

P-Ch 18V Fast Switching MOSFETs

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

Product Summary

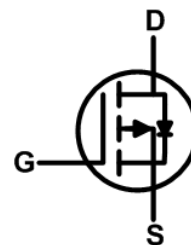
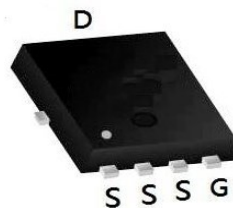


BVDSS	RDS(on)	ID
-18V	2.4mΩ	-85A

Description

The XR20P80F is the high cell density trench P-ch MOSFETs, which provides excellent $R_{DS(on)}$ and efficiency for most of the small power switching and load switch applications. The XR20P80F meet the RoHS and Green Product requirement with full function reliability approved.

PDFN5060-8L Pin Configuration



Absolute Maximum Ratings $T_c=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-18	V
V_{GS}	Gate-Source Voltage	± 12	V
I_D	Drain Current – Continuous ($T_c=25^\circ\text{C}$)	-85	A
	Drain Current – Continuous ($T_c=100^\circ\text{C}$)	-54	A
I_{DM}	Drain Current – Pulsed ¹	-360	A
P_D	Power Dissipation ($T_c=25^\circ\text{C}$)	41.67	W
	Power Dissipation – Derate above 25°C	0.33	W/ $^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	3	$^\circ\text{C/W}$

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)**Off Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=-250\mu A$	-18	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=-1mA$	---	-0.008	---	$V/^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-20V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	-1	μA
		$V_{DS}=-16V$, $V_{GS}=0V$, $T_J=125^\circ\text{C}$	---	---	-30	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 12V$, $V_{DS}=0V$	---	---	± 500	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance					m Ω
		$V_{GS}=-4.5V$, $I_D=-20A$	---	2.4	3.2	
		$V_{GS}=-2.5V$, $I_D=-20A$	---	3.3	4.5	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-0.4	-0.6	-1.0	V
ΔV_{GS}	$V_{GS(th)}$ Temperature Coefficient		---	-3.44	---	$mV/^\circ\text{C}$
gfs	Forward Transconductance	$V_{DS}=-10V$, $I_S=-3A$	---	30	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge ^{2, 3}	$V_{DS}=-16V$, $V_{GS}=-4.5V$, $I_D=-5A$	---	149		nC
Q_{gs}	Gate-Source Charge ^{2, 3}		---	14.4		
Q_{gd}	Gate-Drain Charge ^{2, 3}		---	42.8		
$T_{d(on)}$	Turn-On Delay Time ^{2, 3}	$V_{DD}=-15V$, $V_{GS}=-4.5V$, $R_G=25\Omega$ $I_D=-1A$	---	21.2		nS
T_r	Rise Time ^{2, 3}		---	20.6		
$T_{d(off)}$	Turn-Off Delay Time ^{2, 3}		---	26		
T_f	Fall Time ^{2, 3}		---	400		
C_{iss}	Input Capacitance	$V_{DS}=-15V$, $V_{GS}=0V$, $F=1MHz$	---	10698		pF
C_{oss}	Output Capacitance		---	2347		
C_{rss}	Reverse Transfer Capacitance		---	1267		
Rg	Gate resistance	$V_{GS}=0V$, $V_{DS}=0V$, $F=1MHz$	---	2.6	---	Ω

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	-85	A
I_{SM}	Pulsed Source Current		---	---	-190	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V$, $I_S=-1A$, $T_J=25^\circ\text{C}$	---	---	-1	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
3. Essentially independent of operating temperature.

Typical Performance Characteristics

Figure 1: Output Characteristics

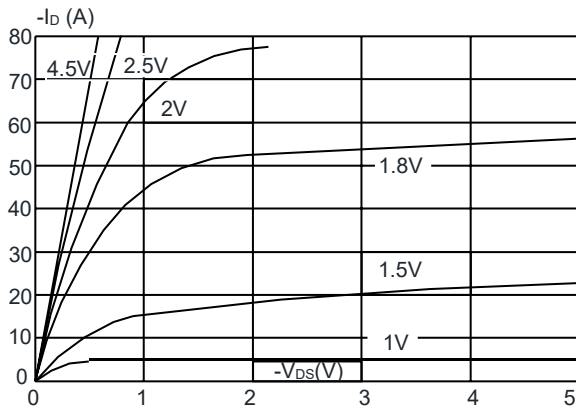


Figure 2: Typical Transfer Characteristics

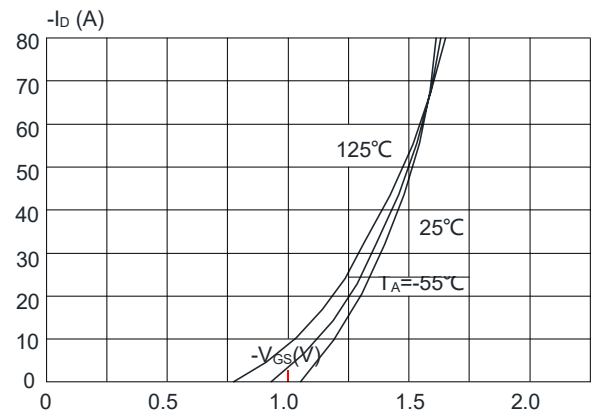


Figure 3: On-resistance vs. Drain Current

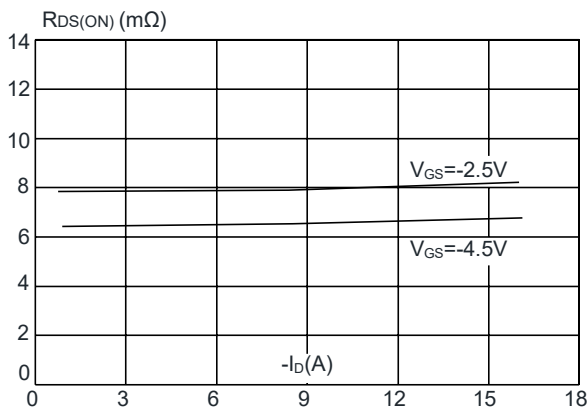


Figure 4: Body Diode Characteristics

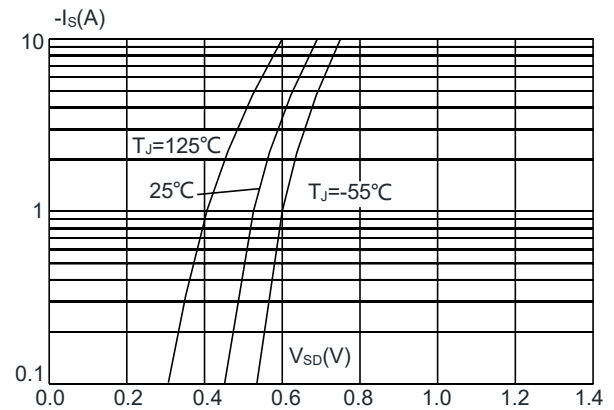


Figure 5: Gate Charge Characteristics

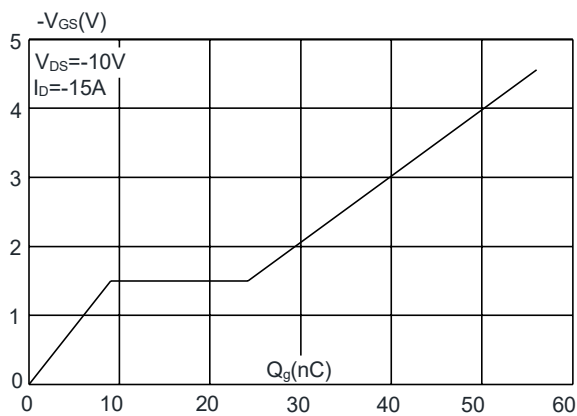
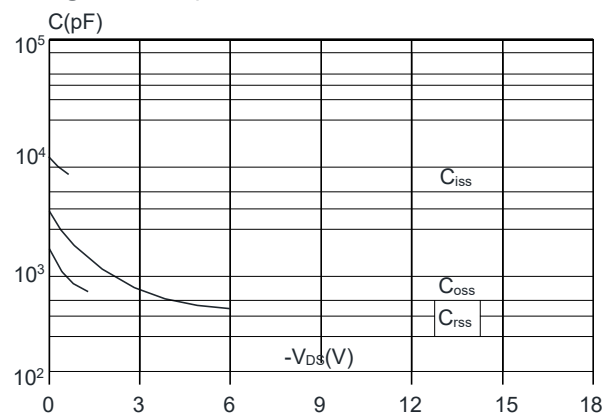


Figure 6: Capacitance Characteristics



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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

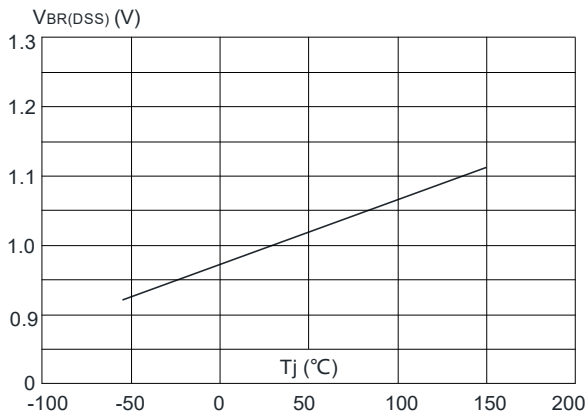


Figure 8: Normalized on Resistance vs. Junction Temperature

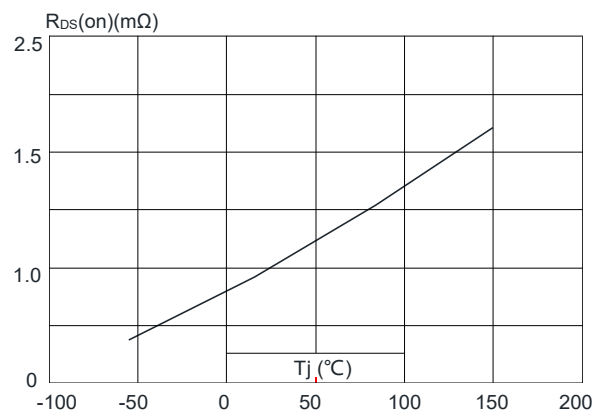


Figure 9: Maximum Safe Operating Area

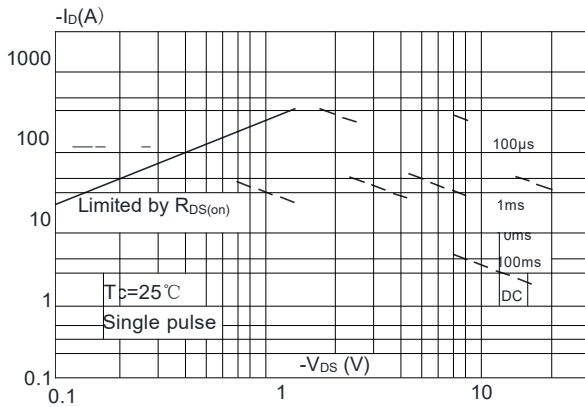


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

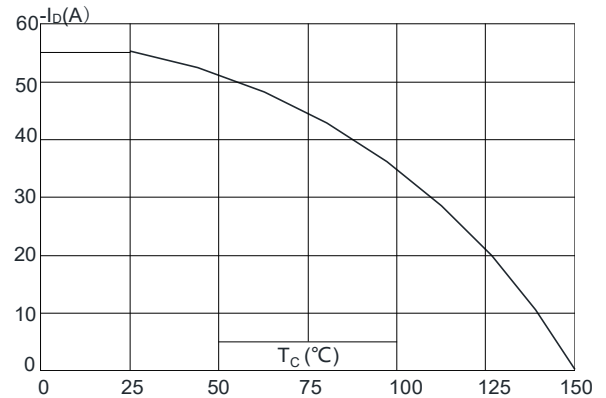
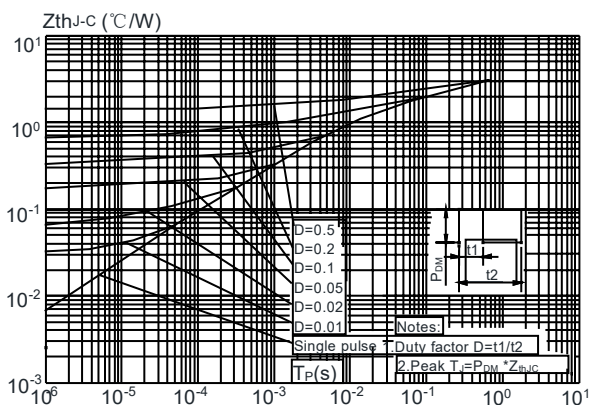
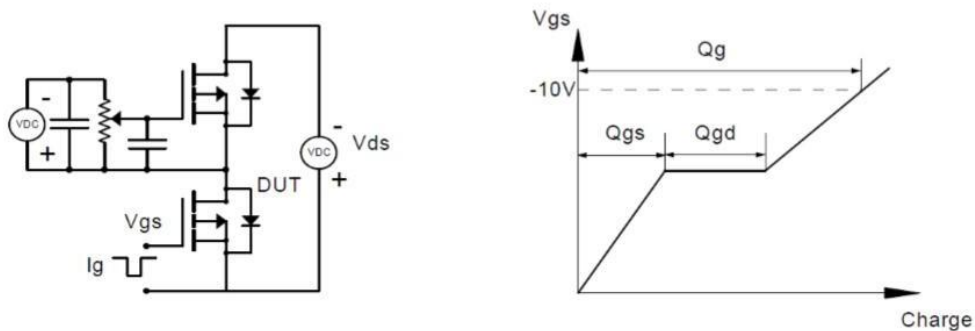


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

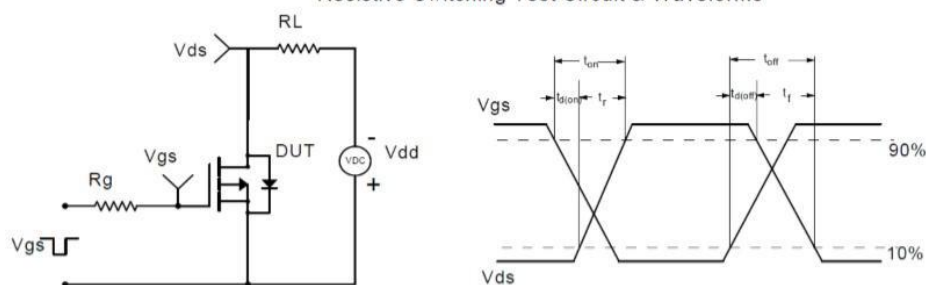


Test Circuit

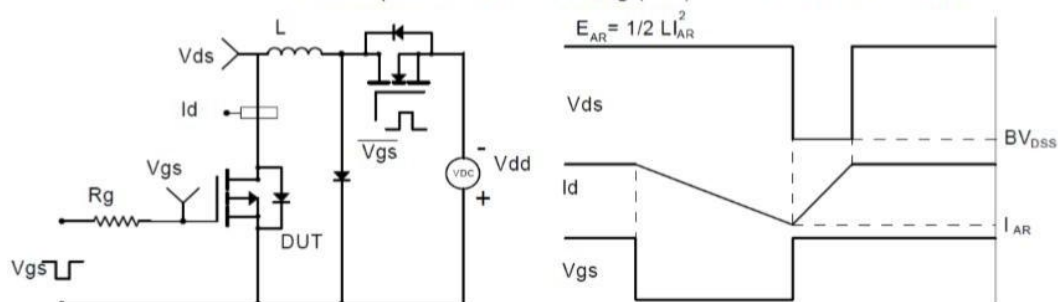
Gate Charge Test Circuit & Waveform



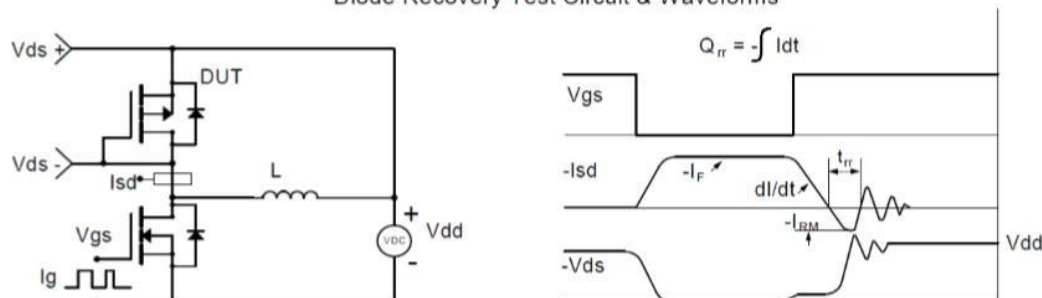
Resistive Switching Test Circuit & Waveforms



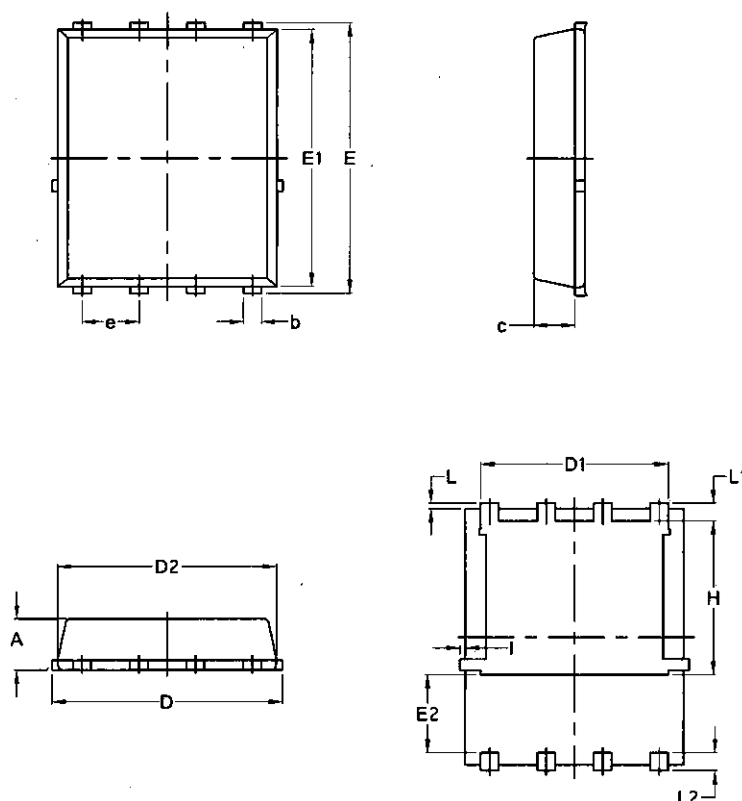
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Mechanical Data-PDFN5060-8L- 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