-20V P-Channel Enhancement Mode MOSFET

Description

The XPX150P02FD uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

V_{DS} = -20V I_D =-150A

$R_{DS(ON)}$ < 2.1mΩ @ V_{GS}=-4.5V

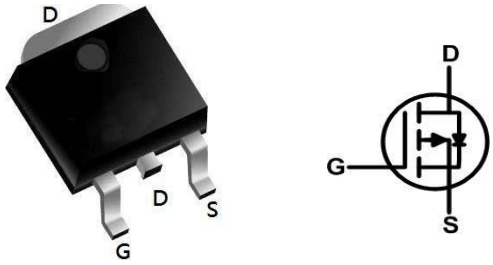
Application

Battery protection

Load switch

Uninterruptible power supply

TO252-3L Pin Configuration



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
XPX150P02FD	TO-252-3L	XPX150P02FD XXX YYYY	2500

Absolute Maximum Ratings (TC=25℃unless otherwise noted)

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	-20	V
VGS	Gate-Source Voltage	±12	V
ID@TC=25℃	Continuous Drain Current, VGS @ -10V1	-150	A
ID@TC=100℃	Continuous Drain Current, VGS @ -10V1	-76	A
IDM	Pulsed Drain Current2	450	A
EAS	Single Pulse Avalanche Energy3	450	mJ
IAS	Avalanche Current	-50	A
PD@TC=25℃	Total Power Dissipation4	104	W
TSTG	Storage Temperature Range	-55 to 150	℃
TJ	Operating Junction Temperature Range	-55 to 150	℃
RθJA	Thermal Resistance Junction-Ambient 1	15	℃/W
RθJC	Thermal Resistance Junction-Case1	0.9	℃/W

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

Symbol	Parameter	Test Condition	Min	Type	Max	Units
VDS	Drain-source breakdown voltage	V_{GS}=0V, I_D = -250μA	-20	-	-	V
IGSS	Gate-source leakage	V_{DS}=0V, V_{GS}=±12V	-	-	± 100	nA
IDSS	Zero gate voltage drain current	V_{DS}=-20V, V_{GS}=0V	-	-	-1	μA
VGS(th)	Gate-source threshold voltage	V_{DS}=V_{GS}, I_D=-250μA	-0.5	-0.7	-1.2	V
RDS(on)	Drain-source on-state resistance	V_{GS}=-4.5V, I_D=-20A	-	2.1	2.5	mΩ
		V_{GS}=-2.5V, I_D=-15A	-	2.6	3.2	
gfs	Forward transconductance [a]	V_{DS}=-10V, I_D=-25A	-	120	-	S
R_g	Gate resistance	f=1MHz	-	1.5	2.5	Ω
Ciss	Input capacitance	V_{DS}=-10V, V_{GS}=0V, f=1MHz	-	22000	-	pF
Coss	Output capacitance		-	2470	-	pF
Crss	Reverse transfer capacitance		-	2515	-	pF
Qgs	Gate-source charge	V_{DS}=-10V, V_{GS}=-4.5V, I_D =-20A	-	32.5	-	nC
Q_{gd}	Gate-drain charge		-	51.5	-	nC
Q_g	Total gate charge	V_{DS}=-10V, V_{GS}=-10V, I_D=20A	-	202.5		nC
td(on)	Turn-on delay time	V_{DD}=-10V, R_L=1Ω V_{GEN}=-4.5V, R_g=1Ω	-	20	40	ns
t_r	Rise time		-	14	28	ns
td(on)	Turn-on delay time		-	115	200	ns
td(off)	Turn-off delay time		-	230	390	ns
IS	Continuous source-drain diode current	T_C = 25 °C	-	-	-150	A
ISM	Pulse diode forward current		-	-	-450	A
VSD	Body diode voltage	I_S = -5 A, V_{GS} = 0 V	-	-0.64	-1.1	V
trr	Body diode reverse recovery time	I_F=-10A, di/dt=100A/μs, T_J =25°C	-	88	140	ns
Q_{rr}	Body diode reverse recovery charge		-	120	200	nC

Note :

1、The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.

2、The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3、The EAS data shows Max. rating . The test condition is VDD=-16V,VGS=-4.5V,L=0.1mH,IAS=-50A

4、The power dissipation is limited by 150℃ junction temperature

5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

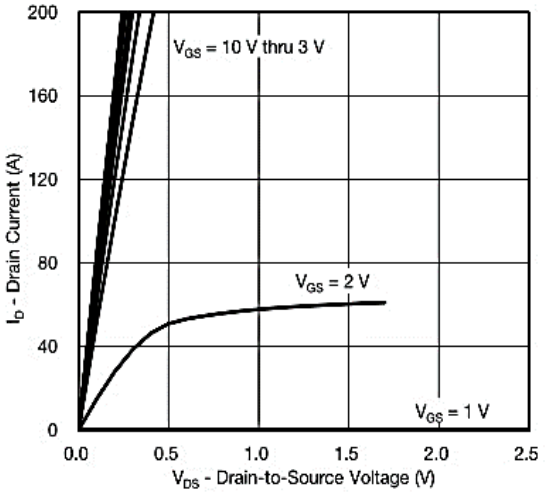


Figure1: Output Characteristics

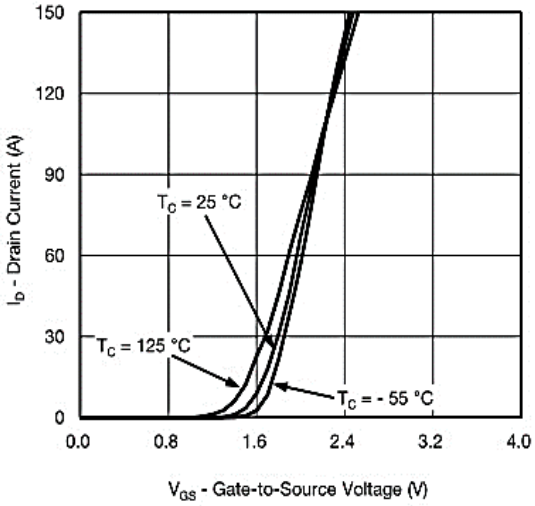


Figure 2: Transfer Characteristics

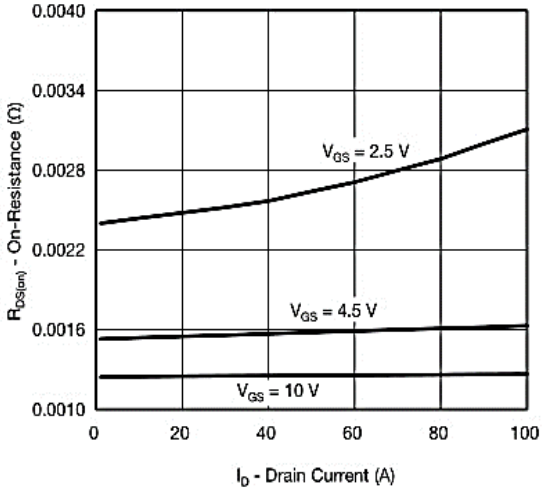


Figure 3: On-Resistance vs. Drain Current

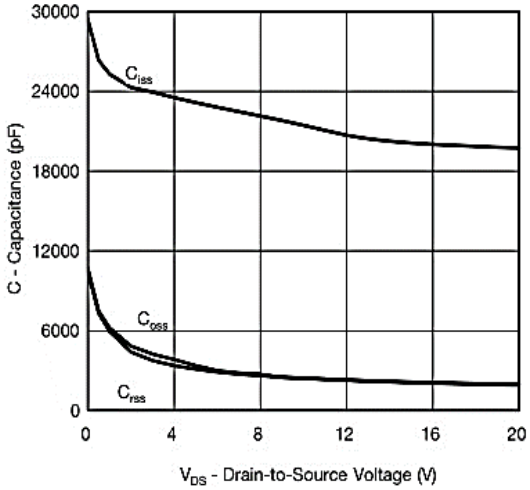


Figure 4: Capacitance

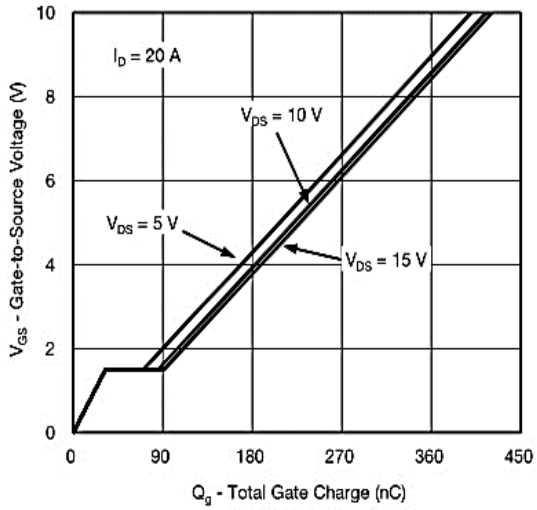


Figure 5: Gate Charge

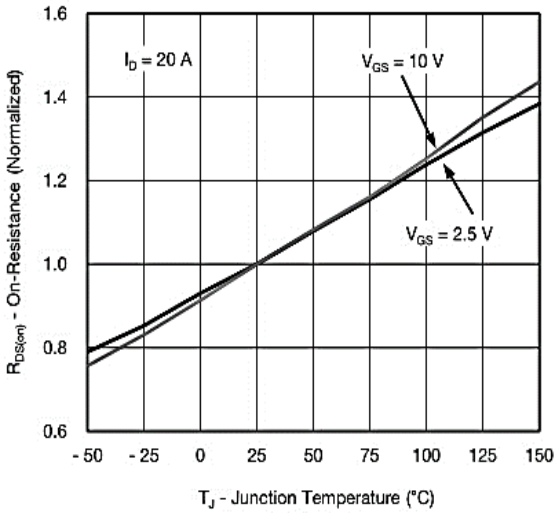


Figure 6: On-Resistance vs. Junction Temperature

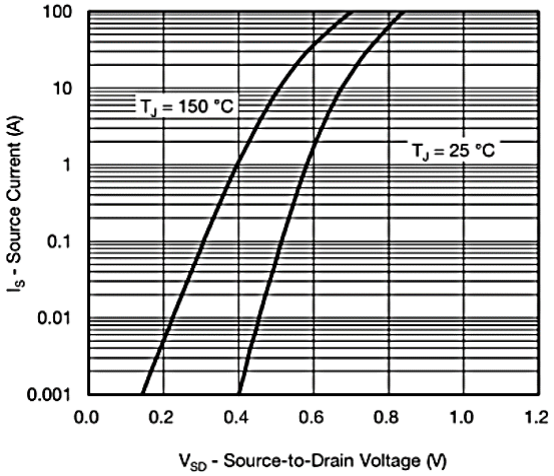


Figure 7: Source-Drain Diode Forward Voltage

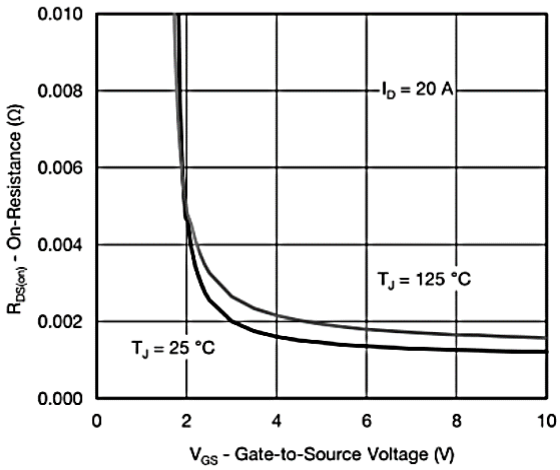


Figure 8: On-Resistance vs. Gate-to-Source Voltage

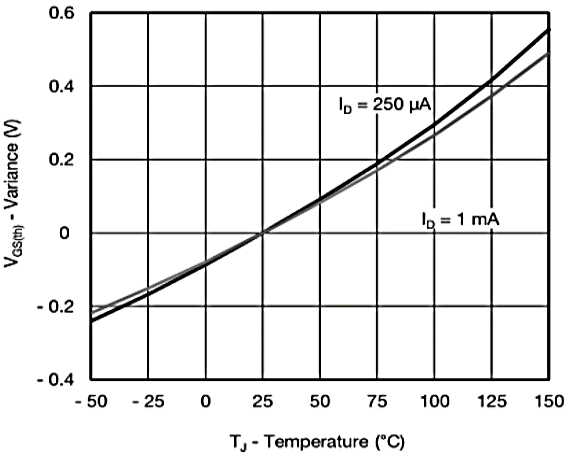


Figure 9: Maximum Safe Operating Area

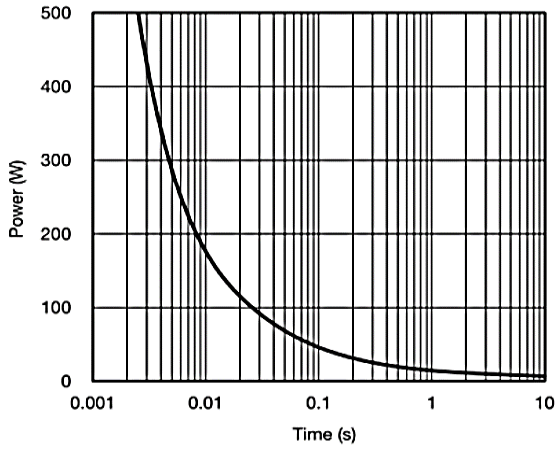


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

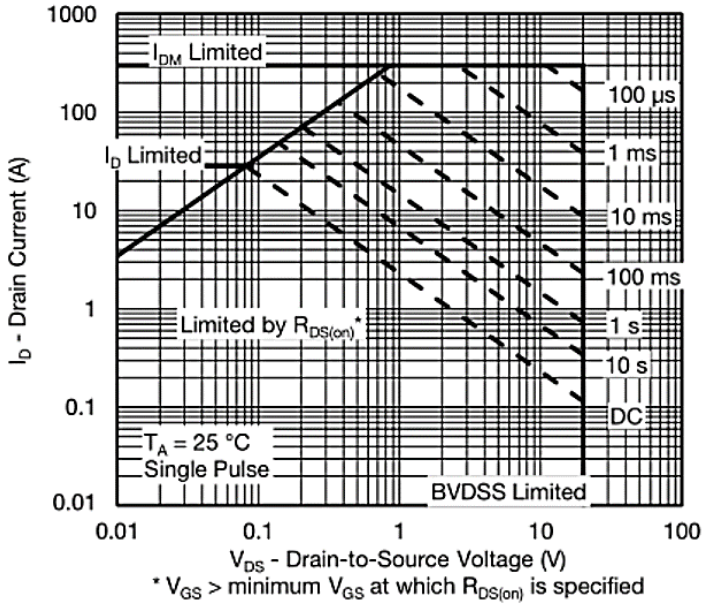
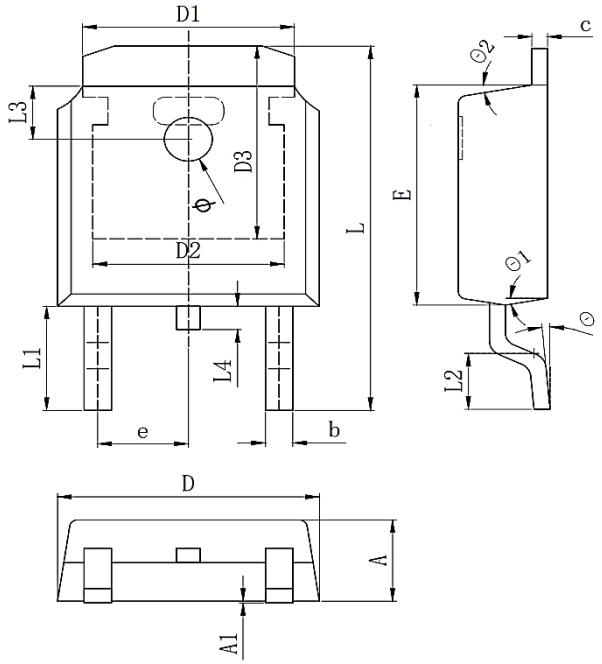


Figure 11: Safe Operating Area

Package Mechanical Data-TO-252-3L



Symbol	Dim in mm		
	Min	Typ	Max
A	2.1	2.3	2.5
A1	0	0.064	0.128
b	0.64	0.75	0.86
c	0.45	0.52	0.6
D	6.4	6.6	6.8
D1	5.33REF		
D2	4.83REF		
D3	5.25REF		
E	5.9	6.1	6.3
e	2.286TYP		
L	9.8	10.1	10.4
L1	2.888REF		
L2	1.4	1.5	1.7
L3	1.65REF		
L4	0.6	0.8	1
ϕ	1.1	1.2	1.3
θ	0°		10°
θ1	5°		10°
θ2	5°		10°

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.

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