



- ★ Super Low Gate Charge
- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

### Product Summary

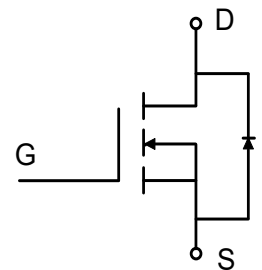
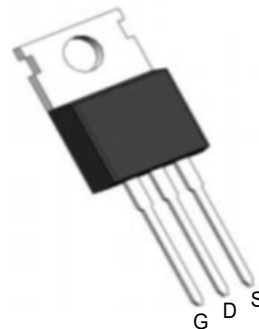
BVDSS	RDSON	ID
200V	20 mΩ	100A

### Description

The XR100N20T is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The XR100N20T meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

### TO220AB Pin Configuration



### Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	200	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^{1,6}$	100	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^{1,6}$	63	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	400	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	1190	mJ
$I_{AS}$	Avalanche Current	---	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation <sup>4</sup>	272	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

### Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup>	---	---	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	0.46	$^\circ\text{C/W}$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V$ , $I_D=250\mu A$	200	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	$BV_{DSS}$ Temperature Coefficient	Reference to $25^\circ\text{C}$ , $I_D=1mA$	---	---	---	$V/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=10V$ , $I_D=61A$	---	20	25.5	$m\Omega$
		$V_{GS}=4.5V$ , $I_D=61A$	---	---	---	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$ , $I_D=250\mu A$	3	---	5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	---	---	$mV/^\circ\text{C}$
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=150V$ , $V_{GS}=0V$ , $T_J=25^\circ\text{C}$	---	---	1	$\mu A$
		$V_{DS}=150V$ , $V_{GS}=0V$ , $T_J=100^\circ\text{C}$	---	---	100	
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V$ , $V_{DS}=0V$	---	---	$\pm 100$	nA
gfs	Forward Transconductance	$V_{DS}=10V$ , $I_D=31A$	---	73	---	S
$R_g$	Gate Resistance	$V_{DS}=0V$ , $V_{GS}=0V$ , $f=1MHz$	---	1.2	---	$\Omega$
$Q_g$	Total Gate Charge	$V_{DS}=50V$ , $V_{GS}=10V$ , $I_D=61A$	---	134	---	nC
$Q_{gs}$	Gate-Source Charge		---	49.6	---	
$Q_{gd}$	Gate-Drain Charge		---	39.6	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=50V, R_L=1.25\Omega$ $R_G=3\Omega, V_{GS}=10V$	---	36.3	---	ns
$T_r$	Rise Time		---	9.2	---	
$T_{d(off)}$	Turn-Off Delay Time		---	64	---	
$T_f$	Fall Time		---	6.3	---	
$C_{iss}$	Input Capacitance	$V_{DS}=50V$ , $V_{GS}=0V$ , $f=1MHz$	---	8826	---	pF
$C_{oss}$	Output Capacitance		---	532	---	
$C_{rss}$	Reverse Transfer Capacitance		---	148	---	

## Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current <sup>1,4</sup>	$V_G=V_D=0V$ , Force Current	---	---	65	A
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V$ , $I_S=31A$ , $T_J=25^\circ\text{C}$	---	---	1.2	V
$t_{rr}$	Reverse Recovery Time	$I_F=61A$ , $di/dt=100A/\mu s$ , $T_J=25^\circ\text{C}$	---	102	---	nS
$Q_{rr}$	Reverse Recovery Charge		---	550.3	---	nC

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.

Notes 2.EAS condition:  $T_J=25^\circ\text{C}$ ,  $V_{DD}=40V$ ,  $V_G=10V$ ,  $R_G=25\Omega$ ,  $L=0.5mH$ .

Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

### Typical Electrical And Thermal Characteristics (Curves)

Figure 1. Output Characteristics

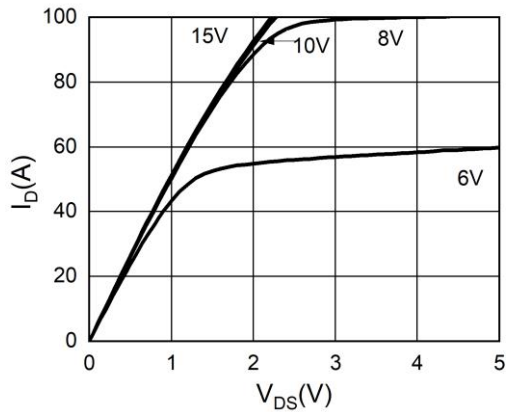


Figure 2. Transfer Characteristics

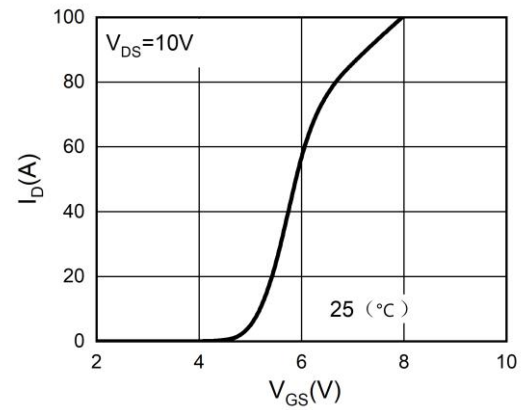


Figure 3. Power Dissipation

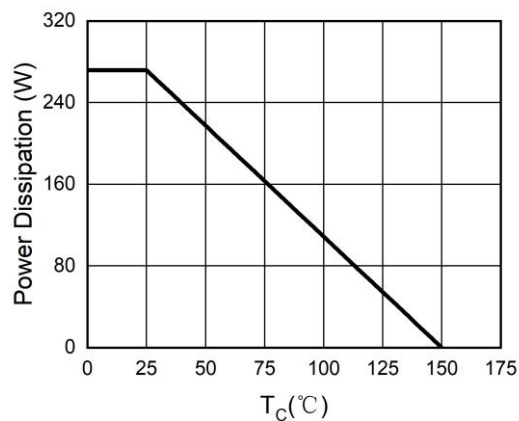


Figure 4. Drain Current

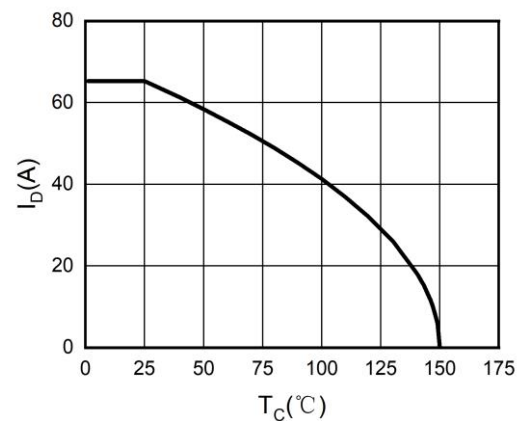


Figure 5.  $BV_{DSS}$  vs Junction Temperature

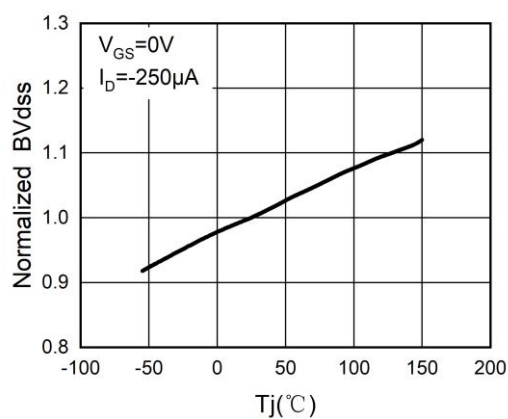
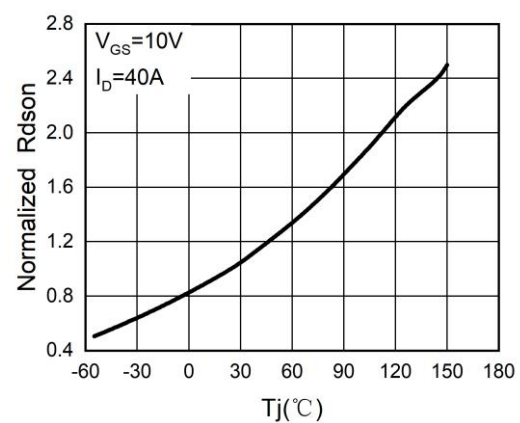


Figure 6.  $R_{DS(ON)}$  vs Junction Temperature



### Typical Electrical And Thermal Characteristics (Curves)

Figure 7. Gate Charge Waveforms

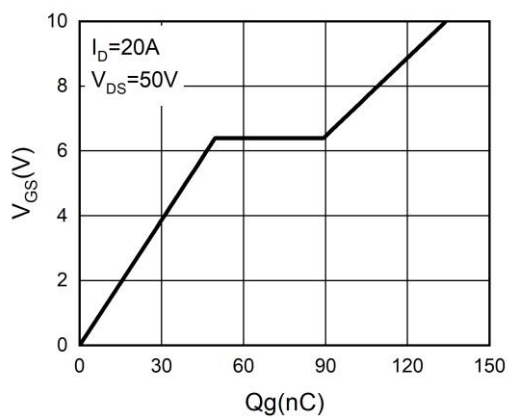


Figure 8. Capacitance

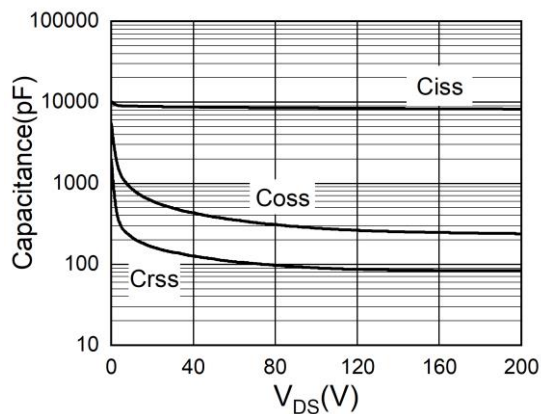


Figure 9. Body-Diode Characteristics

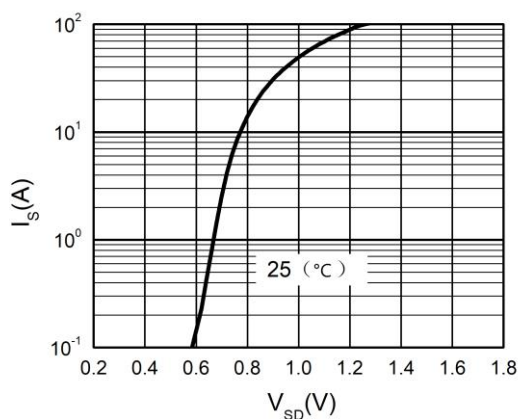
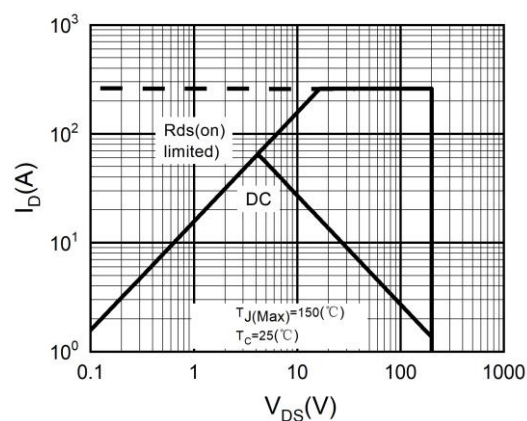
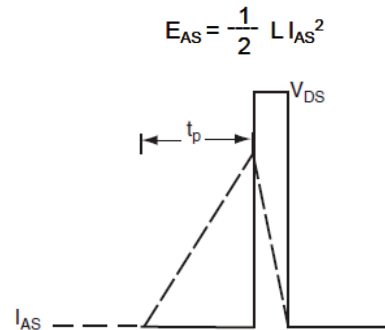
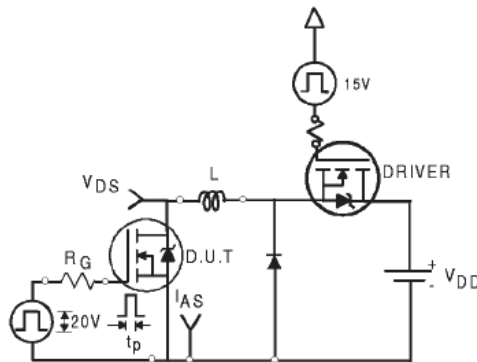


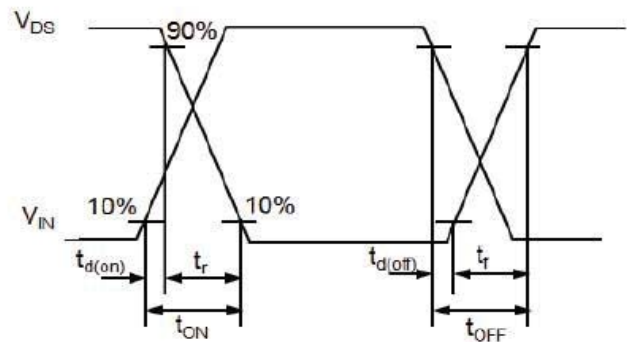
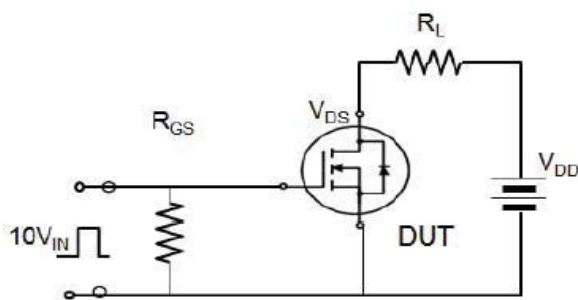
Figure 10. Maximum Safe Operating Area



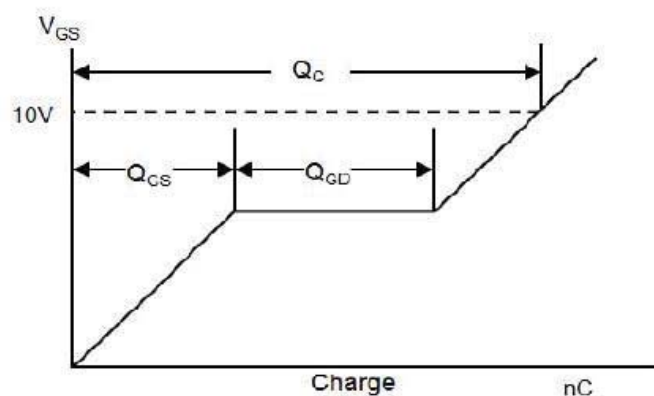
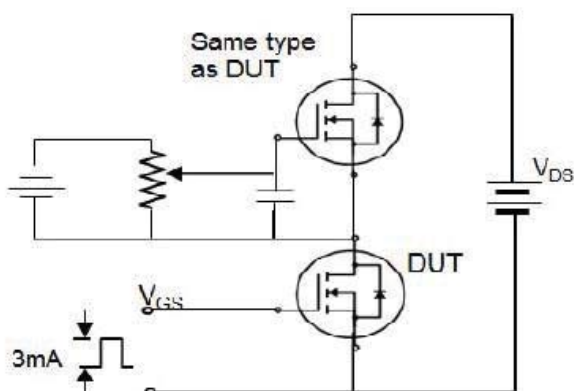
#### Avalanche Test Circuit



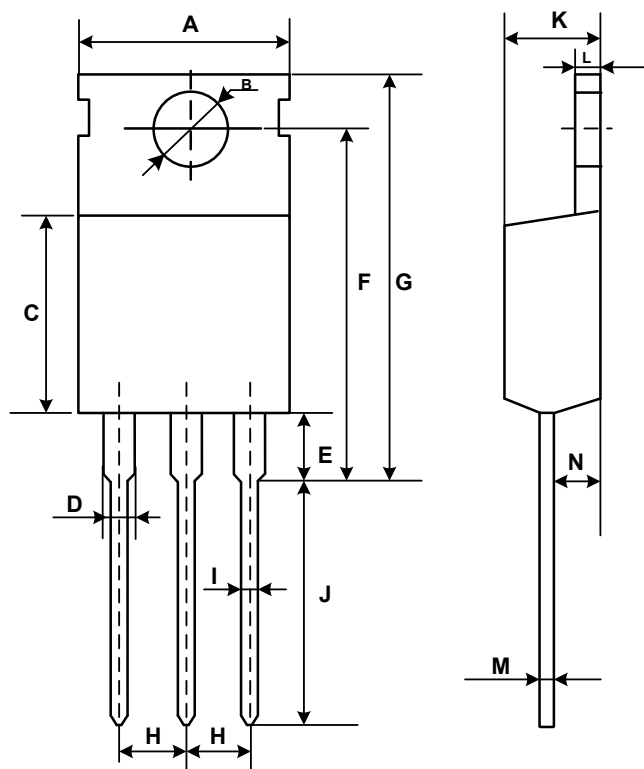
#### Switching Time Test Circuit



#### Gate Charge Test Circuit



Mechanical Dimensions for TO-220



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	9.70	10.30
B	3.40	3.80
C	8.80	9.40
D	1.17	1.47
E	2.60	3.50
F	15.10	16.70
G	19.55MAX	
H	2.54REF	
I	0.70	0.95
J	9.35	11.00
K	4.30	4.77
L	1.20	1.45
M	0.40	0.65
N	2.20	2.60