

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

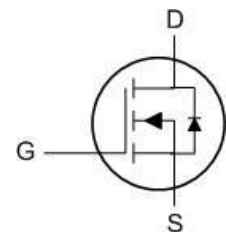
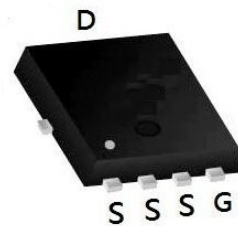
Product Summary

BVDSS	RDSON	ID
30V	5.5mΩ	70 A

Description

The XXW70N03DF is the high cell density trench N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The XXW70N03DF meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

PRPAK5X6 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
$I_D@T_C=25^{\circ}C$	Continuous Drain Current, $V_{GS}@10V^1$	70		A
$I_D@T_C=100^{\circ}C$	Continuous Drain Current, $V_{GS}@10V^1$	60		A
I_{DM}	Pulsed Drain Current ²	192		A
EAS	Single Pulse Avalanche Energy ³	306		mJ
I_{AS}	Avalanche Current	53.8		A
$P_D@T_C=25^{\circ}C$	Total Power Dissipation ⁴	82.5		W
T_{STG}	Storage Temperature Range	-55 to 175		°C
T_J	Operating Junction Temperature Range	-55 to 175		°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	0.56	°C/W

Thermal Characteristic

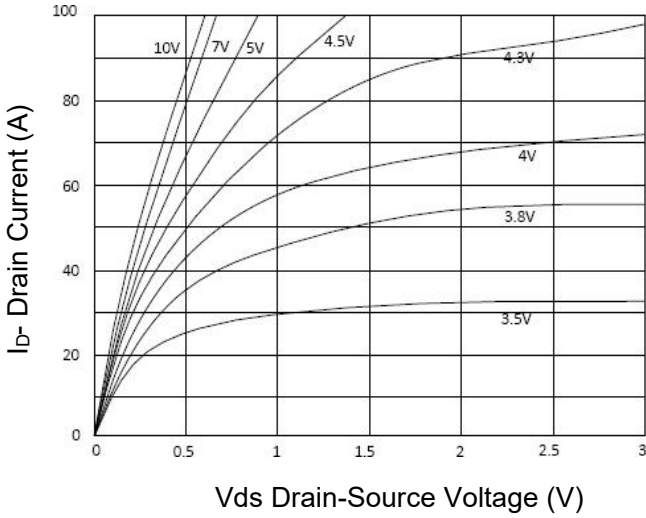
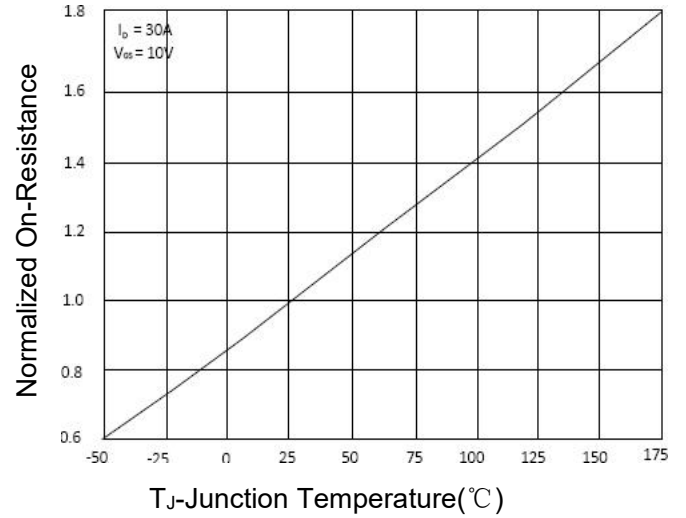
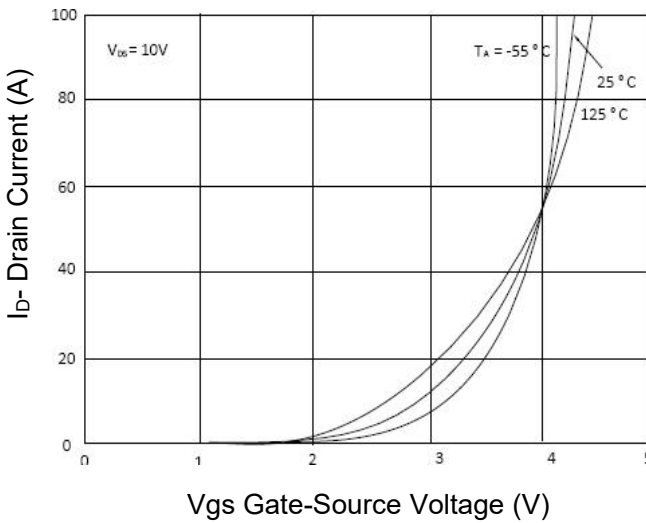
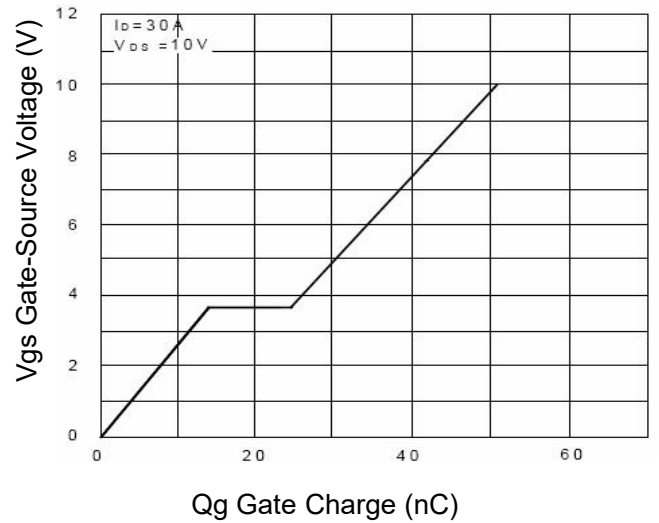
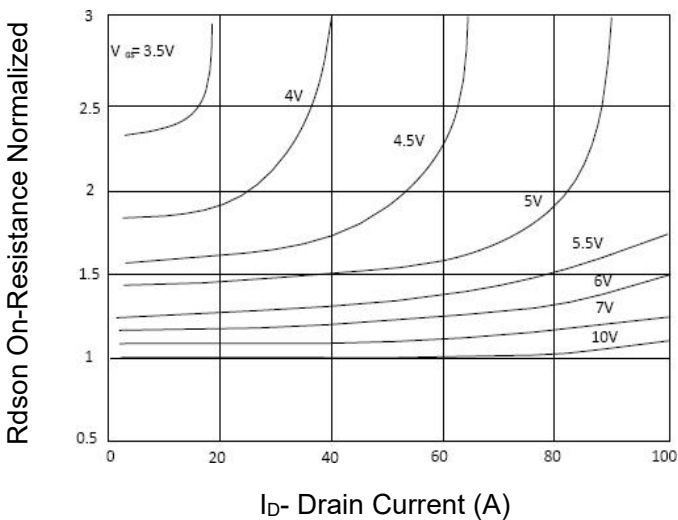
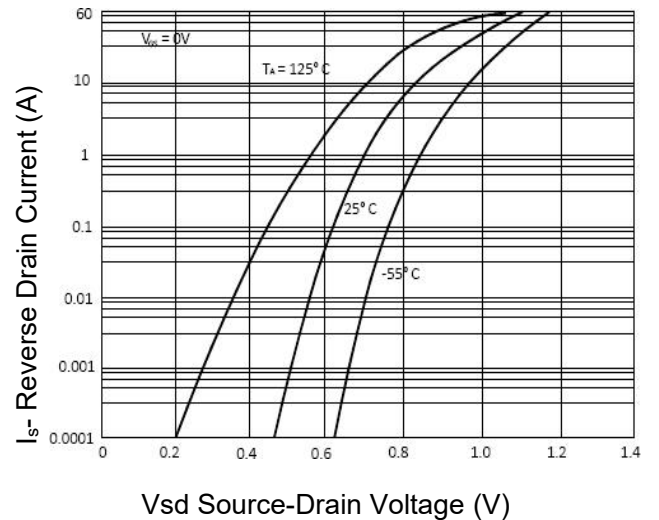
Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	1.8	°C/W
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Electrical Characteristics ($T_C=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.6	3	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=30A$	-	5.5	6.5	m Ω
		$V_{GS}=5V, I_D=24A$	-	7.5	10	
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=24A$	20	-	-	S
Dynamic Characteristics ^(Note 4)						
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0MHz$	-	2016	-	PF
Output Capacitance	C_{oss}		-	251	-	PF
Reverse Transfer Capacitance	C_{rss}		-	230	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=10V, I_D=30A$ $V_{GS}=10V, R_{GEN}=2.7\Omega$	-	20	-	nS
Turn-on Rise Time	t_r		-	15	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	60	-	nS
Turn-Off Fall Time	t_f		-	10	-	nS
Total Gate Charge	Q_g	$V_{DS}=10V, I_D=30A,$ $V_{GS}=10V$	-	60.5	-	nC
Gate-Source Charge	Q_{gs}		-	8.1	-	nC
Gate-Drain Charge	Q_{gd}		-	7.8	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V_{SD}	$V_{GS}=0V, I_S=24A$	-	-	1.2	V
Diode Forward Current ^(Note 2)	I_S		-	-	70	A
Reverse Recovery Time	t_{rr}	$T_J = 25^\circ\text{C}, I_F = 80A$ $di/dt = 100A/\mu\text{s}$ ^(Note 3)	-	32	50	nS
Reverse Recovery Charge	Q_{rr}		-	12	20	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition: $T_J=25^\circ\text{C}, V_{DD}=15V, V_G=10V, L=0.5mH, R_g=25\Omega, I_{AS}=35A$

Typical Electrical and Thermal Characteristics (Curves)

Figure 1 Output Characteristics

Figure 4 $R_{ds(on)}$ -Junction Temperature

Figure 2 Transfer Characteristics

Figure 5 Gate Charge

Figure 3 $R_{ds(on)}$ - Drain Current

Figure 6 Source- Drain Diode Forward

N-Ch 30V Fast Switching MOSFETs

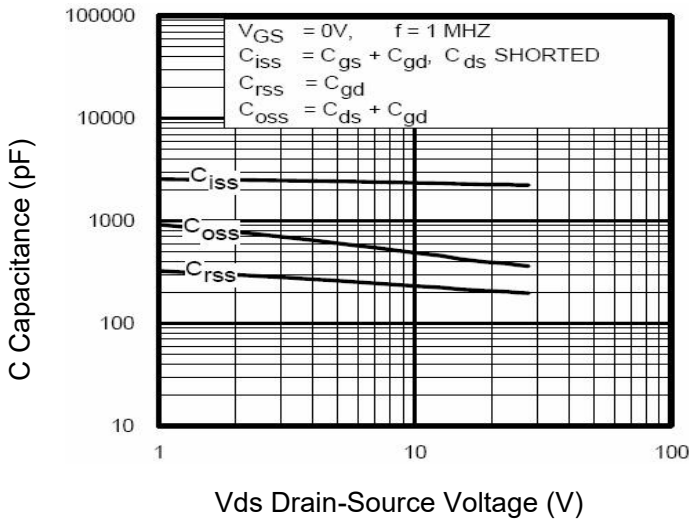


Figure 7 Capacitance vs Vds

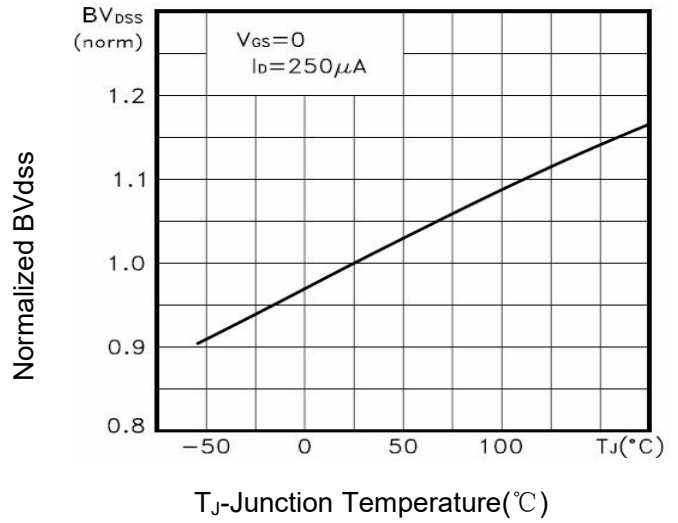


Figure 9 BV_{DSS} vs Junction Temperature

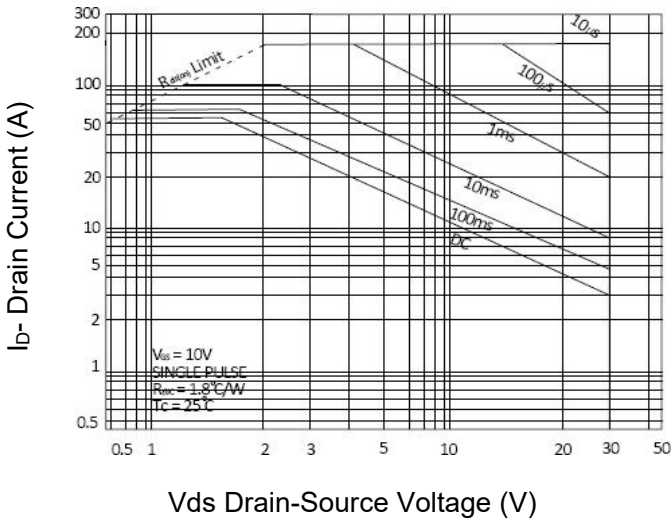


Figure 8 Safe Operation Area

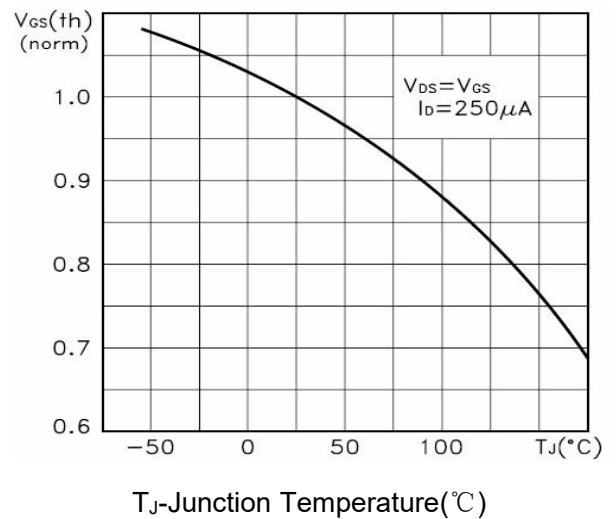


Figure 10 $V_{GS(th)}$ vs Junction Temperature

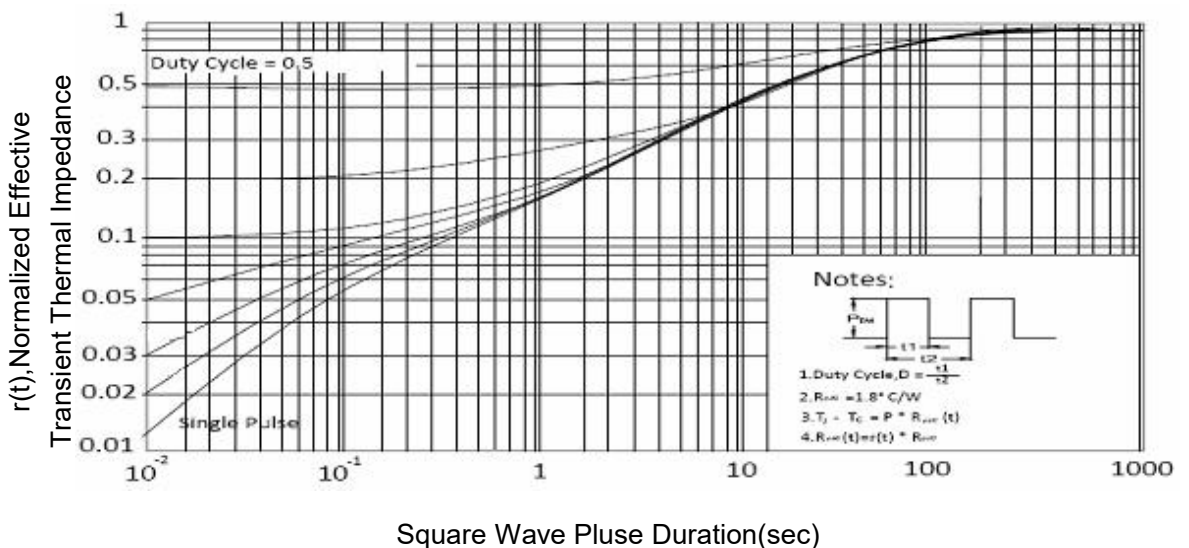
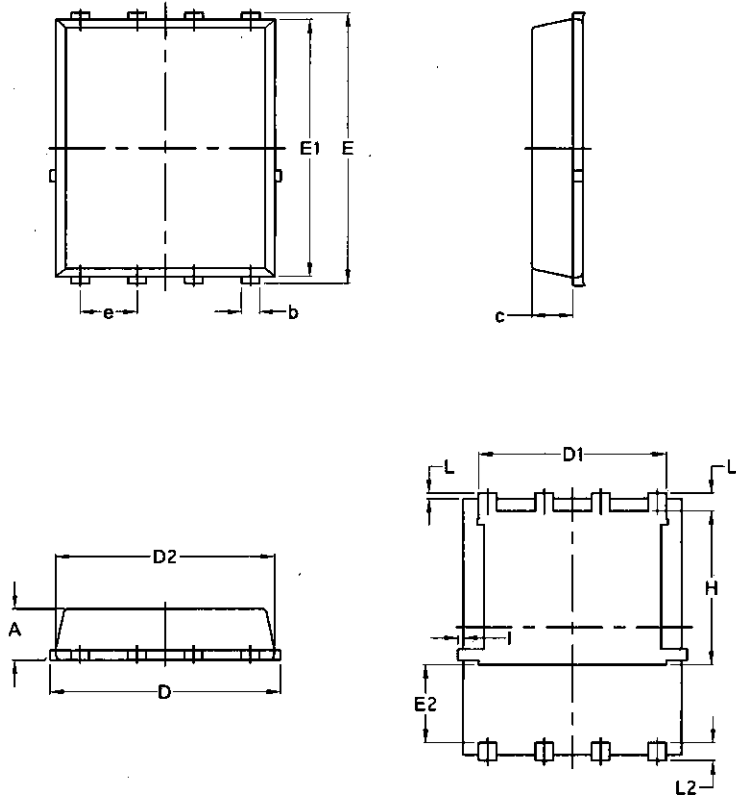


Figure 11 Normalized Maximum Transient Thermal Impedance

Package Mechanical Data-DFN5*6-8L-JQ Single


Symbol	Common			
	mm		Inch	
	Min	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