

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

Product Summary



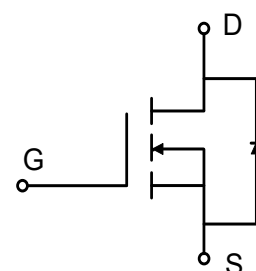
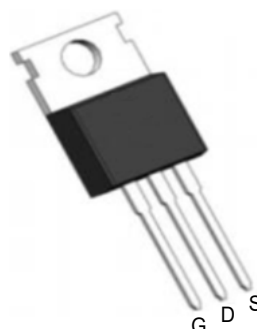
BVDSS	RDSON	ID
200V	23 mΩ	90A

Description

The UDT90N20T 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 UDT90N20T meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

TO220 Pin Configuration



Absolute Maximum Ratings ($T_C = 25^\circ\text{C}$ 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 _{θJC}	Thermal Resistance, Junction-to-Case		0.4	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient **		40	°C/W
E _{AS}	Single Pulsed-Avalanche Energy ***	L=0.5mH	833	mJ

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

Symbol	Parameter	Test Conditions					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			23	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.) (T_c = 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,	-	5871	-	pF
C _{Oss}	Output Capacitance	V _{DS} =25V,	-	392	-	
C _{rss}	Reverse Transfer Capacitance	Frequency=1.0MHz	-	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

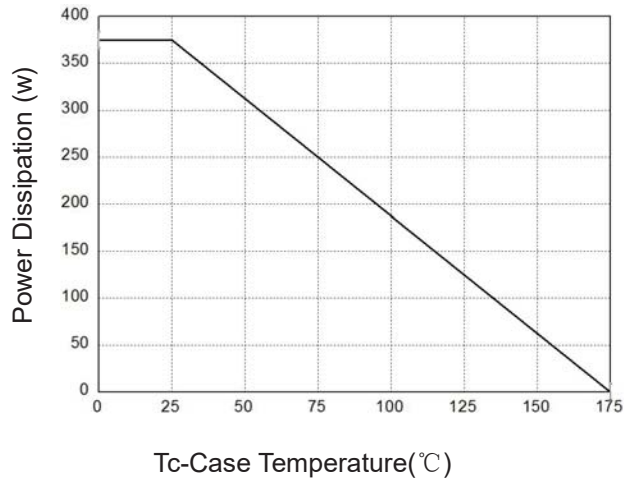


Figure 2: Drain Current

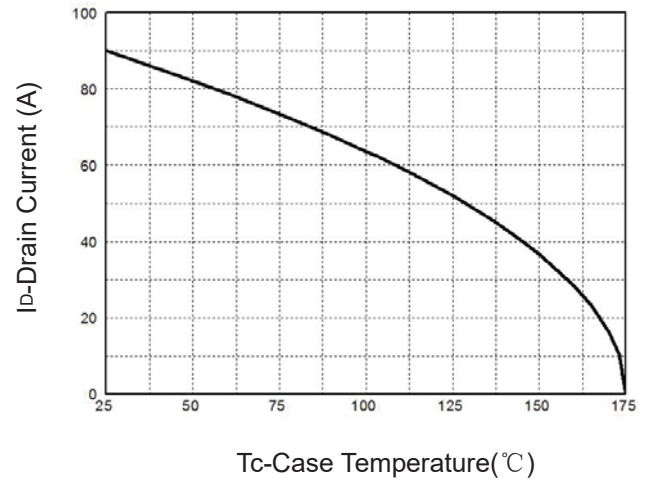


Figure 3: Safe Operation Area

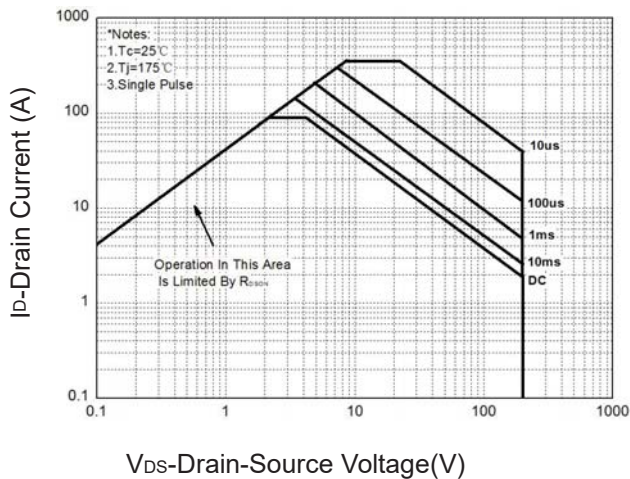
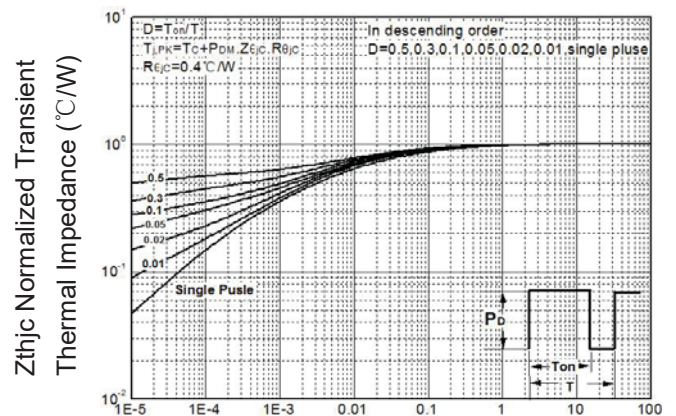


Figure 4: Thermal Transient Impedance



Maximum Effective Transient Thermal Impedance, Junction-to-Case

Figure 5: Output Characteristics

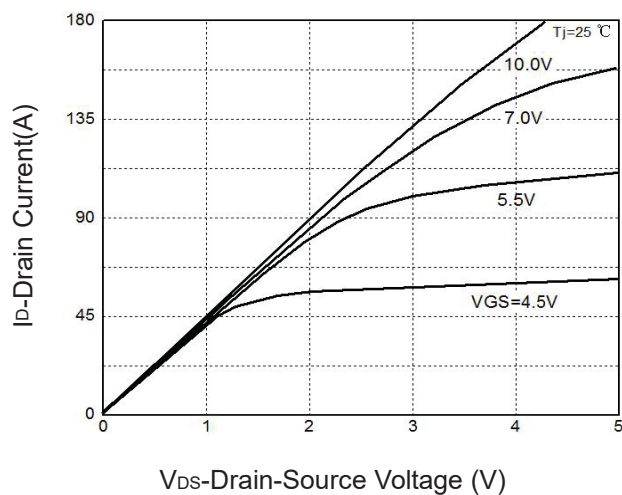
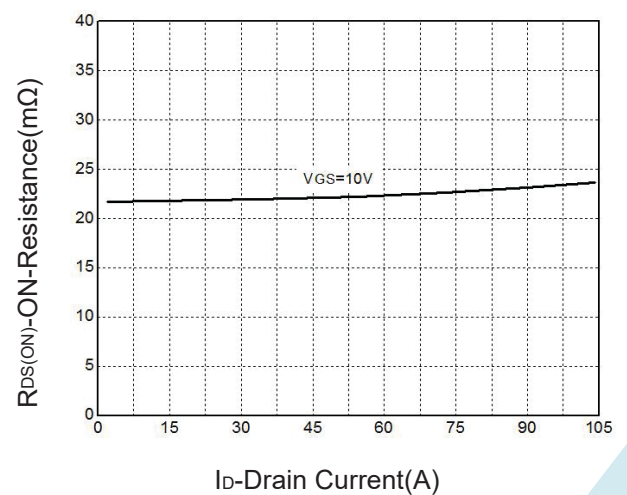


Figure 6: Drain-Source On Resistance



Typical Operating Characteristics(Cont.)

Figure 7: On-Resistance vs. Temperature

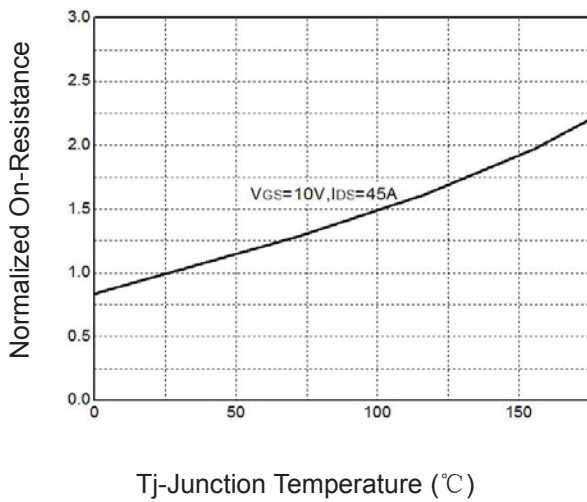


Figure 8: Source-Drain Diode Forward

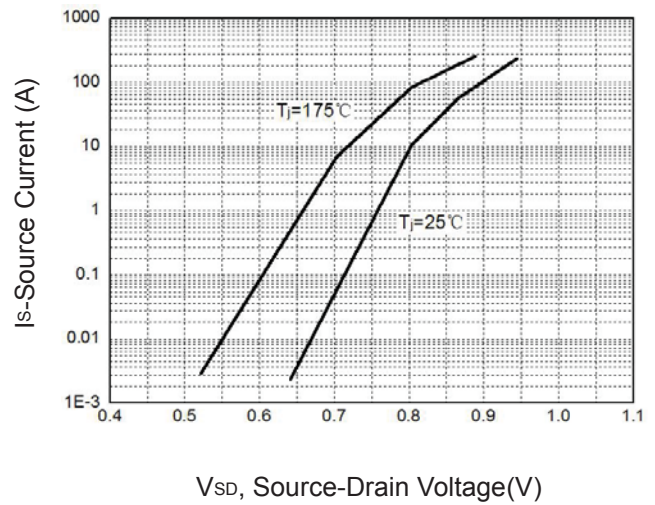


Figure 9: Capacitance Characteristics

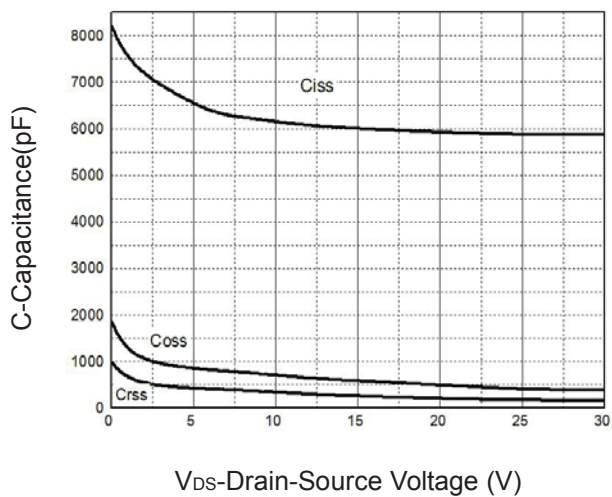
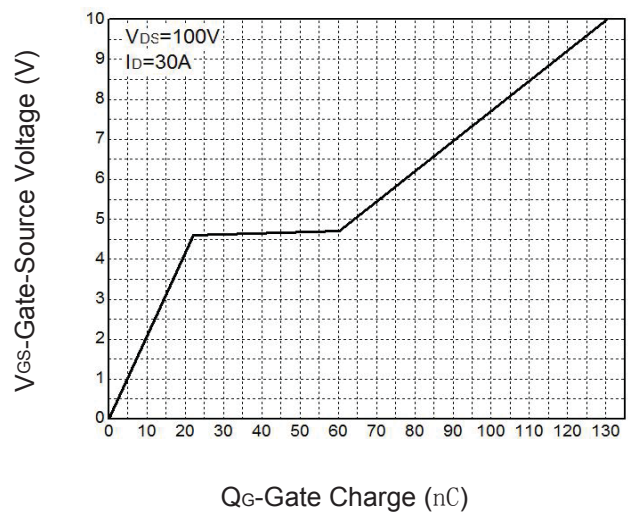
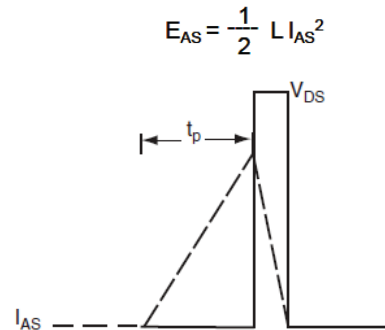
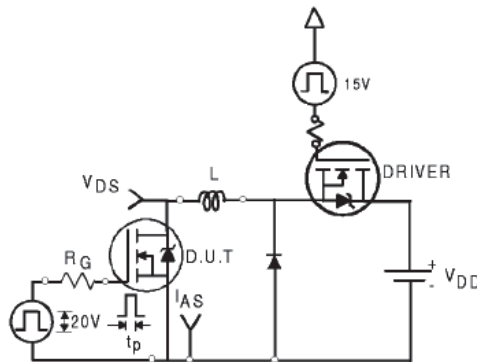


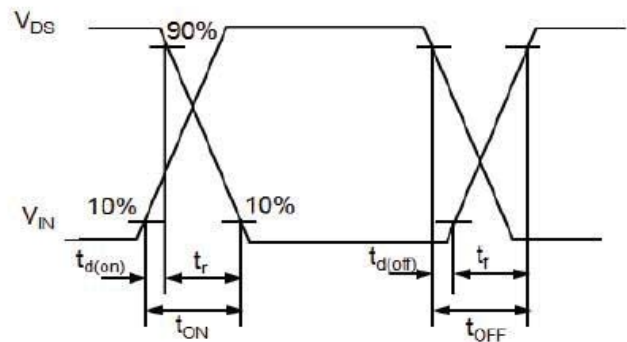
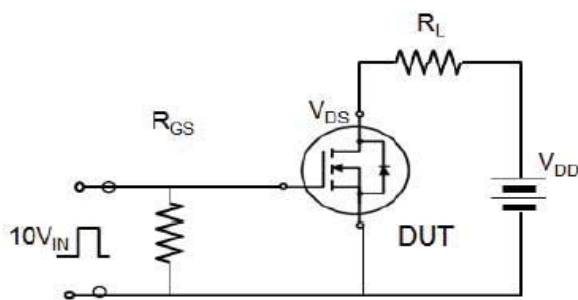
Figure 10: Gate Charge Characteristics



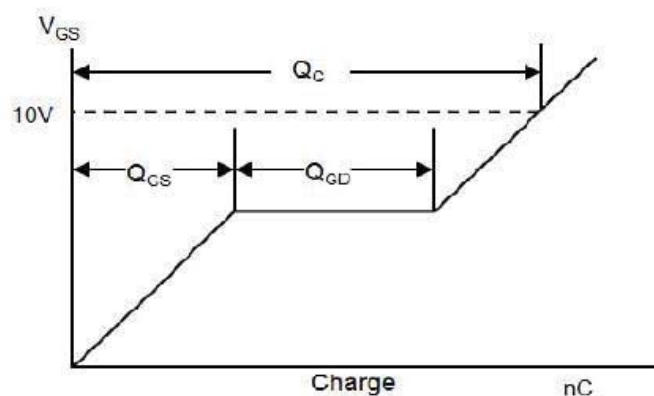
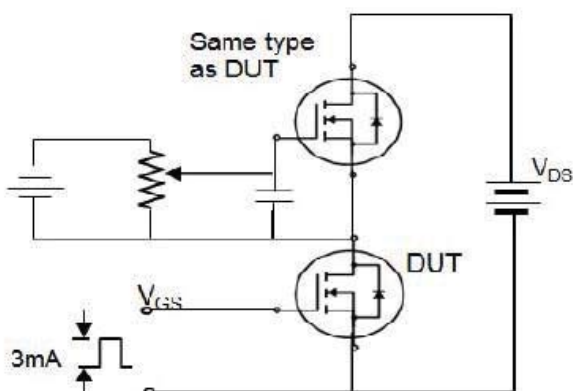
Avalanche Test Circuit



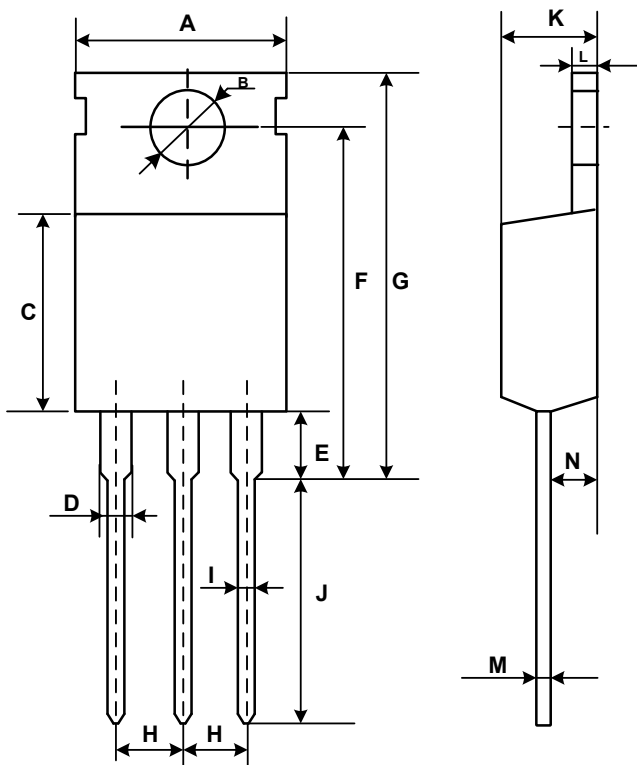
Switching Time Test Circuit



Gate Charge Test Circuit



Mechanical Dimensions for TO-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