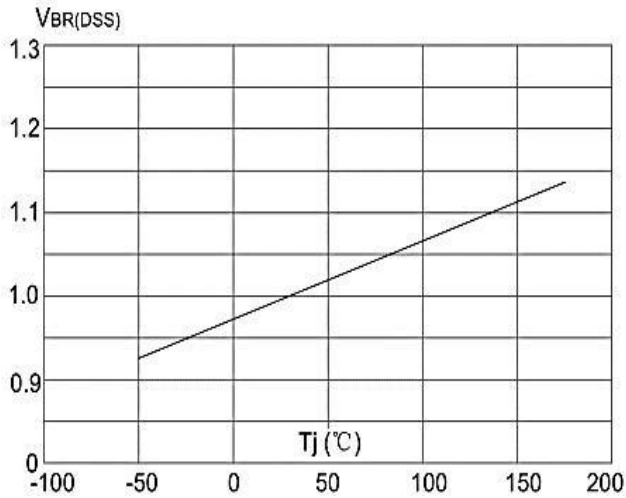


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

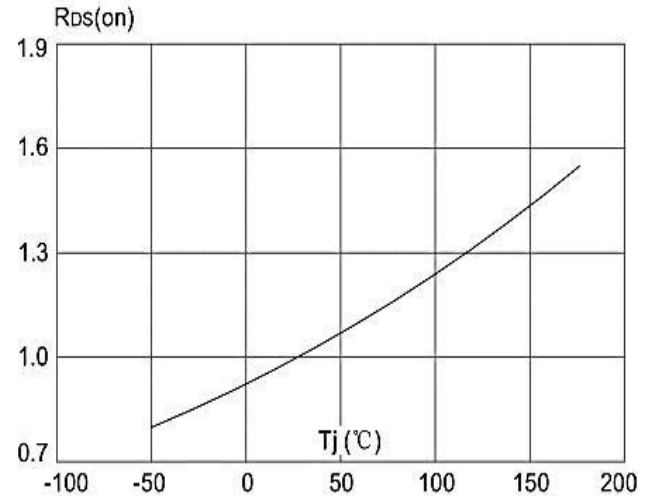


Figure 8: Normalized on Resistance vs. Junction Temperature

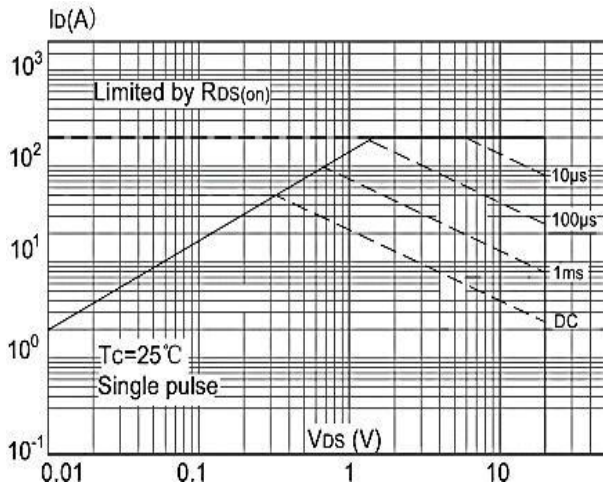


Figure 9: Maximum Safe Operating Area vs. Case Temperature

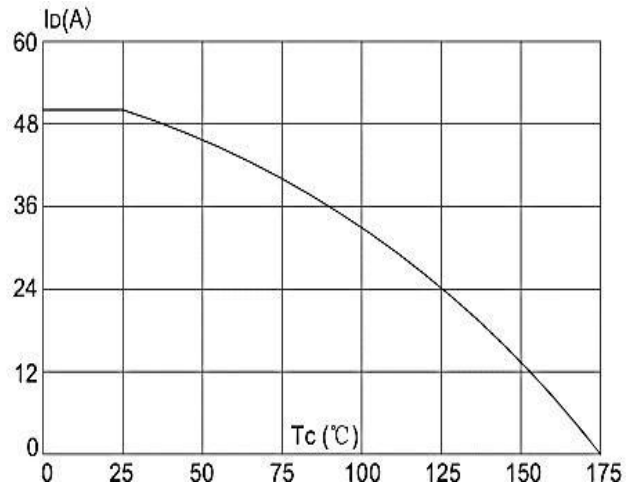


Figure 10: Maximum Continuous Drain Current

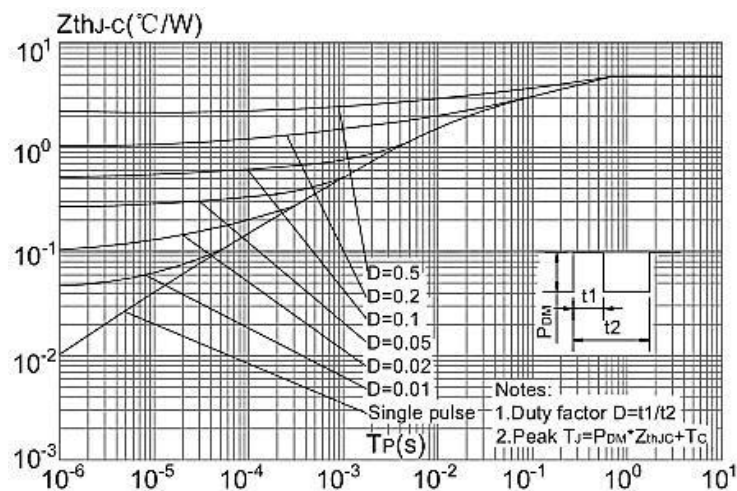
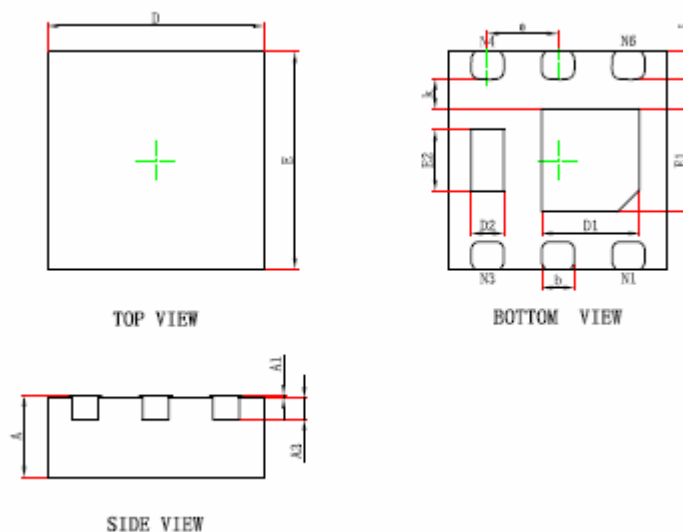


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

DFN2020-6L Package Information


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A3	0.203REF.		0.008REF.	
D	1.924	2.076	0.076	0.082
E	1.924	2.076	0.076	0.082
D1	0.800	1.000	0.031	0.039
E1	0.850	1.050	0.033	0.041
D2	0.200	0.400	0.008	0.016
E2	0.460	0.660	0.018	0.026
k	0.200MIN.		0.008MIN.	
b	0.250	0.350	0.010	0.014
e	0.650TYP.		0.026TYP.	
L	0.174	0.326	0.007	0.013