

P-Ch 150V 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



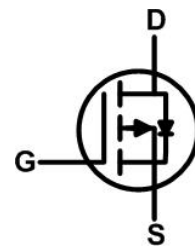
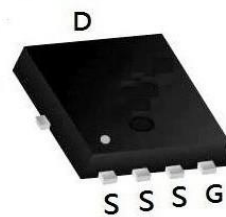
BVDSS	RDSON	ID
-150V	110mΩ	-20A

Description

The XR20P15F is the highest performance trench P-ch MOSFETs with extreme high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications .

The XR20P15F 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
V _{DS}	Drain-Source Voltage	-150	V
V _{GS}	Gate-Source Voltage	±20	V
I _D @T _C =25°C	Continuous Drain Current, V _{GS} @ 10V ^{1,6}	-20	A
I _D @T _C =100°C	Continuous Drain Current, V _{GS} @ 10V ^{1,6}	-14	A
I _{DM}	Pulsed Drain Current ²	-88	A
EAS	Single Pulse Avalanche Energy ³	125	mJ
I _{AS}	Avalanche Current	-25	A
P _D @T _C =25°C	Total Power Dissipation ⁴	162.3	W
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction-Ambient ¹	---	---	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	---	0.80	°C/W

Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-150	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA	---	---	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =-10V, I _D =-1A	---	110	150	mΩ
		V _{GS} =-4.5V, I _D =-1A	---	---	---	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-2	-3	-4	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	---	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-150V, V _{GS} =0V, T _J =25°C	---	---	-1	uA
		V _{DS} =-150V, V _{GS} =0V, T _J =100°C	---	---	-5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =-10V, I _D =-10A	---	47	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	3.3	---	Ω
Q _g	Total Gate Charge	V _{DS} =-75V, V _{GS} =-10V, I _D =-10A	---	86	---	nC
Q _{gs}	Gate-Source Charge		---	8.5	---	
Q _{gd}	Gate-Drain Charge		---	18	---	
T _{d(on)}	Turn-On Delay Time	V _{GS} =-10V, V _{DS} =-75V, I _D =-10A, R _{GEN} =3Ω	---	15	---	ns
T _r	Rise Time		---	55	---	
T _{d(off)}	Turn-Off Delay Time		---	85	---	
T _f	Fall Time		---	74	---	
C _{iss}	Input Capacitance	V _{DS} =-75V, V _{GS} =0V, f=1MHz	---	4450	---	pF
C _{oss}	Output Capacitance		---	89	---	
C _{rss}	Reverse Transfer Capacitance		---	75	---	

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 =-3A, T _J =25°C	---	---	-1.2	V
t _{rr}	Reverse Recovery Time	I _F =-10A, di/dt=100A /	---	96	---	nS
Q _{rr}	Reverse Recovery Charge	μs, T _J =25°C	---	151	---	nC

Notes:

1. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150°C
2. The EAS data shows Max. rating. The test condition is V_D=-50V, V_G=-10V, R_G=25ohm, L=0.4mH
3. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Characteristics

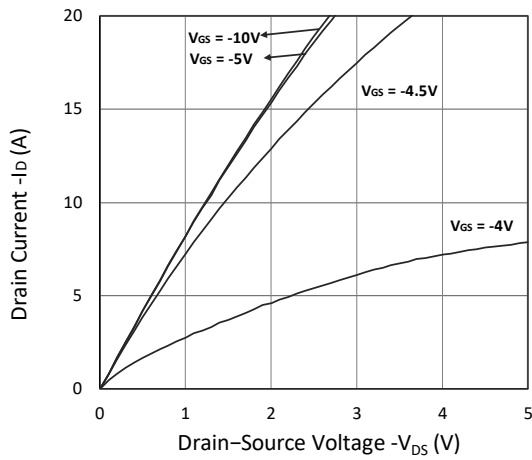


Figure 1. Output Characteristics

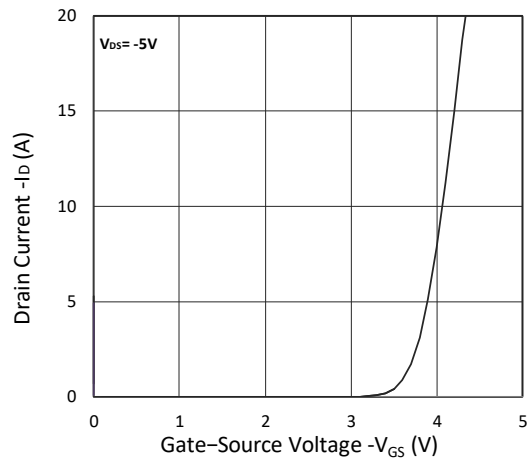


Figure 2. Transfer Characteristics

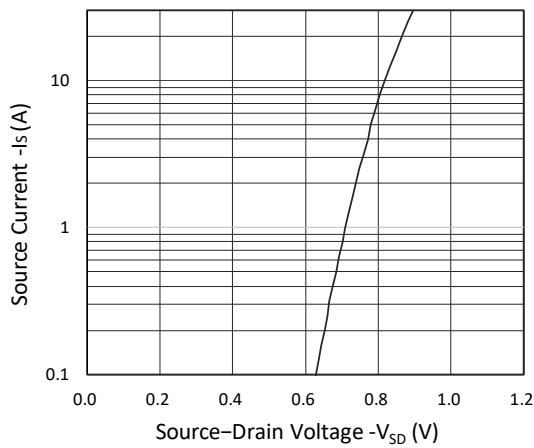


Figure 3. Forward Characteristics of Reverse

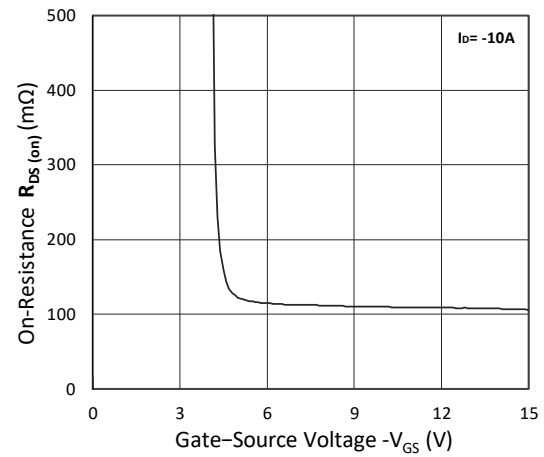


Figure 4. $R_{DS(on)}$ vs. V_{GS}

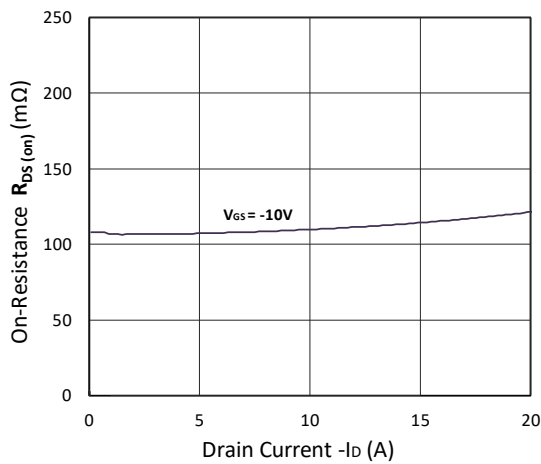


Figure 5. $R_{DS(on)}$ vs. I_D

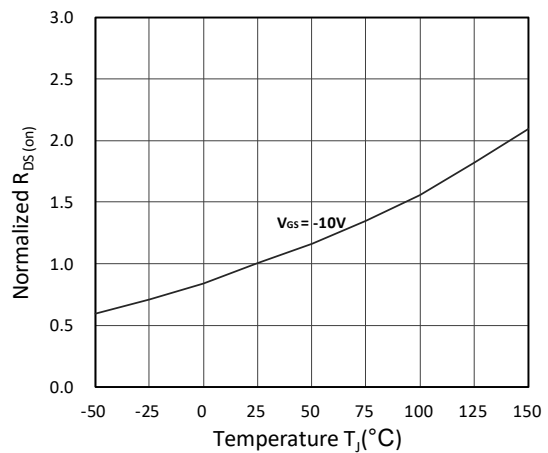


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

P-Ch 150V Fast Switching MOSFETs

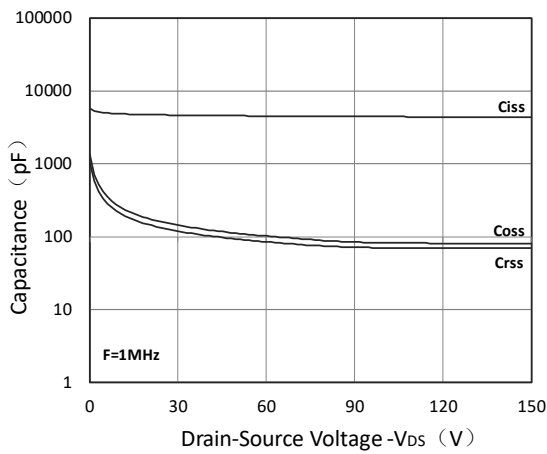


Figure 7. Capacitance Characteristics

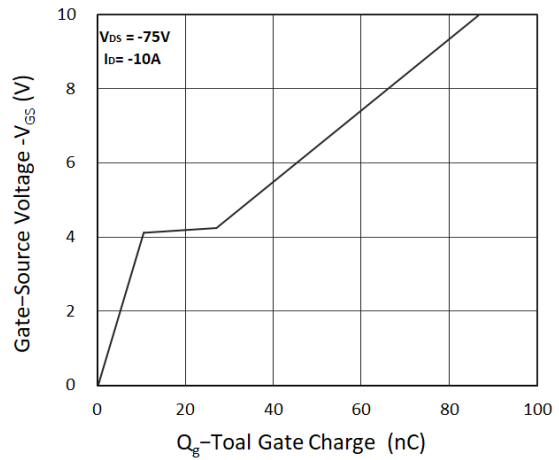


Figure 8. Gate Charge Characteristics

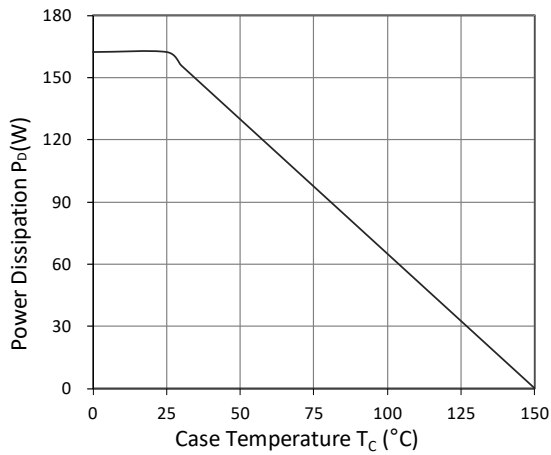


Figure 9. Power Dissipation

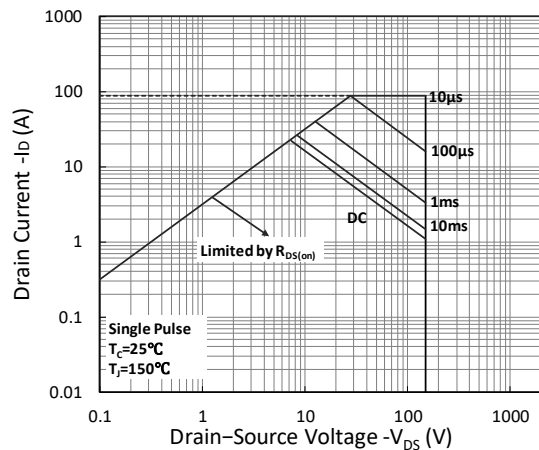


Figure 10. Safe Operating Area

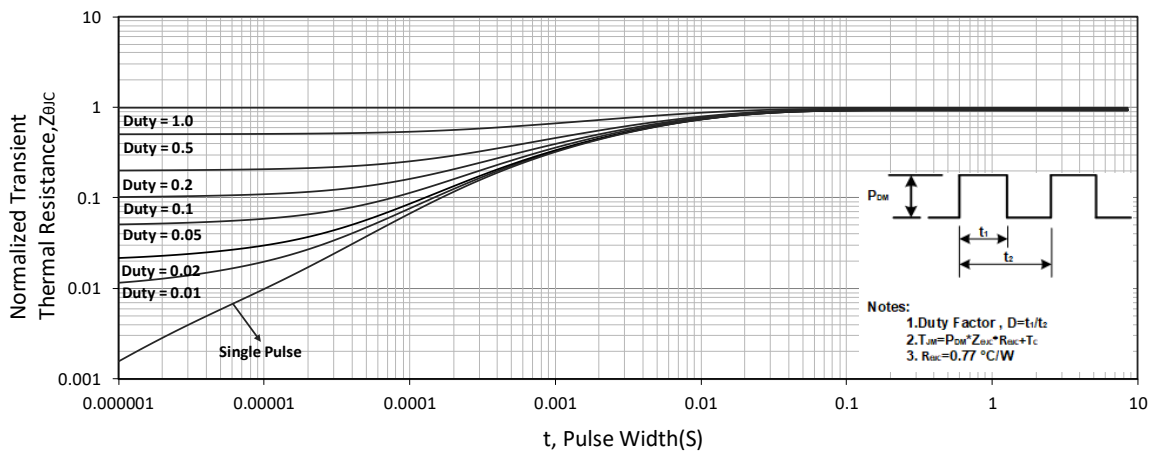
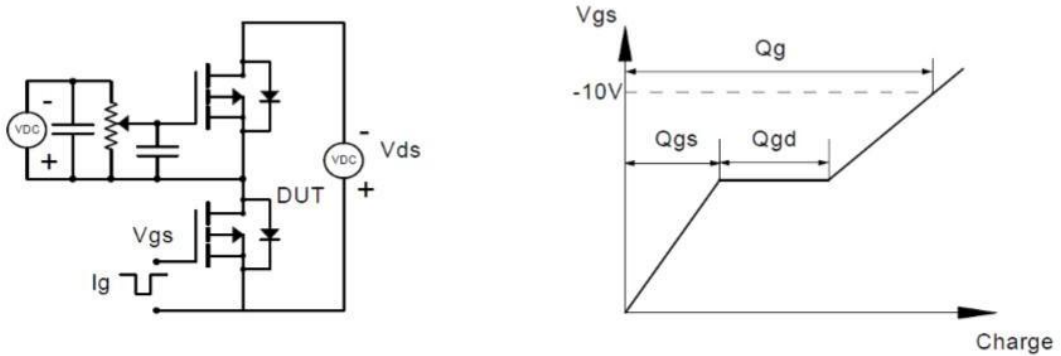


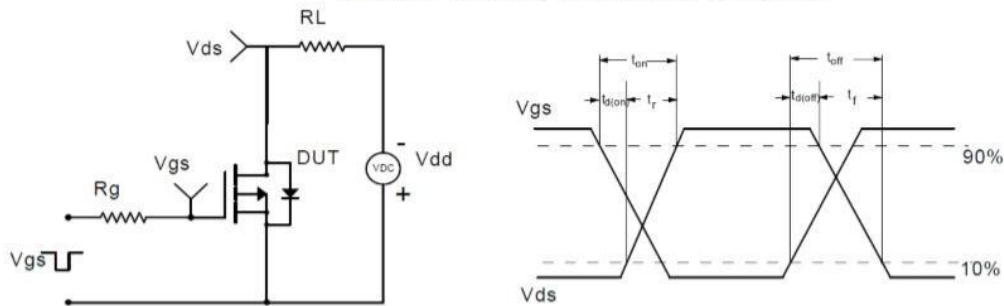
Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

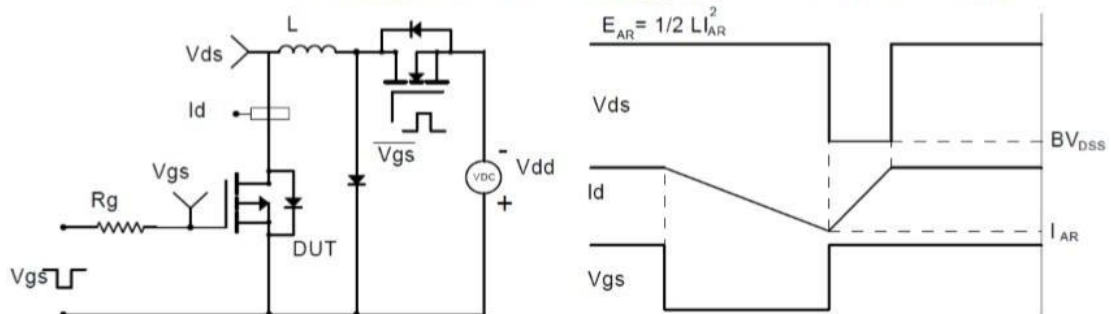
Gate Charge Test Circuit & Waveform



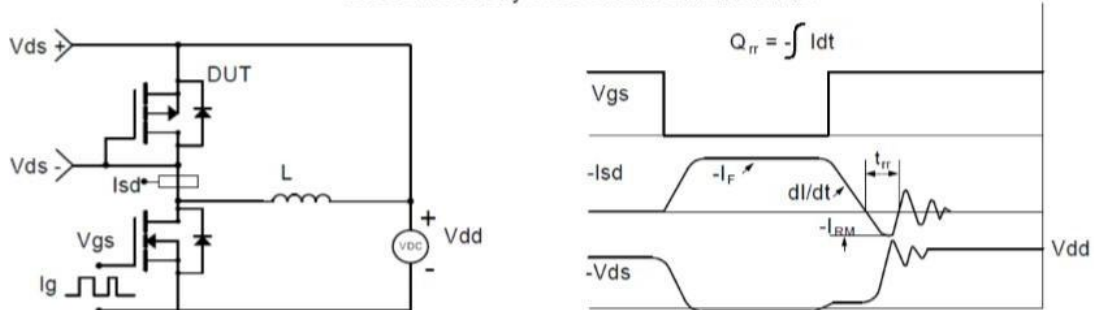
Resistive Switching Test Circuit & Waveforms



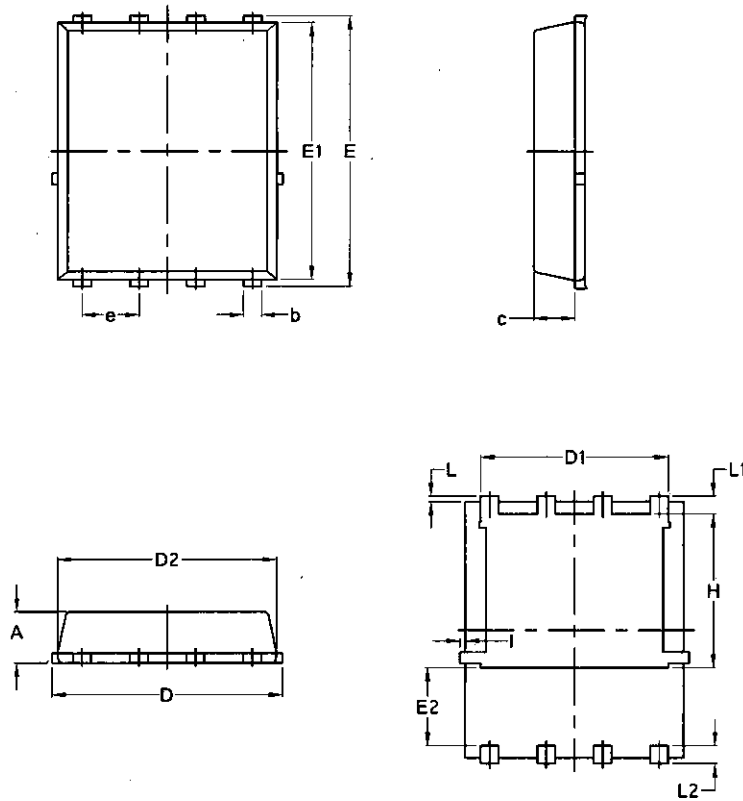
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Mechanical Data-PDFN5060-8L-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