

N-Ch 20V Fast Switching MOSFETs

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

Product Summary

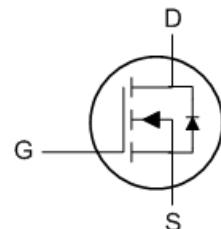


BVDSS	RDS(ON)	ID
20V	2.2mΩ	30A

Description

The XR30N02S is the high cell density trenched N-ch MOSFETs, which provide excellent RDS(ON) and gate charge for most of the synchronous buck converter applications. The XR30N02S meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

SOP8 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	20	V
V _{GS}	Gate-Source Voltage	±12	V
I _D @T _C =25°C	Continuous Drain Current, V _{GS} @ 10V ^{1,6}	30	A
I _D @T _C =100°C	Continuous Drain Current, V _{GS} @ 10V ^{1,6}	19	A
I _{DM}	Pulsed Drain Current ²	120	A
EAS	Single Pulse Avalanche Energy ³	306	mJ
I _{AS}	Avalanche Current	---	A
P _D @T _C =25°C	Total Power Dissipation ⁴	69	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	---	1.8	°C/W

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Electrical Characteristics ($T_J=25^\circ C$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to $25^\circ C, I_D=1mA$	---	---	---	V/C
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=5.5A$	---	---	---	$m\Omega$
		$V_{GS}=4.5V, I_D=5.5A$	---	2.2	2.9	
		$V_{GS}=2.5V, I_D=4A$	---	2.7	3.5	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	0.5	---	1	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	---	---	mV/C
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=20V, V_{GS}=0V, T_J=25^\circ C$	---	---	1	uA
		$V_{DS}=20V, V_{GS}=0V, T_J=125^\circ C$	---	---	100	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=5V, I_D=5.5A$	---	88	---	S
Q_g	Total Gate Charge	$V_{DS}=10V, V_{GS}=4.5V, I_D=5.5A$	---	70	---	nC
Q_{gs}	Gate-Source Charge		---	10	---	
Q_{gd}	Gate-Drain Charge		---	14	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DS}=10V, V_{GS}=4.5V, R_G=3\Omega, R_L=0.5\Omega$	---	8	---	ns
T_r	Rise Time		---	20	---	
$T_{d(off)}$	Turn-Off Delay Time		---	75	---	
T_f	Fall Time		---	82	---	
C_{iss}	Input Capacitance	$V_{DS}=10V, V_{GS}=0V, f=1MHz$	---	5670	---	pF
C_{oss}	Output Capacitance		---	460	---	
C_{rss}	Reverse Transfer Capacitance		---	416	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_s	Continuous Source Current ^{1,4}	$V_G=V_D=0V$, Force Current	---	---	30	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=5.5A, T_J=250^\circ C$	---	---	1	V
t_{rr}	Reverse Recovery Time	$IF=5.5A, di/dt=100A/\mu s, T_J=25^\circ C$	---	15	---	nS
			---	6	---	nC

Note :

- 1..Repetitive Rating: Pulse width limited by maximum junction temperature.
- 2.EAS condition: $T_J=25^\circ C, VDD=10V, VG=10V, Rg=25\Omega, L=0.5mH$.
- 3.Repetitive Rating: Pulse width limited by maximum junction temperature.e.

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Typical Electrical And Thermal Characteristics (Curves)

Figure 1. Output Characteristics

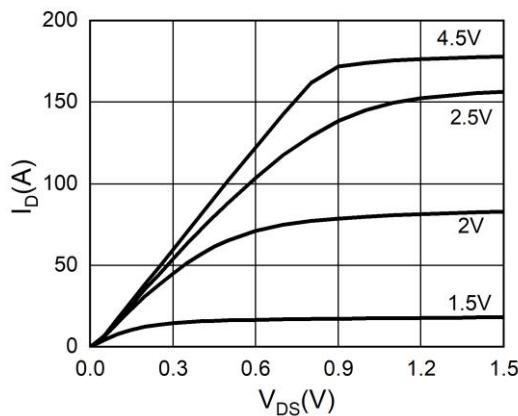


Figure 2. Transfer Characteristics

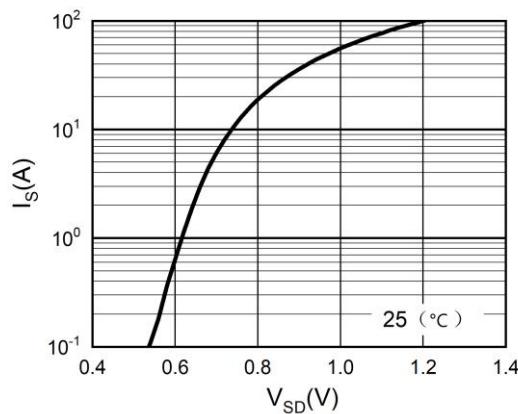


Figure 3. Power Dissipation

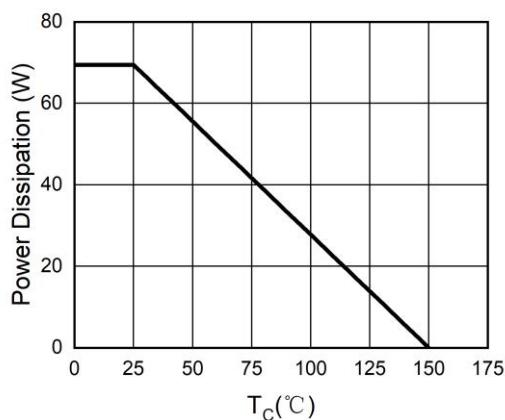
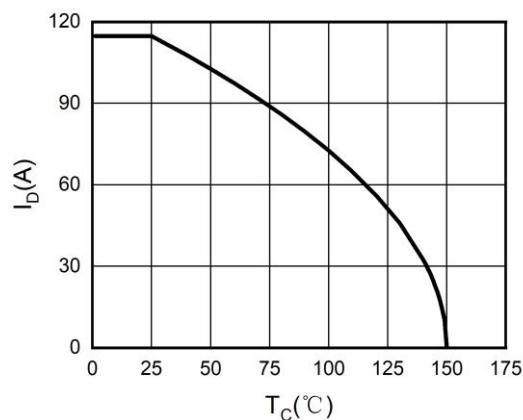
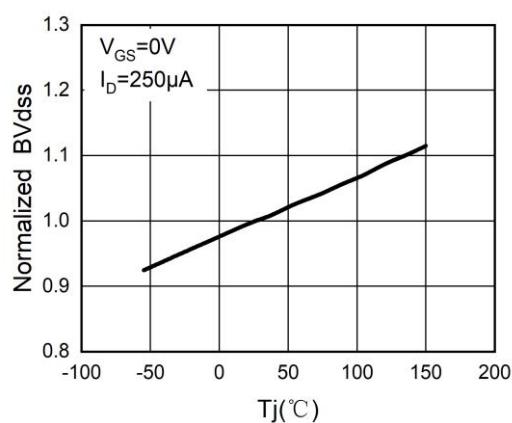
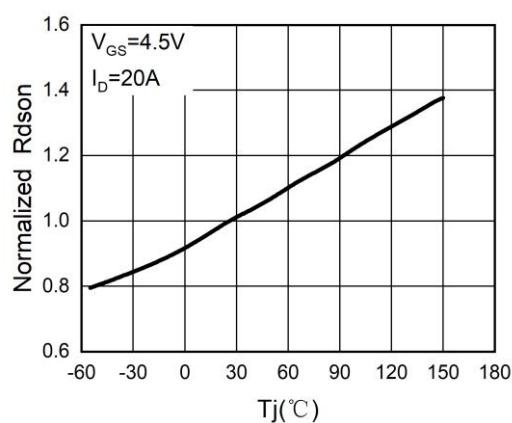


Figure 4. Drain Current

Figure 5. BV_{DSS} vs Junction TemperatureFigure 6. R_{DSON} vs Junction Temperature

Typical Electrical And Thermal Characteristics (Curves)

Figure 7. Gate Charge Waveforms

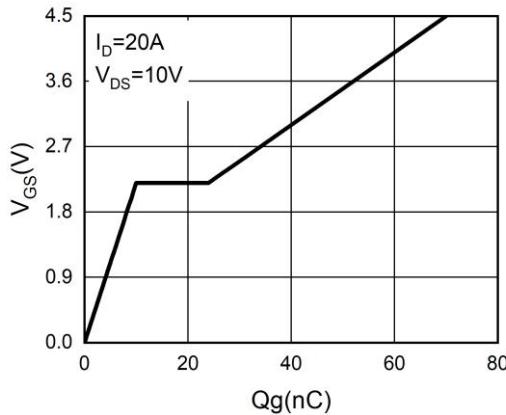


Figure 8. Capacitance

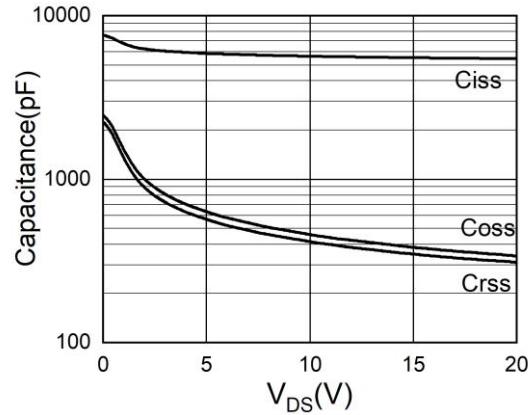


Figure 9. Body-Diode Characteristics

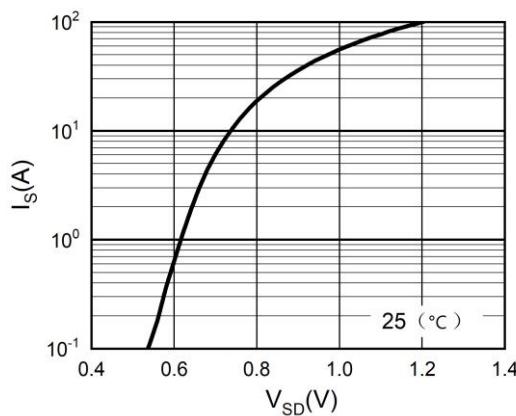
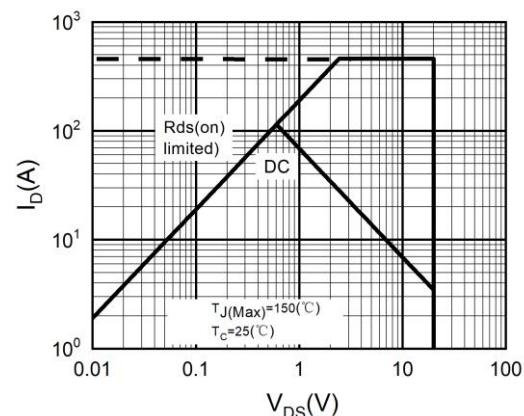
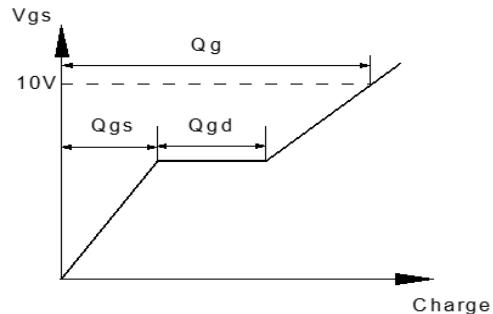
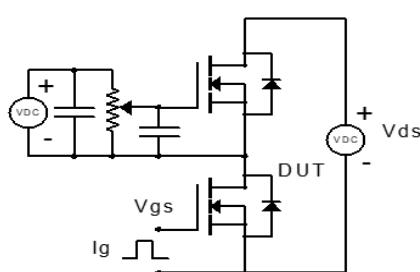
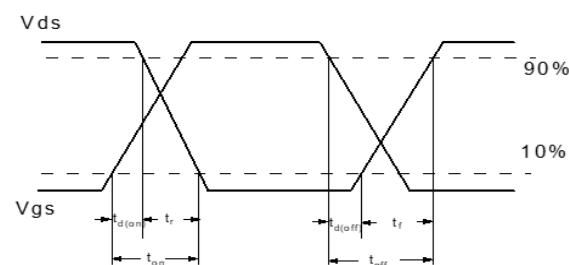
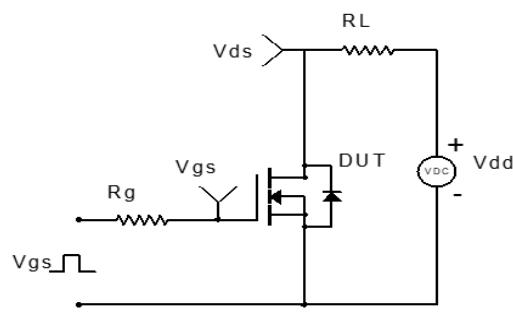
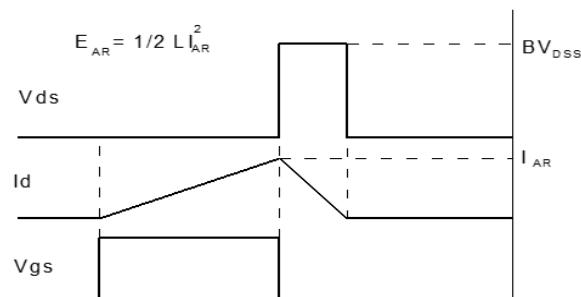
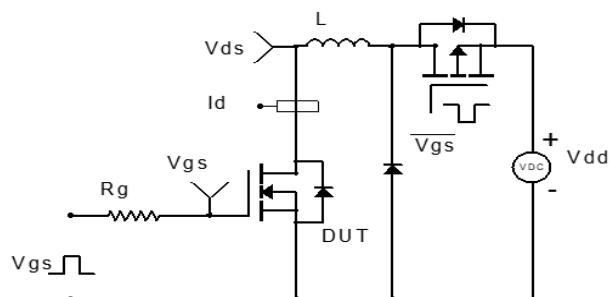
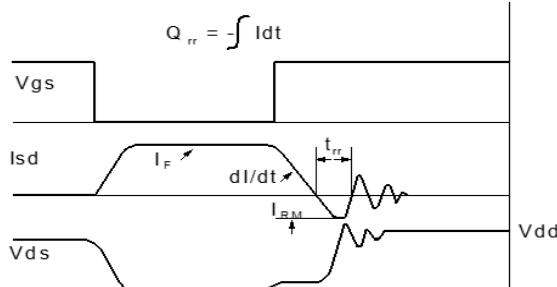
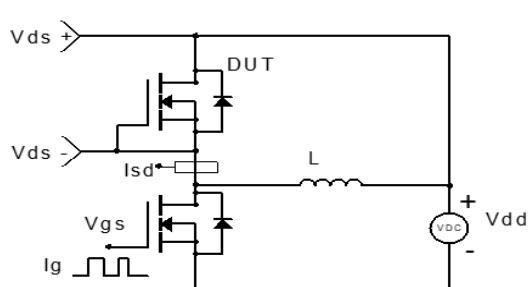


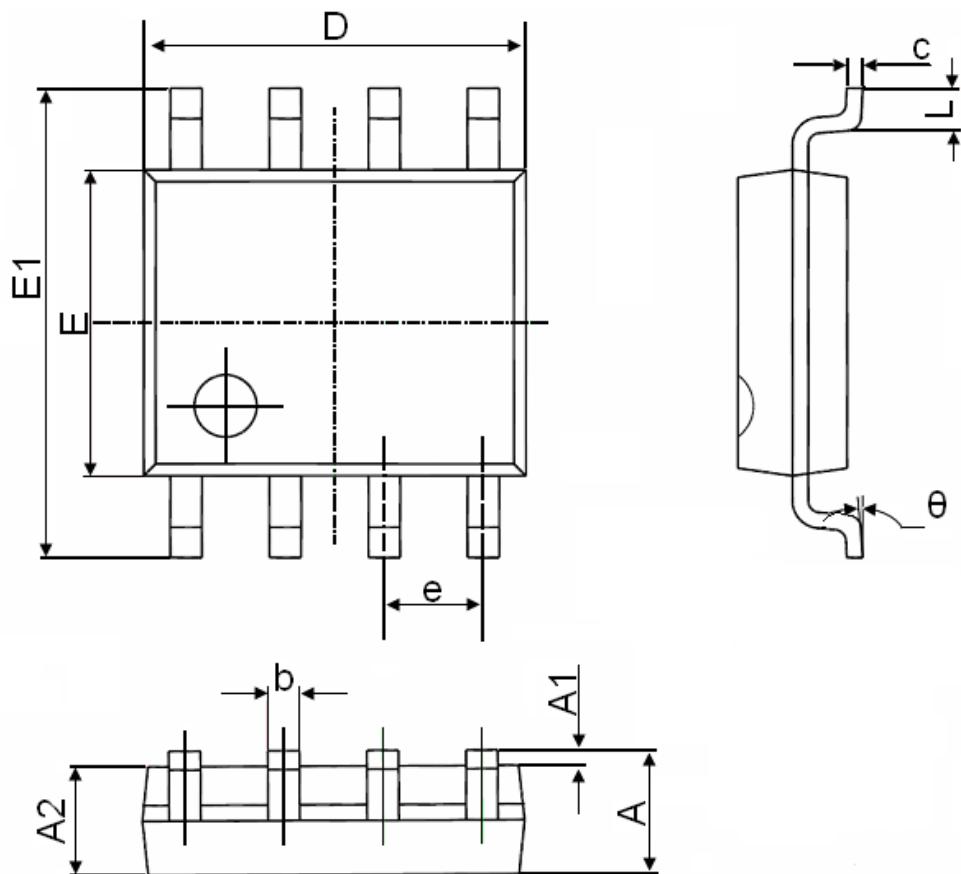
Figure 10. Maximum Safe Operating Area



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Test Circuit**Figure 1: Gate Charge Test Circuit & Waveform****Figure 2: Resistive Switching Test Circuit & Waveform****Figure 3: Unclamped Inductive Switching Test Circuit & Waveform****Figure 4: Diode Recovery Test Circuit & Waveform**

Package Mechanical Data- SOP8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°