

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

Product Summary

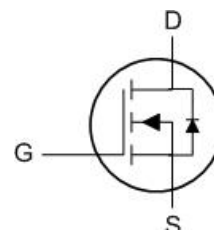
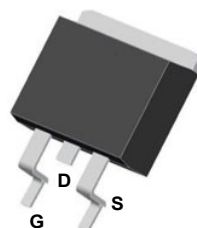


BVDSS	RDSON	ID
30V	1.6mΩ	200A

Description

The XR200N03G is the high cell density trench N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications. The XR200N03G meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

TO263Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^{1,6}$	200	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^{1,6}$	80	A
I_{DM}	Pulsed Drain Current ²	450	A
EAS	Single Pulse Avalanche Energy ³	580	mJ
I_{AS}	Avalanche Current	60	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation ⁴	87	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 ¹	---	62	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	2.1	$^\circ\text{C/W}$

N-Ch 30V Fast Switching MOSFETs

Electrical characteristic ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	$V_{GS}=0V, I_D=250\mu A$	30			V
$\Delta BV_{DSS} / \Delta T_J$	Breakdown voltage temperature coefficient	$I_D=250\mu A$, referenced to 25°C		0.02		$V/^\circ\text{C}$
I_{DSS}	Drain to source leakage current	$V_{DS}=30V, V_{GS}=0V$			1	μA
		$V_{DS}=24V, T_J=125^\circ\text{C}$			50	μA
I_{GSS}	Gate to source leakage current, forward	$V_{GS}=20V, V_{DS}=0V$			100	nA
	Gate to source leakage current, reverse	$V_{GS}=-20V, V_{DS}=0V$			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2		2.4	V
$R_{DS(ON)}$	Drain to source on state resistance	$V_{GS}=4.5V, I_D=30A, T_J=25^\circ\text{C}$		2.2	4.8	$m\Omega$
		$V_{GS}=10V, I_D=30A, T_J=25^\circ\text{C}$		1.6	2.9	$m\Omega$
		$V_{GS}=10V, I_D=30A, T_J=125^\circ\text{C}$		2.5		$m\Omega$
G_{fs}	Forward transconductance	$V_{DS}=5V, I_D=30A$		73		S
Dynamic characteristics						
C_{iss}	Input capacitance	$V_{GS}=0V, V_{DS}=15V, f=1\text{MHz}$		6272		pF
C_{oss}	Output capacitance			1022		
C_{rss}	Reverse transfer capacitance			718		
$t_{d(on)}$	Turn on delay time	$V_{DS}=15V, I_D=30A, R_G=4.7\Omega, V_{GS}=10V$ (note 4,5)		20		ns
t_r	Rising time			58		
$t_{d(off)}$	Turn off delay time			158		
t_f	Fall time			77		
Q_g	Total gate charge	$V_{DS}=24V, V_{GS}=10V, I_D=30A, I_G=5mA$ (note 4,5)		143		nC
Q_{gs}	Gate-source charge			17		
Q_{gd}	Gate-drain charge			43		
R_g	Gate resistance	$V_{DS}=0V$, Scan F mode		4.2		Ω

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			200	A
I_{SM}	Pulsed source current				440	A
V_{SD}	Diode forward voltage drop.	$I_S=45A, V_{GS}=0V$			1.4	V
t_{rr}	Reverse recovery time	$I_S=30A, V_{GS}=0V, di/dt=100A/\mu s$		26		ns
Q_{rr}	Reverse recovery charge			10		nC

※. Notes

1. Repetitive rating : pulse width limited by junction temperature.
2. $L=0.5mH, I_{AS}=48A, V_{DD}=30V, R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$
3. $I_{SD}\leq 30A, di/dt=100A/\mu s, V_{DD}\leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$
4. Pulse Test : Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- 5.

N-Channel Typical Characteristics

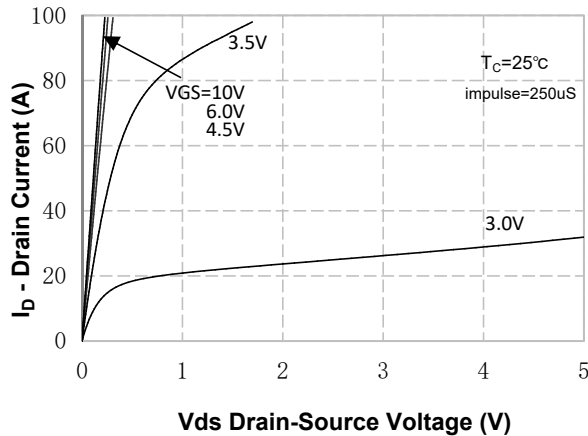


Figure 1. On-Region Characteristics

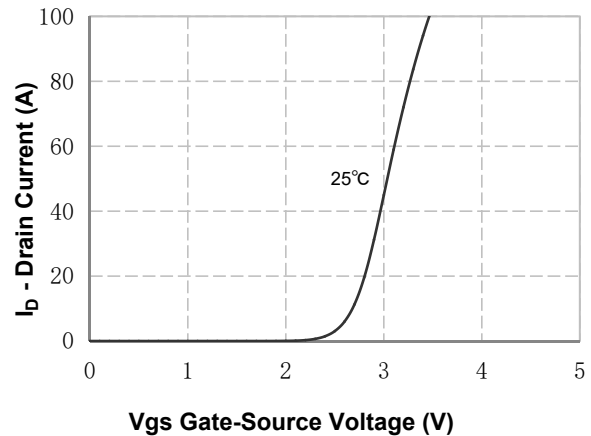


Figure 2. Transfer Characteristics

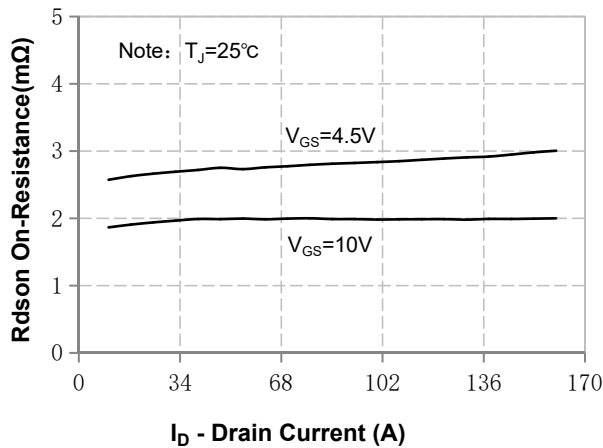


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

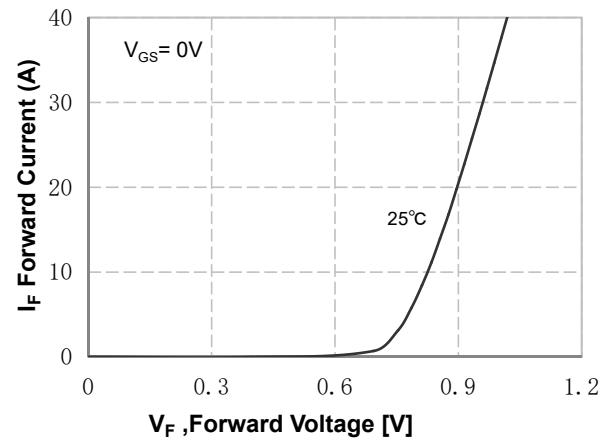


Figure 4. Body Diode Forward Voltage Variation vs Source Current

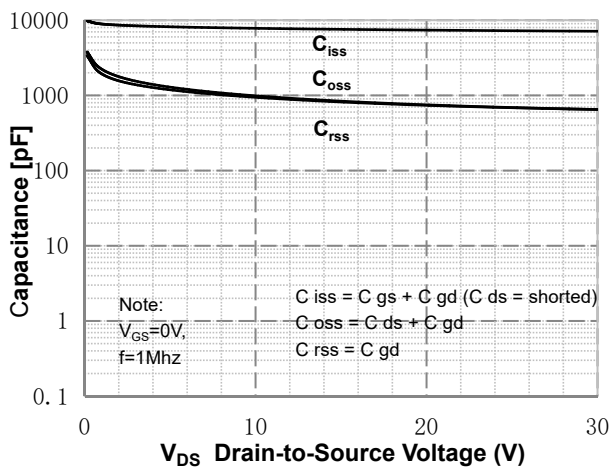


Figure 5. Capacitance Characteristics

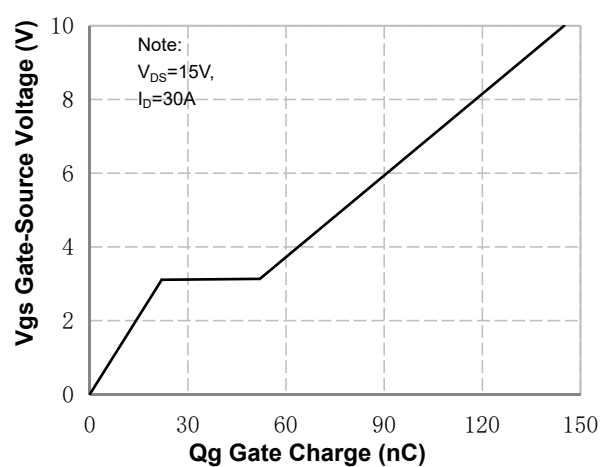


Figure 6. Gate Charge Characteristics

N- Channel Typical Characteristics (Continued)

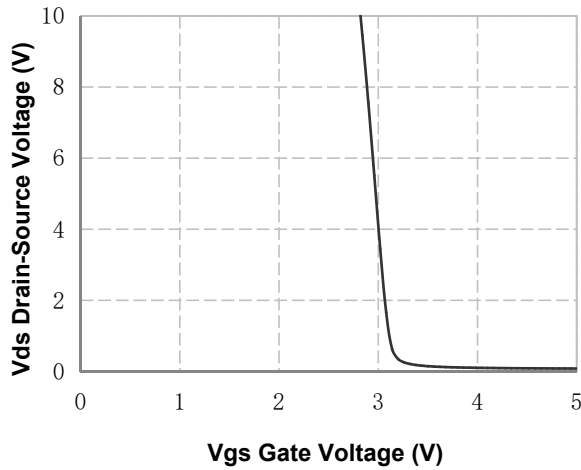


Figure 7. Vds Drain-Source Voltage vs Gate Voltage

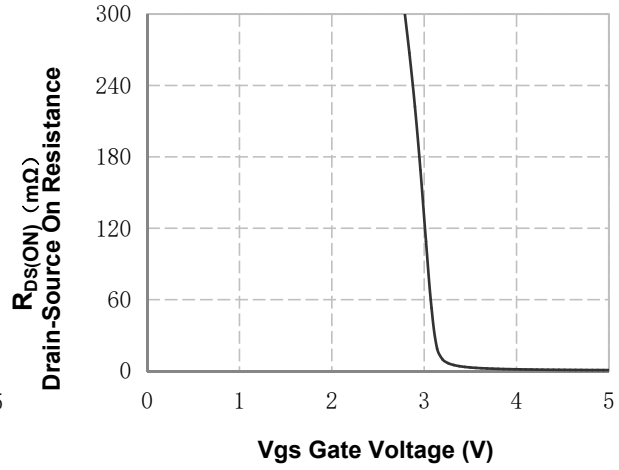


Figure 8. On-Resistance vs Gate Voltage

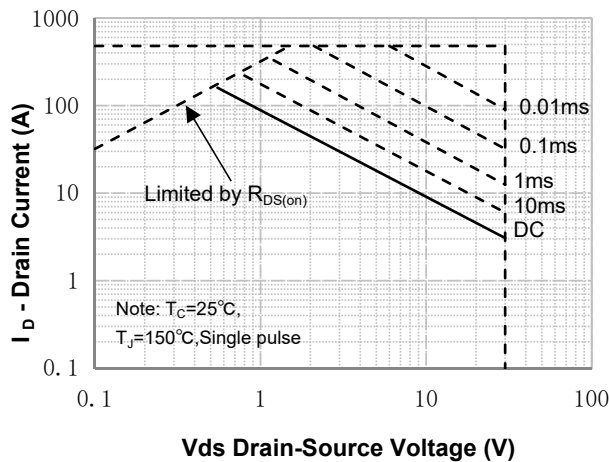


Figure 9. Maximum Safe Operating Area

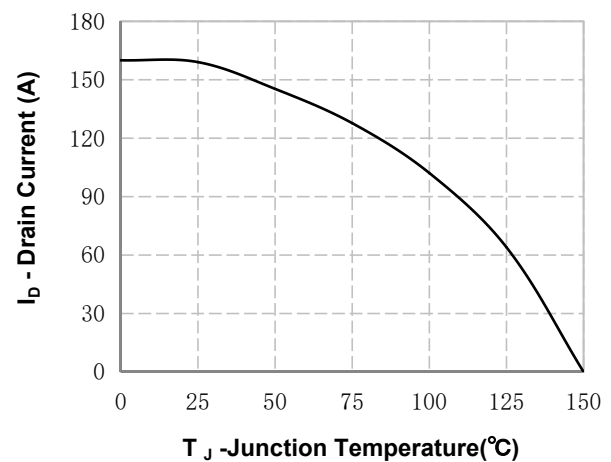


Figure 10. Maximum Continuous Drain Current vs Temperature

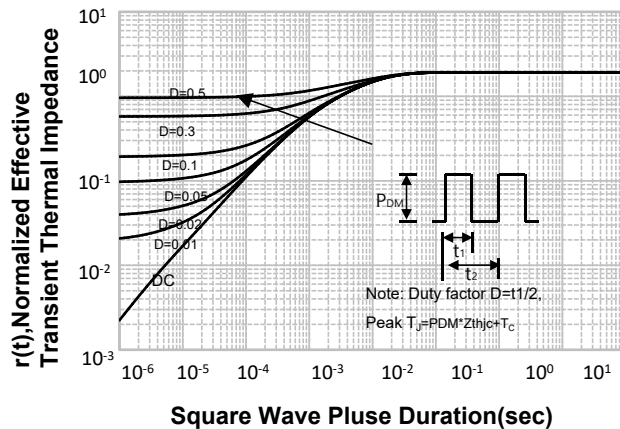
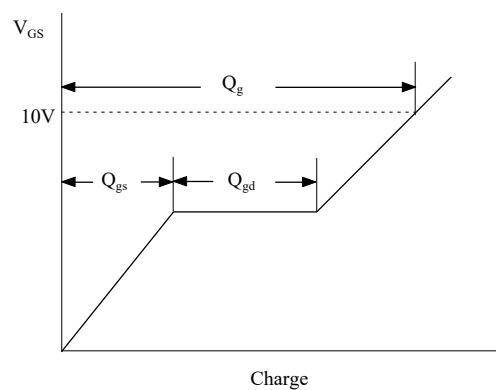
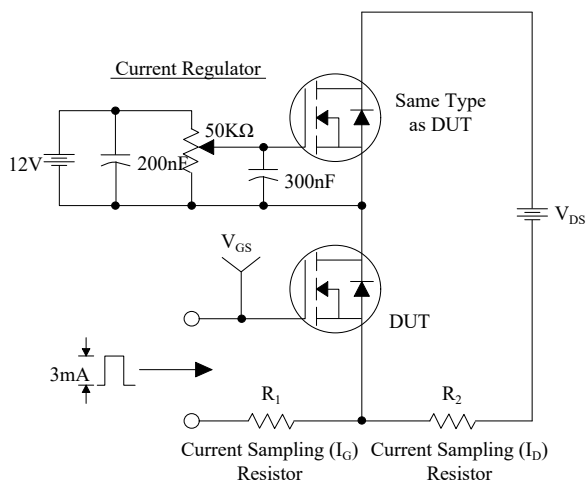
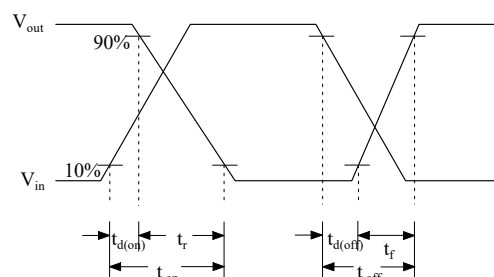
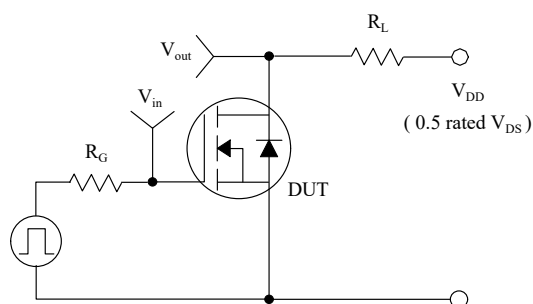


Figure 11. Transient Thermal Response Curve

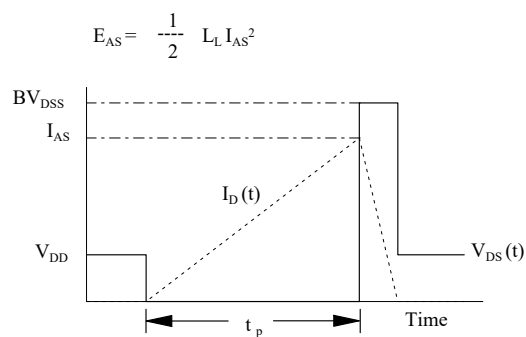
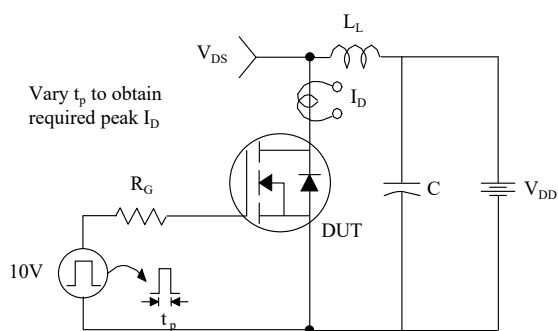
Gate Charge Test Circuit & Waveform



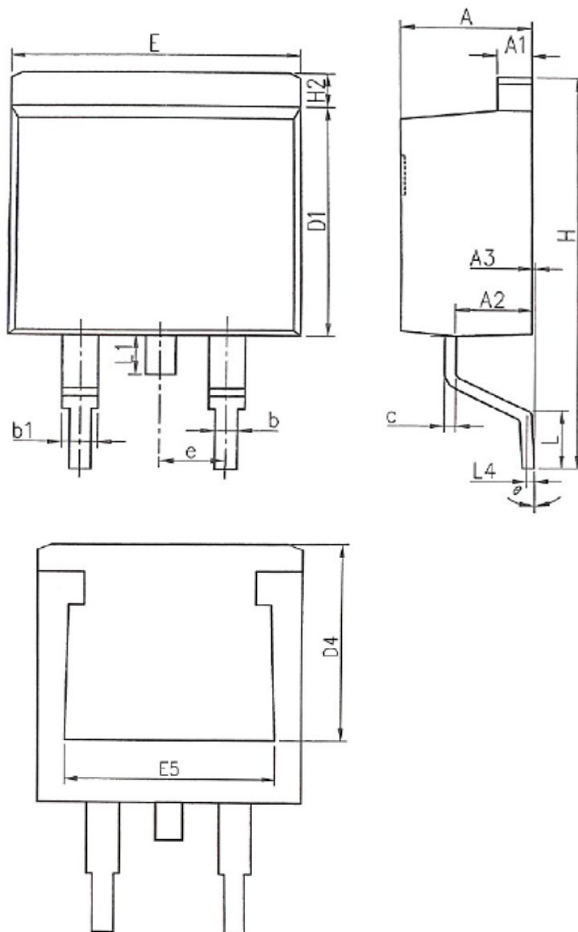
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



Mechanical Dimensions for TO-263



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	4.37	4.89
A1	1.17	1.42
A2	2.20	2.90
A3	0.00	0.25
b	0.70	0.96
b1	1.17	1.47
c	0.28	0.60
D1	8.45	9.30
D4	6.60	-
E	9.80	10.40
E5	7.06	-
e	2.54BSC	
H	14.70	15.70
H2	1.07	1.47
L	2.00	2.80
L1	-	1.75
L4	0.254BSC	
θ	0°	9°