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

Product Summary

Green

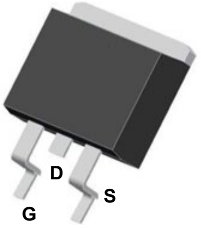
BVDSS	RDSON	ID
200V	22 mΩ	90A

Description

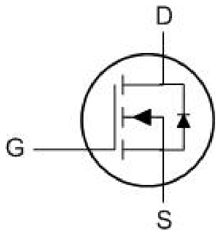
The XRT90N20G is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The XRT90N20G meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

TO263Pin Configuration



TO-263



Absolute Maximum Ratings (T$_C$= 25℃ unless otherwise specified):

Symbol	Parameter		Rating	Unit
Common Ratings (Tc=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		200	V
V_{GSS}	Gate-Source Voltage		±20	V
T_J	Maximum Junction Temperature		175	°C
T_{STG}	Storage Temperature Range		-55 to 175	°C
I_S	Source Current-Continuous(Body Diode)	Tc=25°C	90	A
Mounted on Large Heat Sink				
I_{DM}	Pulsed Drain Current *	Tc=25°C	360	A
I_D	Continuous Drain Current	Tc=25°C	90	A
		Tc=100°C	64	A
P_D	Maximum Power Dissipation	Tc=25°C	375	W
		Tc=100°C	187.5	W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		0.4	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient **		40	°C/W
E_{AS}	Single Pulsed-Avalanche Energy ***	L=0.5mH	833	mJ

Electrical Characteristics(Tc =25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	HY1920			Unit
			Min	Typ.	Max	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V,I_{DS}=250μA	200	-		V
I_{DSS}	Drain-to-Source Leakage Current	V_{DS}=200V,V_{GS}=0V	-	-	1	μA
		T_J=55°C	-	-	5	μA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	2.0	3.0	4.0	V
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$*	Drain-Source On-State Resistance	V_{GS}=10V,I_{DS}=45A		22	25	mΩ
Diode Characteristics						
V_{SD}*	Diode Forward Voltage	I_{SD}=45A,V_{GS}=0V	-	0.85	1.2	V
t_{rr}	Reverse Recovery Time	I_{SD}=45A,dI_{SD}/dt=100A/μs	-	80	-	ns
Q_{rr}	Reverse Recovery Charge		-	160	-	nC

Electrical Characteristics (Cont.) (Tc =25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	HY1920			Unit
			Min	Typ.	Max	
Dynamic Characteristics						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V, F=1MHz	-	3.4	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, Frequency=1.0MHz	-	5871	-	pF
C_{oss}	Output Capacitance		-	392	-	
C_{rss}	Reverse Transfer Capacitance		-	165	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=100V,R_G=4Ω, I_{DS}=45A,V_{GS}=10V	-	29	-	ns
T_r	Turn-on Rise Time		-	45	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	22	-	
T_f	Turn-off Fall Time		-	41	-	
Gate Charge Characteristics						
Q_g	Total Gate Charge	V_{DS} =100V, V_{GS}=10V, I_D=30A	-	130	-	nC
Q_{gs}	Gate-Source Charge		-	22	-	
Q_{gd}	Gate-Drain Charge		-	38	-	

[a1]: Repetitive rating; pulse width limited by maximum junction temperature

Typical Operating Characteristic

Figure 1: Power Dissipation

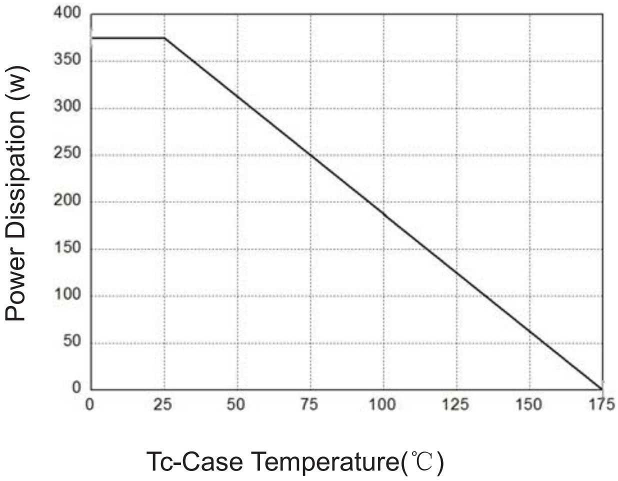


Figure 2: Drain Current

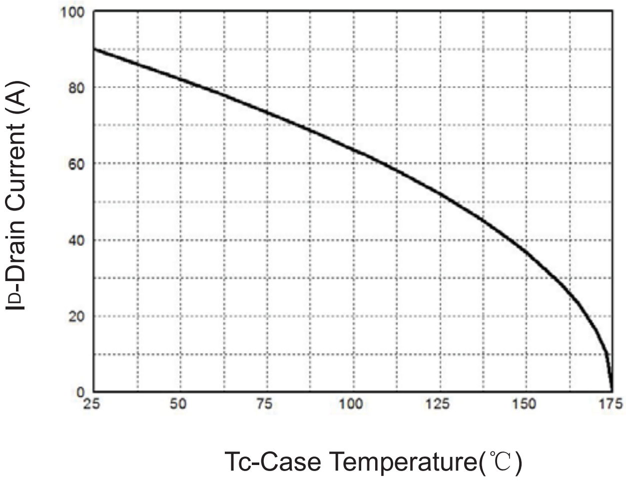


Figure 3: Safe Operation Area

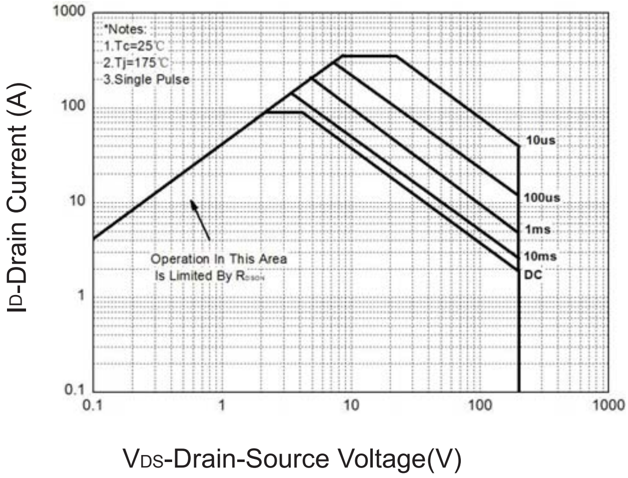
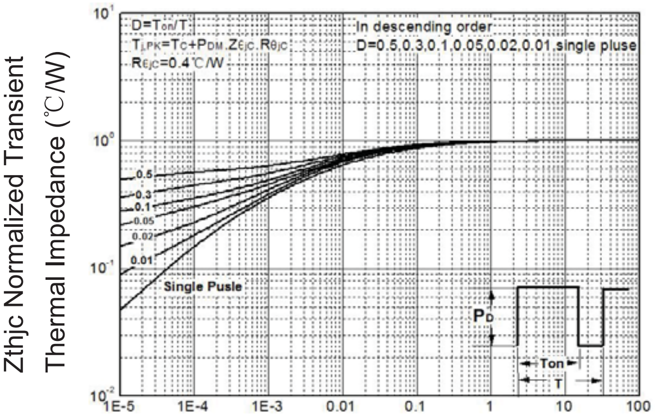


Figure 4: Thermal Transient Impedance



Maximum Effective Transient Thermal
Impedance, Junction-to-Case

Figure 5: Output Characteristics

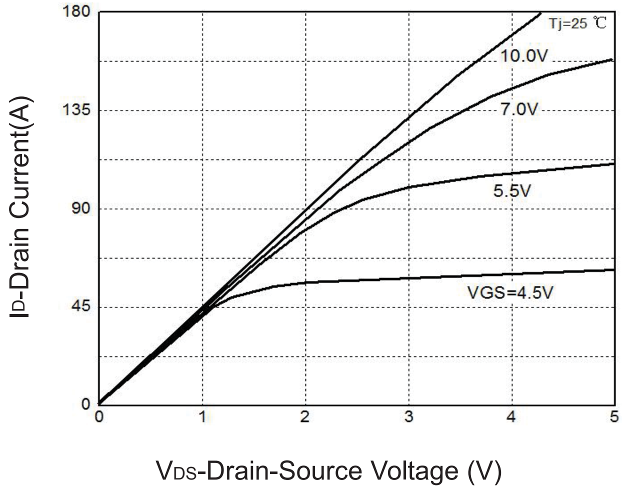
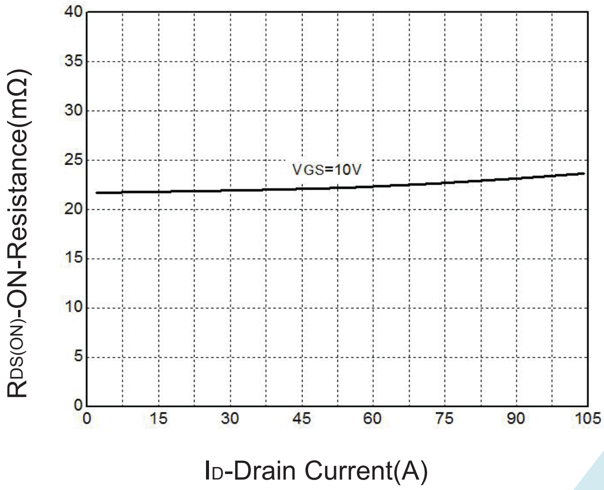


Figure 6: Drain-Source On Resistance



Typical Operating Characteristics(Cont.)

Figure 7: On-Resistance vs. Temperature

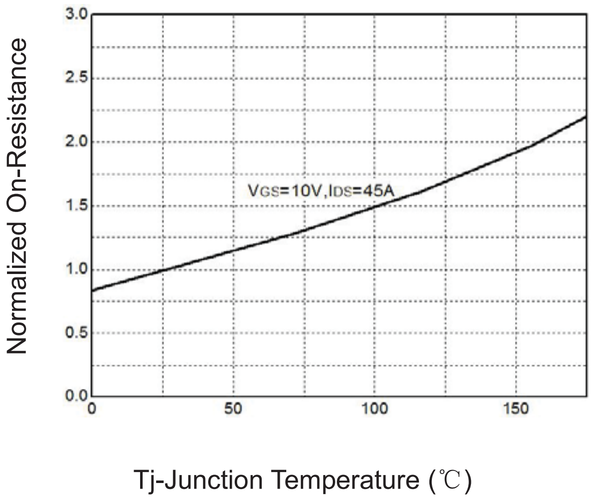


Figure 8: Source-Drain Diode Forward

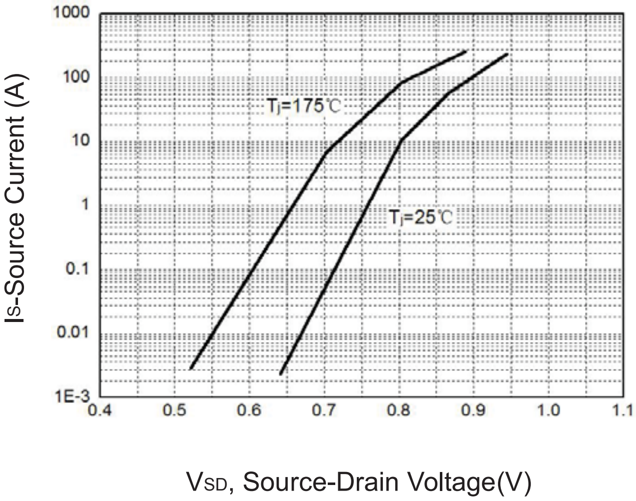


Figure 9: Capacitance Characteristics

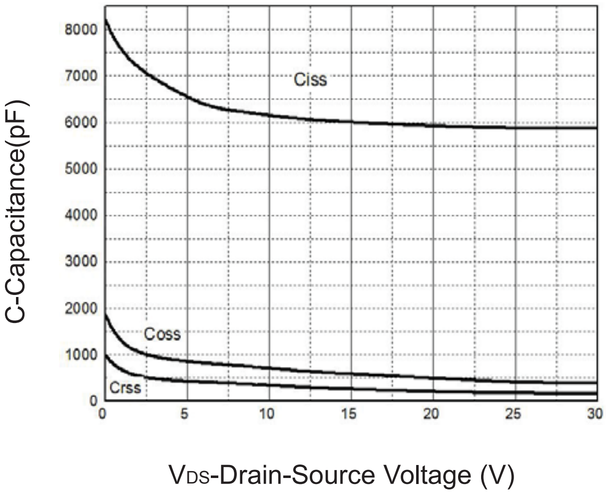
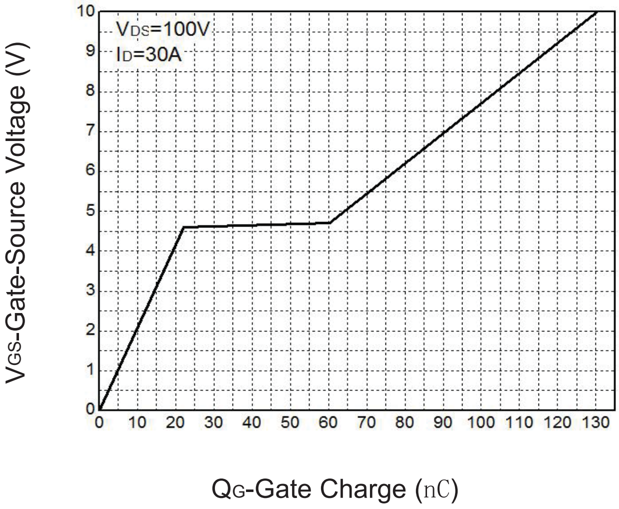
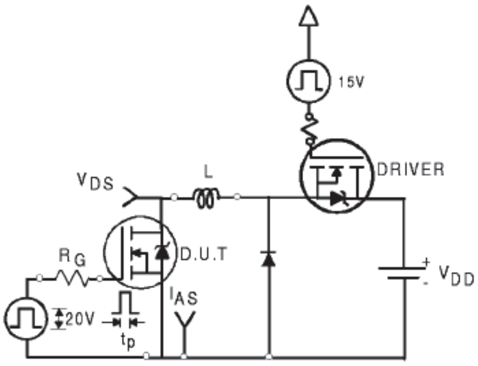
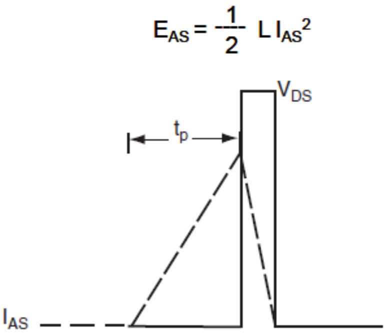


Figure 10: Gate Charge Characteristics

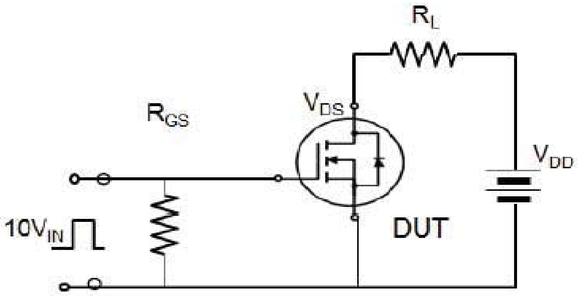


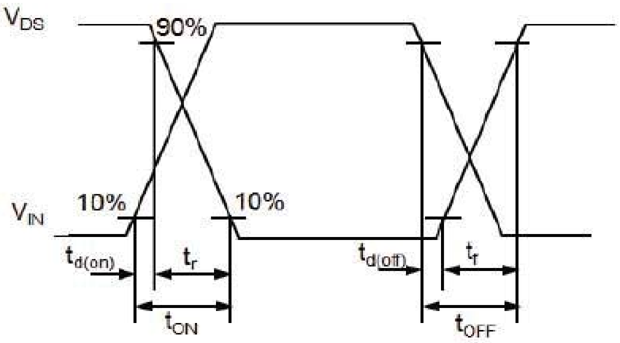
Avalanche Test Circuit



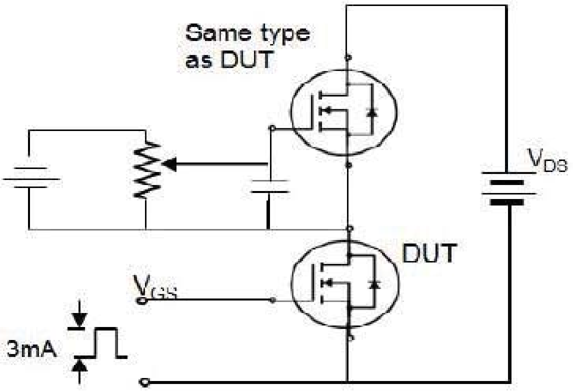


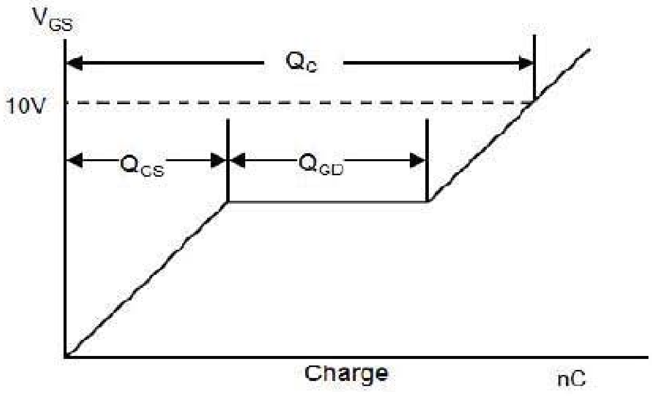
Switching Time Test Circuit



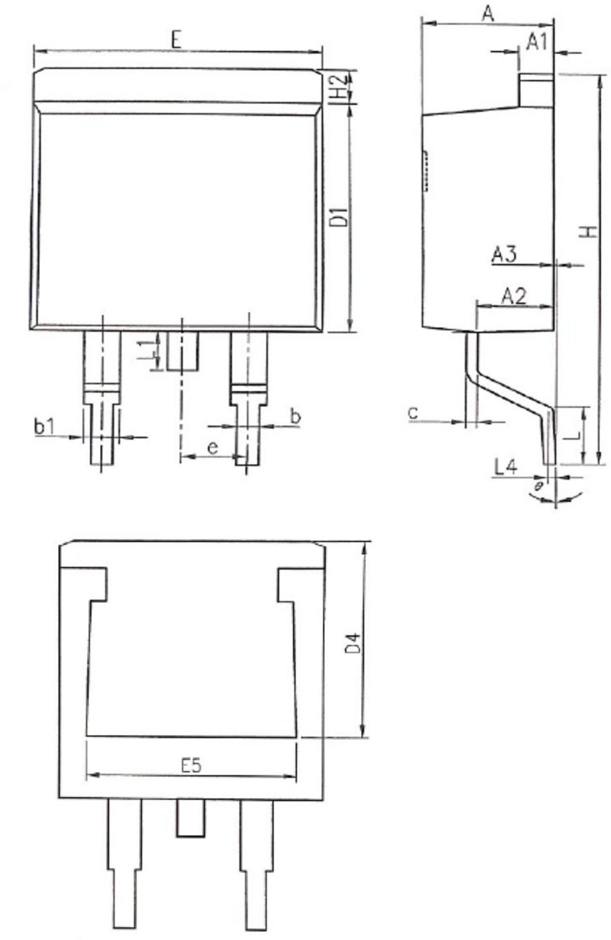


Gate Charge Test Circuit





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°