N-Ch 30V Fast Switching MOSFETs

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

Product Summary

Green

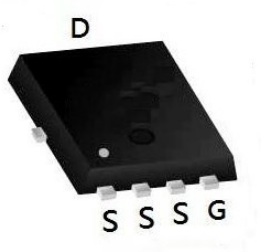
BVDSS	RDSON	ID
30V	3.0mΩ	120 A

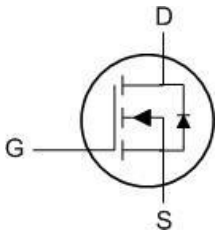
Description

The XR120N03F 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 XR120N03F meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

PDFN5060-8L Pin Configuration





Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		10s	Steady State	
V_{DS}	Drain-Source Voltage	30		V
V_{GS}	Gate-Source Voltage	±20		V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	120		A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	75		A
I_{DM}	Pulsed Drain Current[2]	384		A
EAS	Single Pulse Avalanche Energy[3]	198		mJ
I_{AS}	Avalanche Current	53.8		A
P_D@T_C=25℃	Total Power Dissipation[4]	62.5		W
P_D@T_A=25℃	Total Power Dissipation[4]	6	2.42	W
T_{STG}	Storage Temperature Range	-55 to 175		℃
T_J	Operating Junction Temperature Range	-55 to 175		℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	62	℃/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1] (t ≤10s)	---	25	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	2.4	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=24V, V_{GS}=0V	-	-	1	μA
		T_J=85°C	-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	1.4	1.7	2.5	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$ [d]	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=20A	-	3	3.8	mΩ
		T_J=125°C	-	4.4	-	
		V_{GS}=4.5V, I_{DS}=15A	-	4.0	5.5	
Gfs	Forward Transconductance	V_{DS}=5V, I_{DS}=10A	-	24.6	-	S
Diode Characteristics						
V_{SD} [d]	Diode Forward Voltage	I_{SD}=20A, V_{GS}=0V	-	0.8	1.1	V
t_{rr}	Reverse Recovery Time	I_{DS}=20A, dI_{SD}/dt=100A/μs	-	35.6	-	ns
t_a	Charge Time		-	19.3	-	
t_b	Discharge Time		-	16.3	-	
Q_{rr}	Reverse Recovery Charge		-	26	-	nC
Dynamic Characteristics [e]						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	-	1	2	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, Frequency=1.0MHz	-	2485	2971	pF
C_{oss}	Output Capacitance		-	850	-	
C_{rss}	Reverse Transfer Capacitance		-	85	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=15V, R_L=15Ω, I_{DS}=1A, V_{GEN}=10V, R_G=6Ω	-	12.4	23	ns
t_r	Turn-on Rise Time		-	9.5	18	
$t_{d(OFF)}$	Turn-off Delay Time		-	27.2	49	
t_f	Turn-off Fall Time		-	35.2	64	
Gate Charge Characteristics [e]						
Q_g	Total Gate Charge	V_{DS}=15V, V_{GS}=10V, I_{DS}=20A	-	20.6	28.8	nC
Q_g	Total Gate Charge	V_{DS}=15V, V_{GS}=4.5V, I_{DS}=20A	-	9.8	-	
Q_{gth}	Threshold Gate Charge		-	1.8	-	
Q_{gs}	Gate-Source Charge		-	3.8	-	
Q_{gd}	Gate-Drain Charge		-	3.7	-	

Note d：Pulse test ; pulse width≤300μs, duty cycle≤2%.
Note e：Guaranteed by design, not subject to production testing.

N- Channel Typical Characteristics

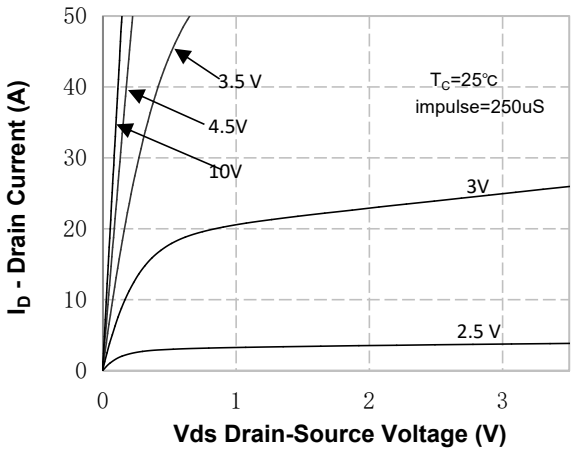


Figure 1. On-Region Characteristics

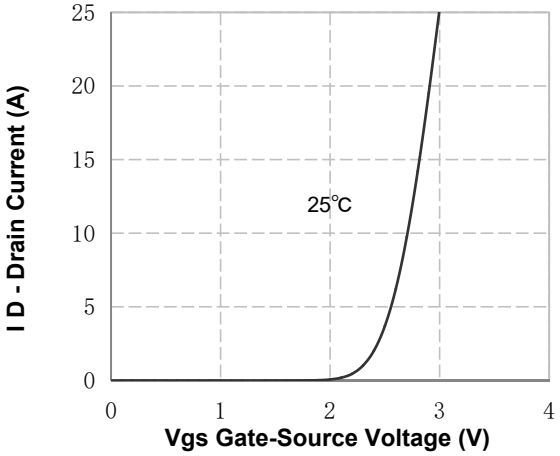


Figure 2. Transfer Characteristics

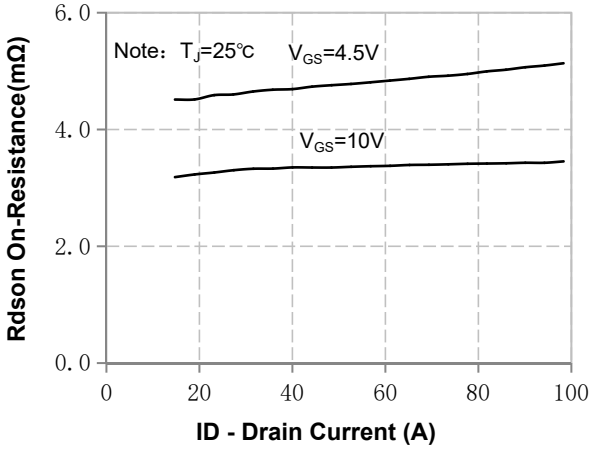


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

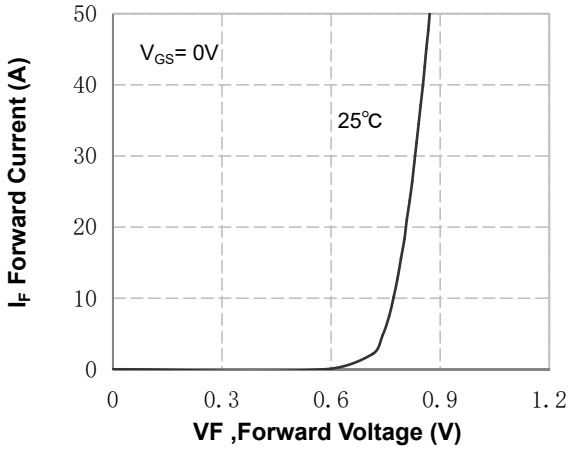


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

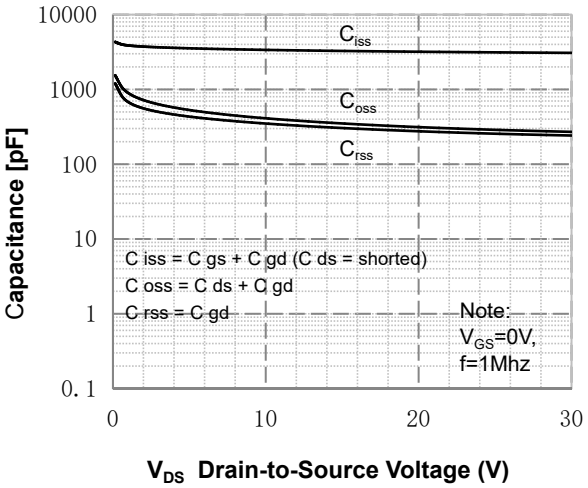


Figure 5. Capacitance Characteristics

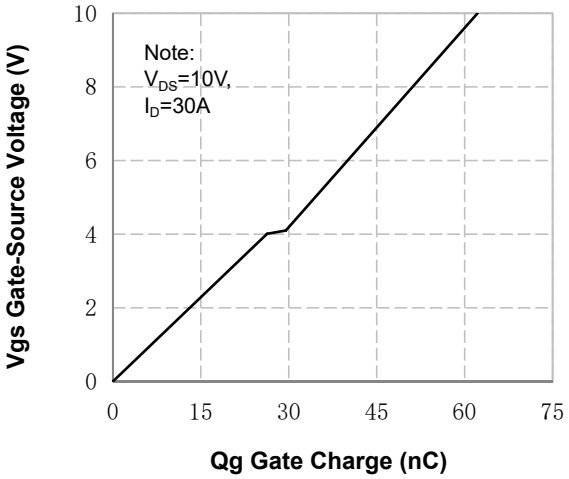


Figure 6. Gate Charge Characteristics

N- Channel Typical Characteristics (Continued)

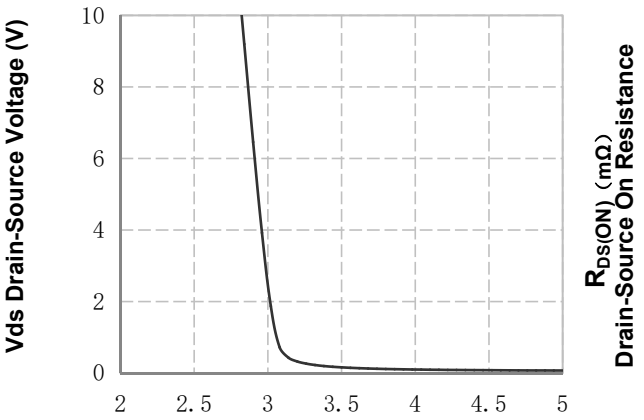


Figure 7. Vds Drain-Source Voltage vs Gate Voltage

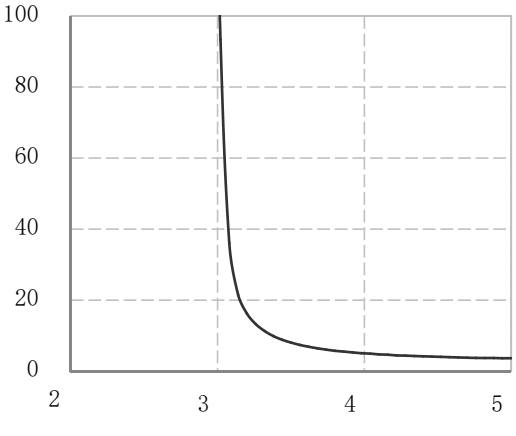


Figure 8. On-Resistance vs Gate Voltage

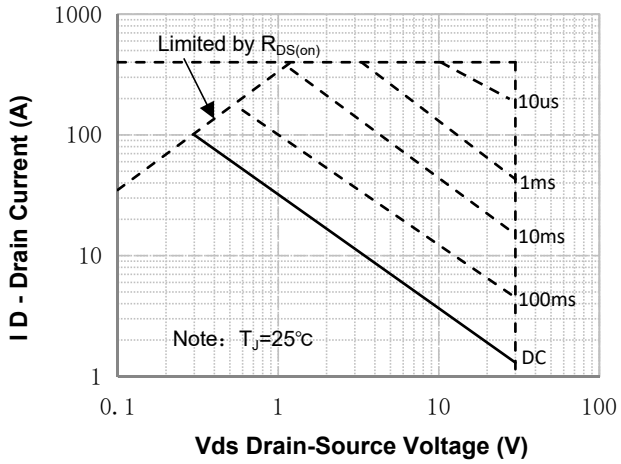


Figure 9. Maximum Safe Operating Area

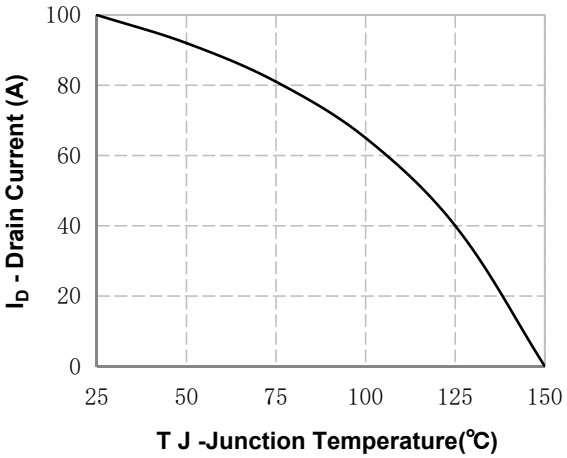


Figure 10. Maximum Continuous Drain Current vs Temperature

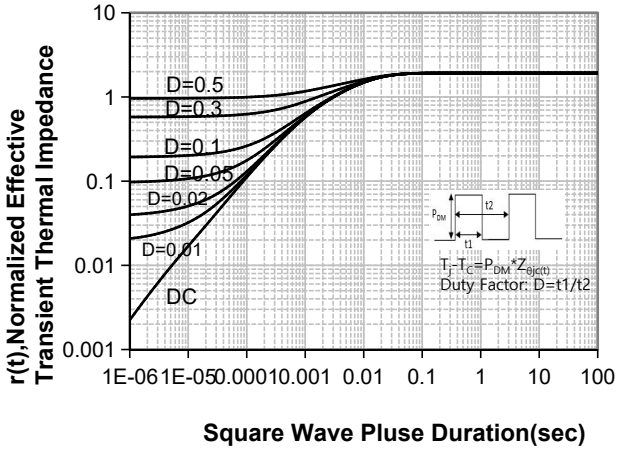
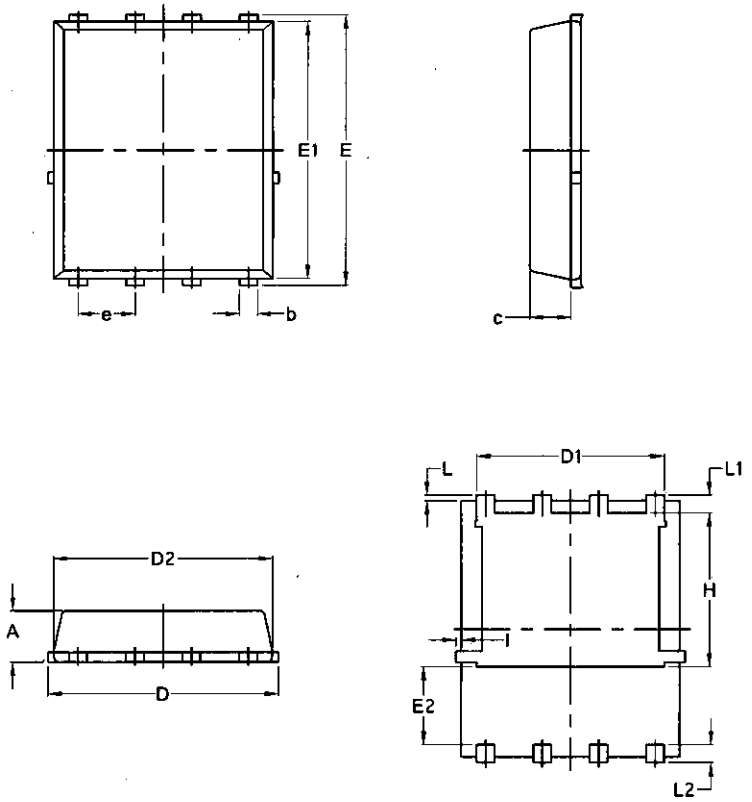


Figure 11. Transient Thermal Response Curve

Package Mechanical Data-PDFN5060-8L-Single



Symbol	Common			
	mm		Inch	
	Mim	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070