N-Channel Enhancement Mode Power MOSFET

Features

V_{DS} = 40V,

I_D = 40A

$R_{DS(ON)}$ @V_{GS}= 10V, TYP 4.5 mΩ

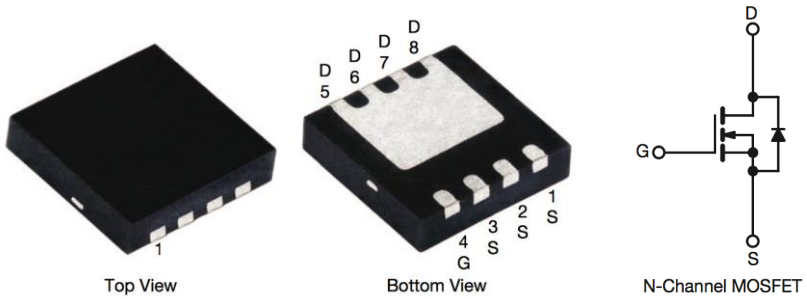
$R_{DS(ON)}$ @V_{GS}= 4.5V, TYP 6 mΩ

General Description

• DC/DC power supplies

• Motor drive control

Pin Configurations



TDFN3.3*3.3-8L/ TDFN3*3-8L

Absolute Maximum Ratings @T_A=25℃ unless otherwise noted

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DSS}	40	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current (Continuous) *AC	T_C=25°C	I_D	40	A
	T_C=70°C		40	
Drain Current (Pulse) *B		I_{DM}	225	A
Power Dissipation	T_C=25°C	P_D	52	W
Operating Temperature/ Storage Temperature		T_J/T_{STG}	-55~150	℃

Thermal Resistance Ratings

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient	t ≤ 10 s	R_{thJA}	24	33	°C/W
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	1.9	2.4	

- **Electrical Characteristics** @T_A=25℃ unless otherwise noted

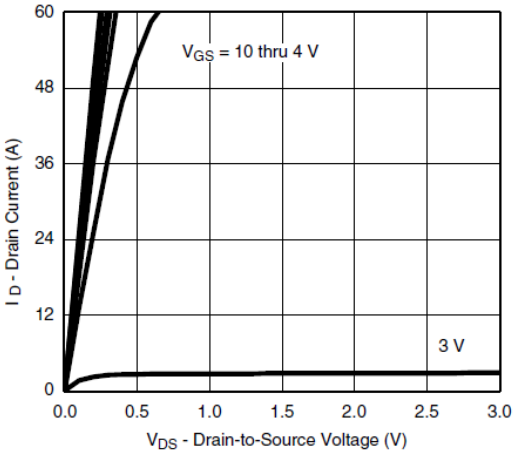
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D= 250μA	40	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 40V, V_{GS} = 0V	--	--	1	μA
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_{DS}= 250μA	1	--	3	V
Gate Leakage Current	I_{GSS}	V_{GS}= ±20V, V_{DS}=0V	--	--	±100	nA
Drain-Source On-state Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 15A	--	4.5	5.9	mΩ
	$R_{DS(on)}$	V_{GS} = 4.5V, I_D = 10A	--	6	7.8	mΩ
Diode Forward Voltage	V_{SD}	I_{SD}= 10A , V_{GS}=0V	--	0.69	1.2	V
Diode Forward Current *AC	I_S	T_C =25°C	--	--	40	A
Switching						
Total Gate Charge	Q_g	V_{DS}=20V , V_{GS}=10V , I_D=1.5A	--	71.5	--	nC
Gate-Source Charge	Q_{gs}		--	4.2	--	nC
Gate-Drain Charge	Q_{gd}		--	17	--	nC
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 20V, R_L = 30Ω V_{GEN} = 10V, R_g = 6Ω	--	19.5	--	ns
Turn-on Rise Time	t_r		--	15	--	ns
Turn-off Delay Time	$t_{d(off)}$		--	109	--	ns
Turn-Off Fall Time	t_f		--	35	--	ns
Dynamic						
Input Capacitance	C_{iss}	V_{DS}=20V,V_{GS}=0V, f=1.0MHz	--	3611	--	pF
Output Capacitance	C_{oss}		--	287	--	pF
Reverse Transfer Capacitance	C_{rss}		--	261	--	pF

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.

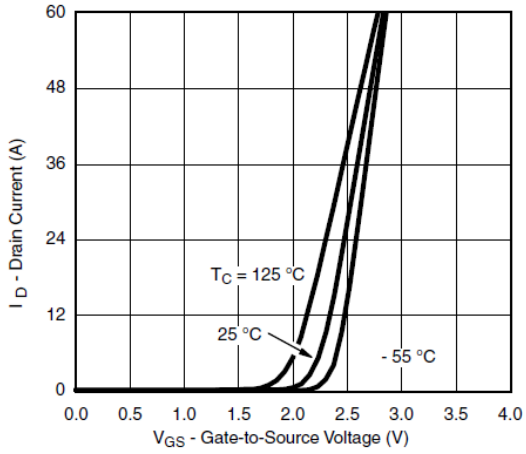
B: Repetitive rating, pulse width limited by junction temperature.

C: The current rating is based on the t≤ 10s junction to ambient thermal resistance rating, package limited 40A

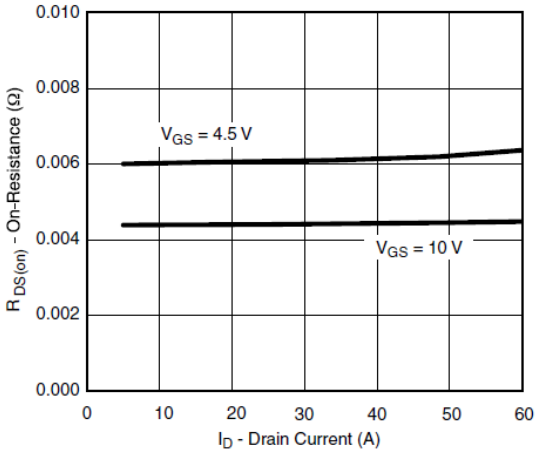
- **Typical Performance Characteristics（(TJ = 25 °C, unless otherwise noted)）**



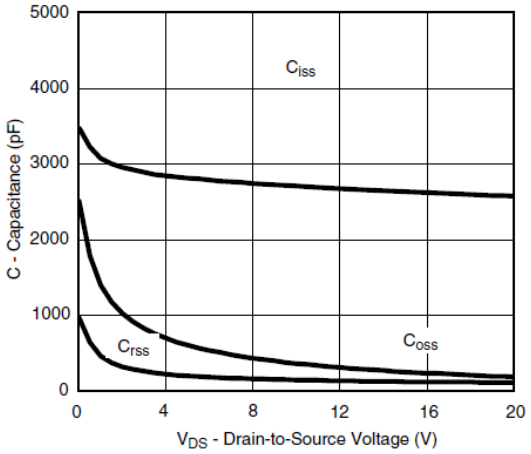
Output Characteristics



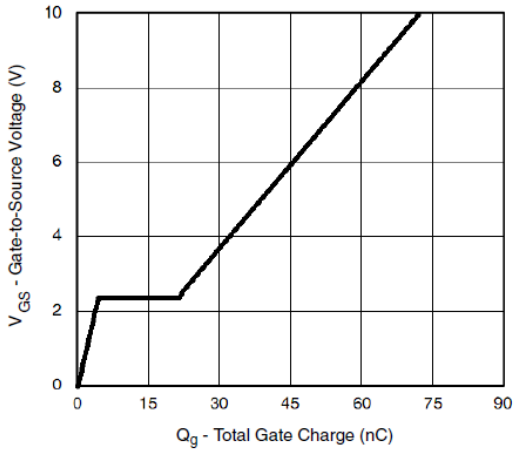
Transfer Characteristics



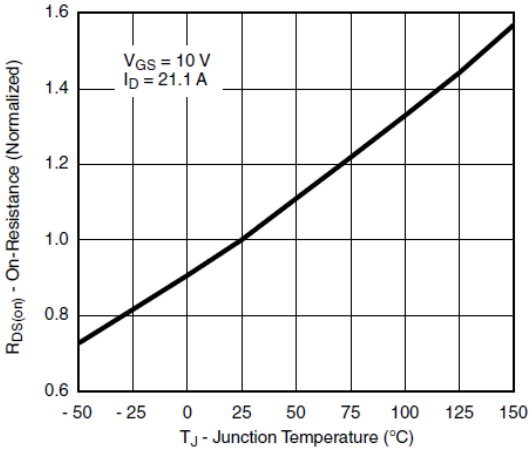
On-Resistance vs. Drain Current



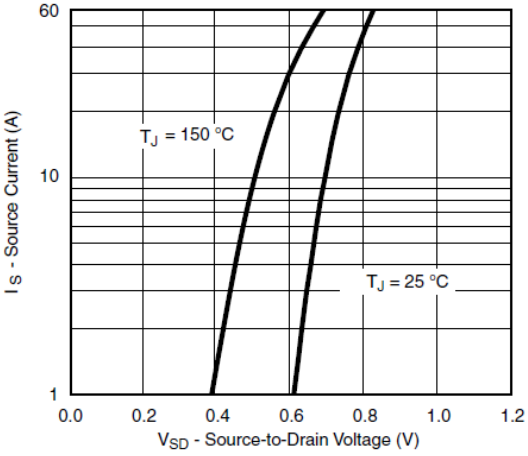
Capacitance



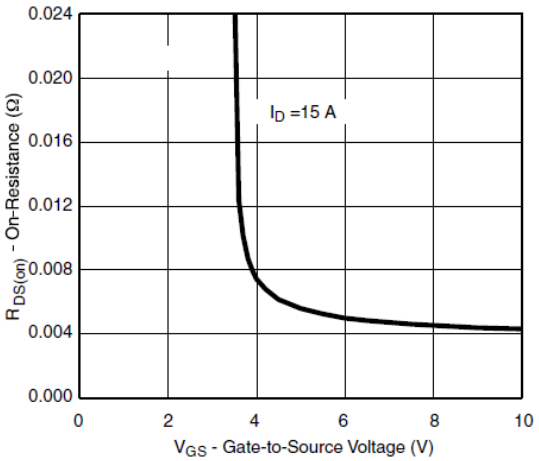
Gate Charge



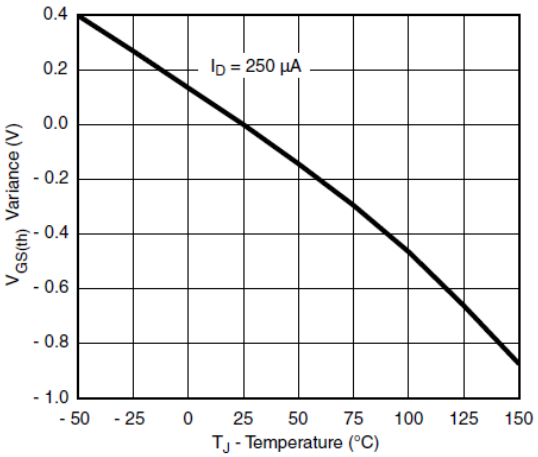
On-Resistance vs. Junction Temperature



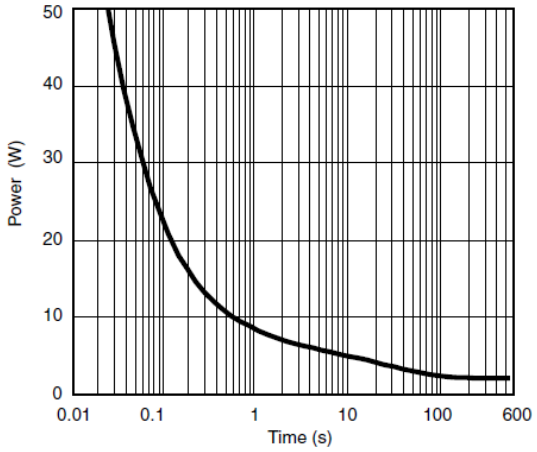
Source-Drain Diode Forward Voltage



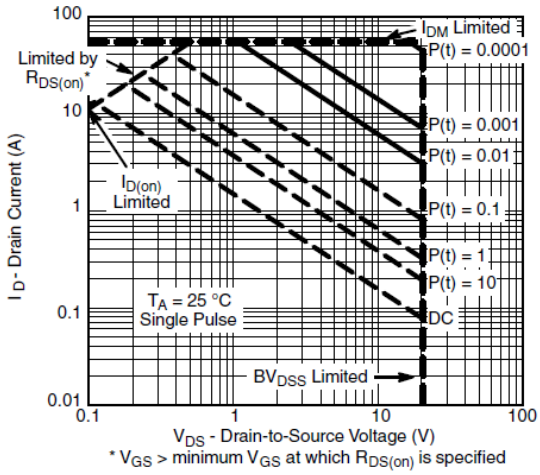
On-Resistance vs. Gate-to-Source Voltage



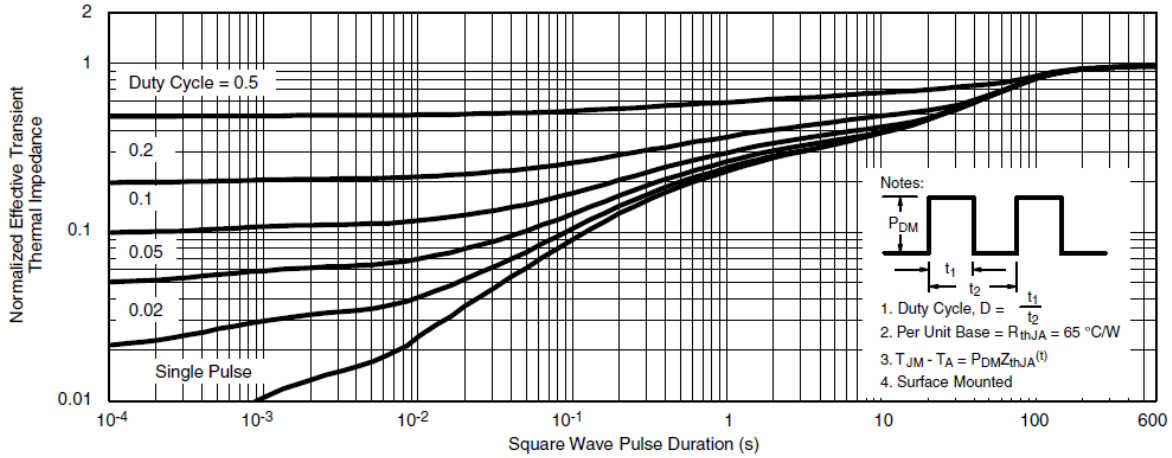
Threshold Voltage



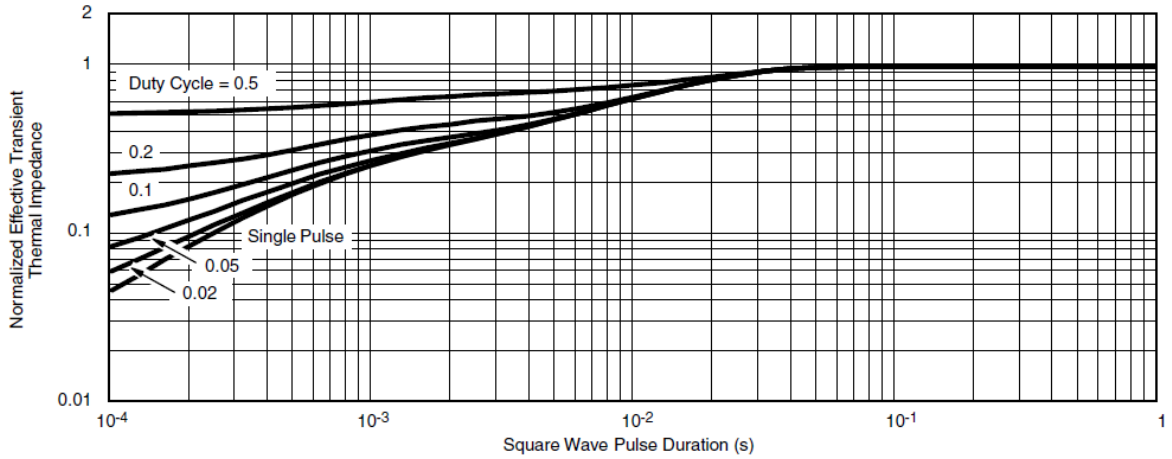
Single Pulse Power, Junction-to-Ambient



Safe Operating Area



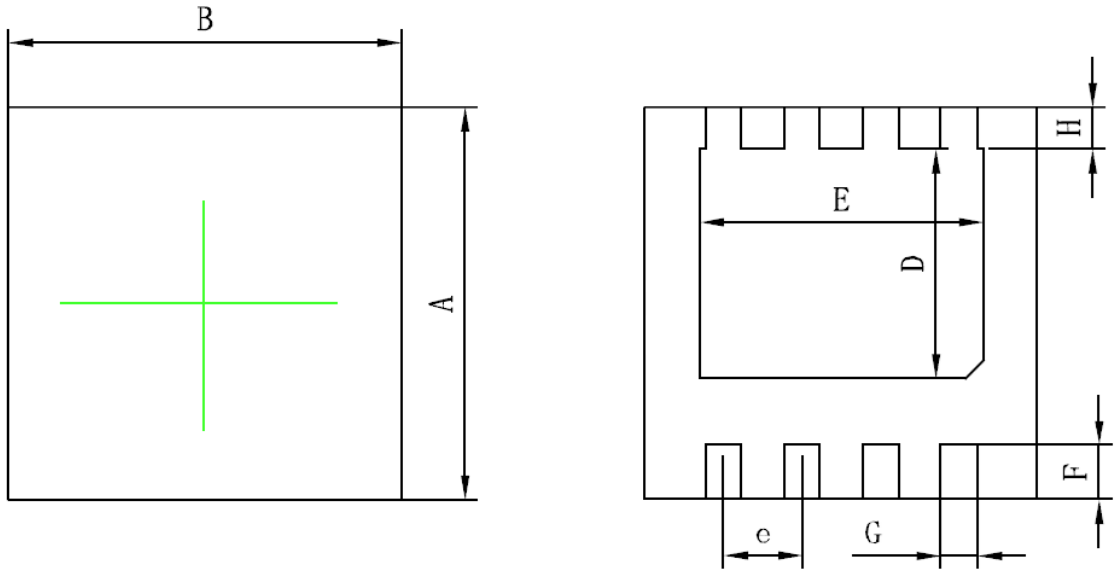
Normalized Thermal Transient Impedance, Junction-to-Ambient

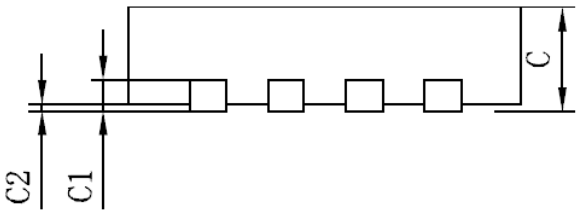


Normalized Thermal Transient Impedance, Junction-to-Case

- **Package Information**

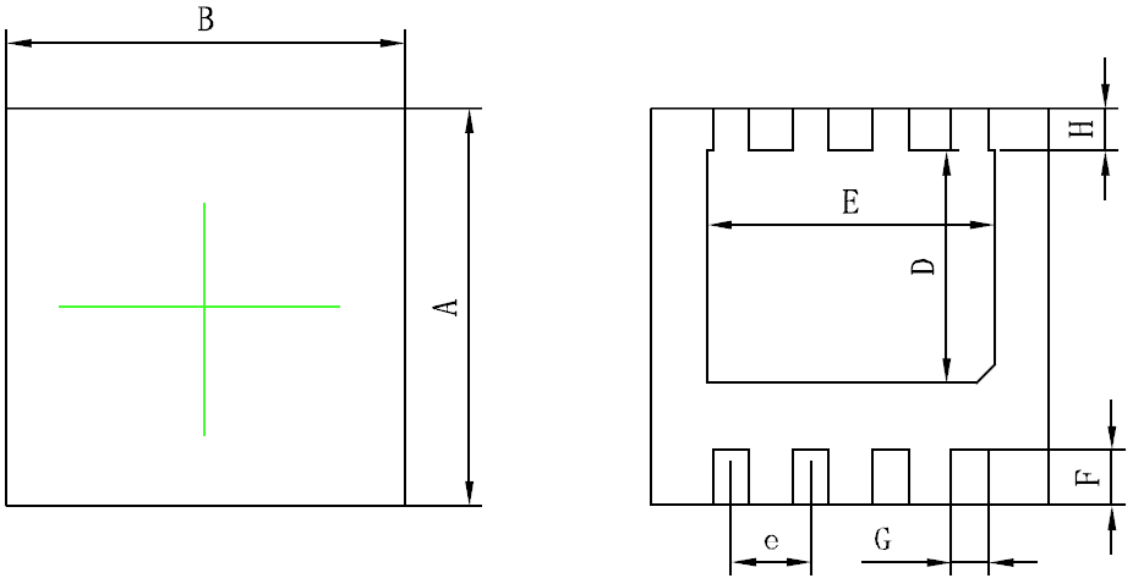
TDFN3.3*3.3-8L





DIM	MILLIMETERS		
	MIN	NOM	MAX
A	3.2	--	3.35
B	3.2	--	3.35
C	0.7	--	0.85
C1		0.2	
C2			0.05
D	1.8	1.9	2
E	2.2	2.35	2.5
F	0.35	0.45	0.55
G	0.25	0.3	0.35
H	0.3	--	0.4
e		0.65	

TDFN3*3-8L



DIM	MILLIMETERS		
	MIN	NOM	MAX
A	2.9	3	3.1
B	2.9	3	3.1
C	0.7	0.75	0.8
C1	0.18	0.2	0.3
C2		0.02	0.05
D	1.6	1.7	1.8
E	2.3	2.4	2.5
F	0.3	--	0.5
G	0.25	0.3	0.35
H	0.3	--	0.5
e	0.65		

Flow (wave) soldering (solder dipping)

Product	Peak Temperature	Dipping Time
Pb device	245℃±5℃	5sec±1sec
Pb-Free device	260℃+0/-5℃	5sec±1sec

This integrated circuit can be damaged by ESD UniverChip Corporation recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedure can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

Attention:

- Any and all XPX power products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your XPX power representative nearest you before using any XPX power products described or contained herein in such applications.

- XPX power assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all XPX power products described or contained herein.

- Specifications of any and all XPX power products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.

- XPX power Semiconductor CO.,LTD. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.

- In the event that any or all XPX power products(including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.

- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of XPX power Semiconductor CO.,LTD.

- Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. XPX power believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

- Any and all information described or contained herein are subject to change without notice due to product/ technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the XPX power product that you intend to use.

- This catalog provides information as of Sep.2019. Specifications and information herein are subject to change without notice.