

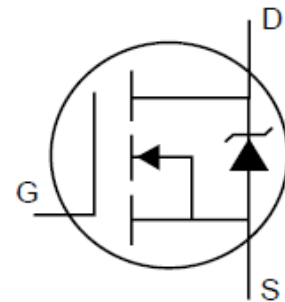
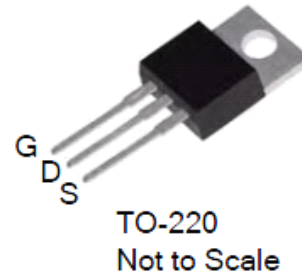
DESCRIPTION

The 11N10 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

V_{DSS}	$R_{DS(ON)}$	I_D
100V	7.8m Ω	110A

GENERAL FEATURES

- $V_{DS} = 100V, I_D = 110A$
 $R_{DS(ON)} < 9m\Omega @ V_{GS} = 10V$
- High density cell design for ultra low $R_{ds(on)}$.
- Fully characterized avalanche voltage and current.
- Good stability and uniformity with high EAS .
- Excellent package for good heat dissipation .
- Special process technology for high ESD capability .



Applications

- Power switching application.
- Hard switched and high frequency circuits.
- Uninterruptible power supply.

Ordering Information

PART NUMBER	PACKAGE	BRAND
11N10	TO-220	0GFD

Absolute Maximum Ratings (TC=25°C, unless otherwise noted)

Symbol	Parameter	11N10	Units
V _{DSS}	Drain-to-Source Voltage	100	V
I _D	Continuous Drain Current	110	A
I _D (100°C)	Drain Current-Continuous(TC=100°C)	78	
I _{DM}	Pulsed Drain Current@VG=10V	440	
P _D	Power Dissipation	220	W
	Derating Factor above 25°C	1.47	W/°C
V _{GS}	Gate-to-Source Voltage	± 20	V
E _{AS}	Single Pulse Avalanche Energy	1100	mJ
T _J and T _{STG}	Operating Junction and Storage Temperature Range	-55 to 175	°C

Thermal Resistance

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
R _{θJC}	Junction-to-Case	--	--	0.68	°C/W	Water cooled heatsink, PD adjusted for a peak junction temperature of +175°C.
R _{θJA}	Junction-to-Ambient	--	--	--		1 cubic foot chamber, free air.

OFF Characteristics T_J=25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
B _V D _{SS}	Drain-to-Source Breakdown Voltage	100	113	--	V	V _{GS} =0, I _D =250uA
I _{GSS}	Gate-to-Source Forward Leakage	--	--	±100	nA	V _{DS} =0V, V _{GS} =±20V
I _{DSS}	Zero Gate Voltage Drain Current	--	--	1	uA	V _{DS} =100V, V _{GS} =0V

ON Characteristics T_J=25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max	Units	Test Conditions
R _{DS(ON)}	Static Drain-to-Source On-Resistance	--	7.8	9	mΩ	V _{GS} =10V, I _D =40A
V _{GS(TH)}	Gate Threshold Voltage, Figure 12.	2	3	4	V	V _{DS} =10V, I _D =250uA
G _{fs}	Forward Transconductance	90	---	--	S	V _{DS} =25V, I _D =57A

Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
C _{iss}	Input Capacitance	--	6500	--	pF	V _{DS} =25V, V _{GS} =0V, f=1.0MHZ
C _{oss}	Output Capacitance	--	380	--		
C _{rss}	Reverse Transfer Capacitance	--	330	--		
Q _g	Total Gate Charge	--	163	--	nC	V _{DS} =30V, V _{GS} =10V, I _D =30A
Q _{gs}	Gate-to-Source Charge	--	31	--		
Q _{gd}	Gate-to-Drain ("Miller") Charge	--	64	--		

Resistive Switching Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
T _{d(ON)}	Turn-on Delay Time		26		ns	VDD=30V, I _D =2A RL=15Ω VGS=10V, RG=2.5Ω
T _{rise}	Rise Time		24			
T _{d(OFF)}	Turn-Off Delay Time		91			
T _{fall}	Fall Time		39			

Drain-Source Diode Characteristics

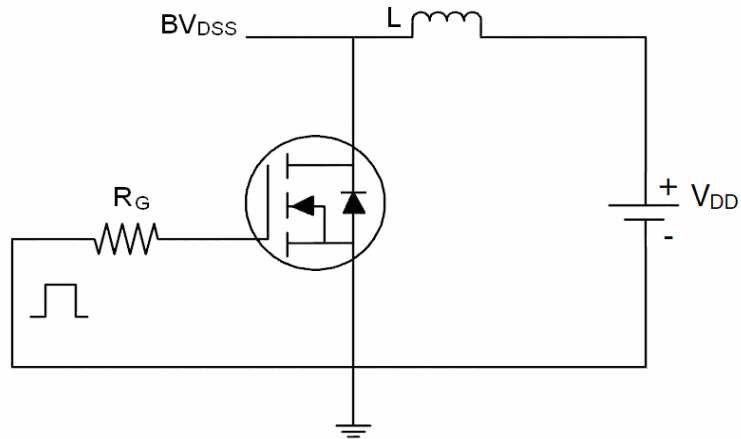
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =40A	--	--	1.2	V	
Diode Forward Current	I _S	--	--	--	110	A	
Reverse Recovery Time	t _{rr}	T _J =25°C, I _F =40A Di/dt = 100 A/μs	--	42	--	nS	
Reverse Recovery Charge	Q _{rr}		--	66	--	nC	
Forward Turn-On Time	t _{ton}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)					

Notes:

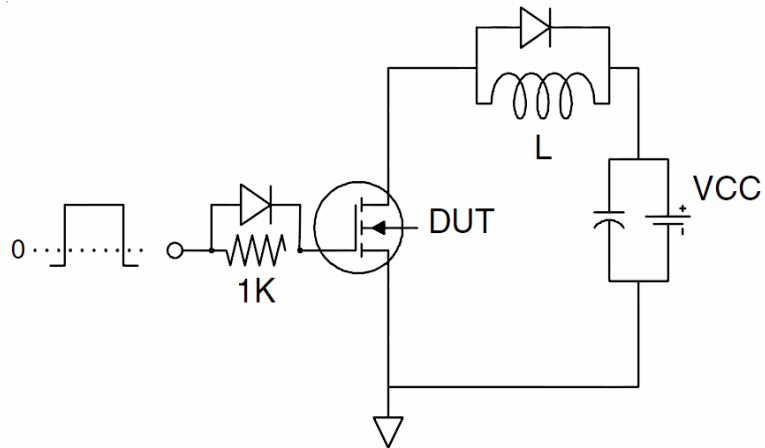
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production.
5. EAS condition: T_J=25°C, VDD=50V, V_G=10V, L=0.5mH, R_g=25Ω

Test circuit

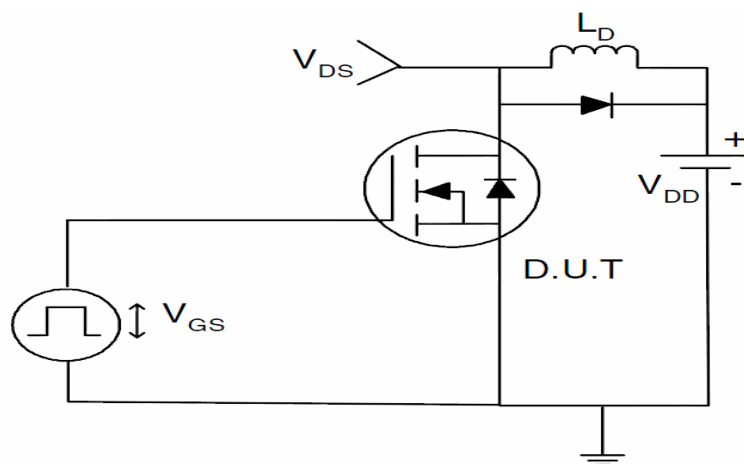
1) E_{AS} test Circuits



2) Gate charge test Circuit:



3) Switch Time Test Circuit:



Typical Electrical and Thermal Characteristics

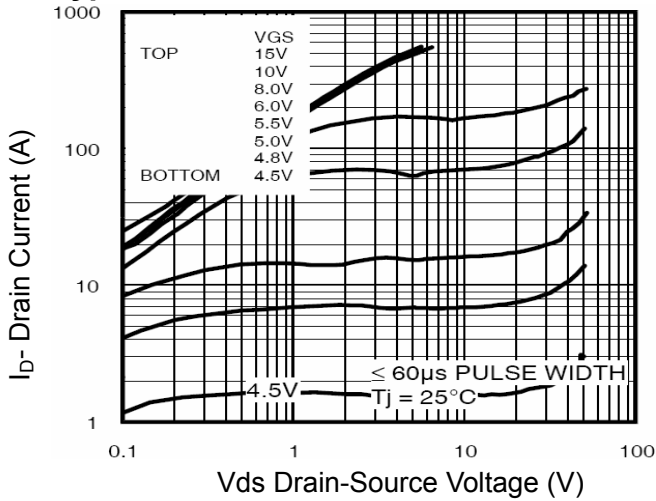


Figure 1 Output Characteristics

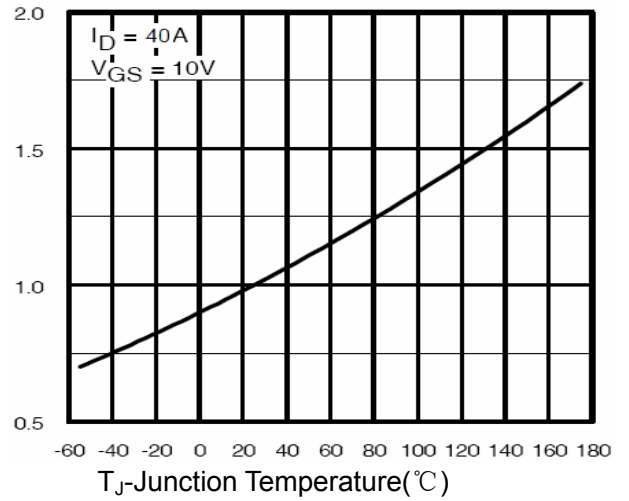


Figure 4 Rdson-Junction Temperature

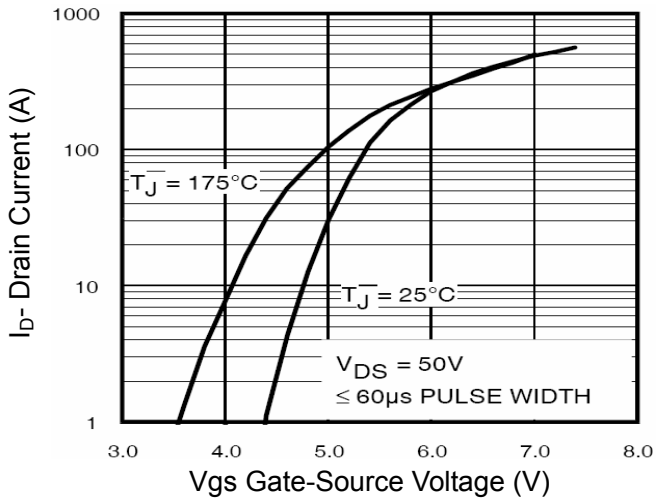


Figure 2 Transfer Characteristics

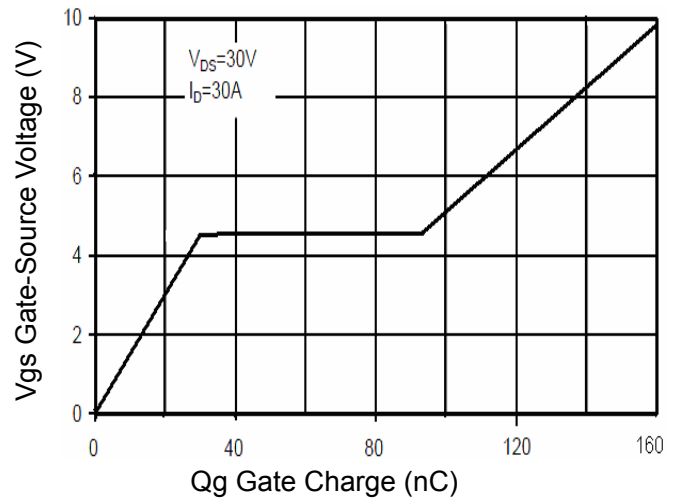


Figure 5 Gate Charge

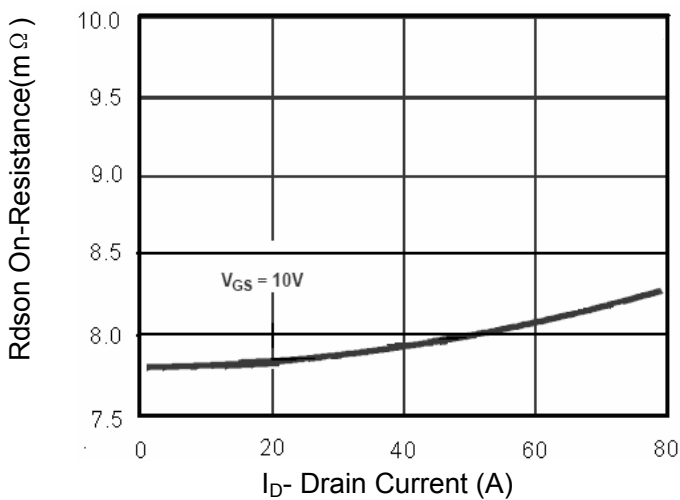


Figure 3 Rdson- Drain Current

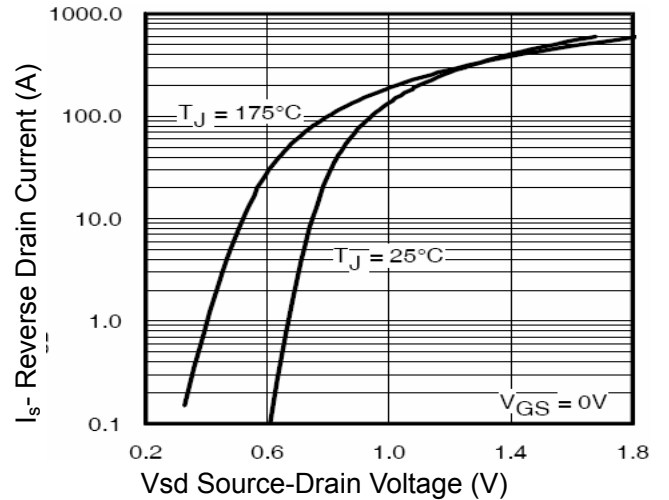


Figure 6 Source- Drain Diode Forward

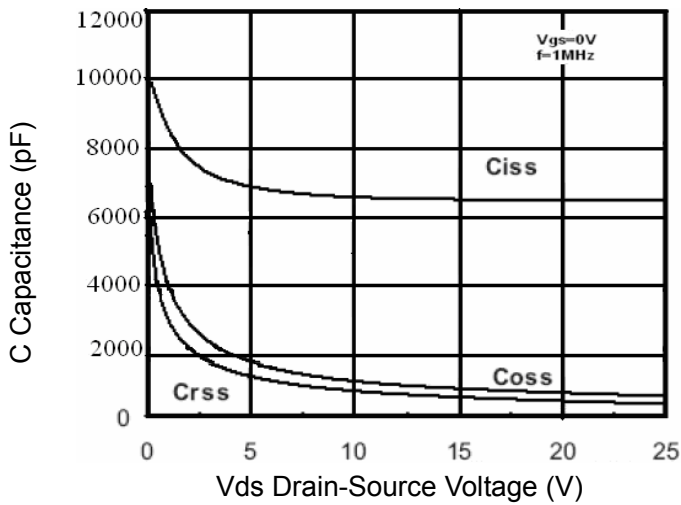


Figure 7 Capacitance vs Vds

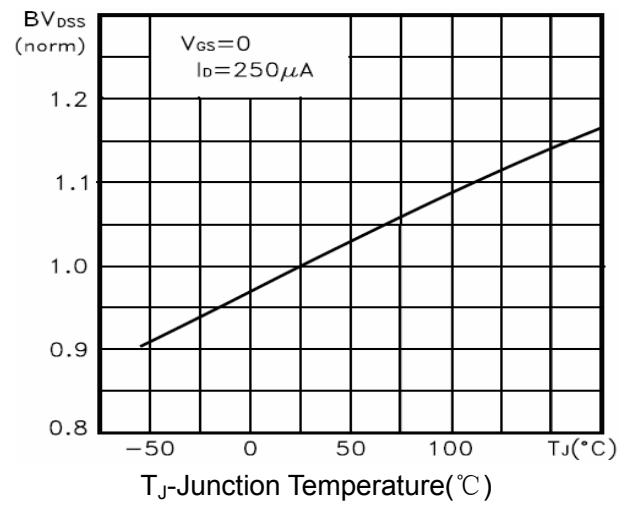


Figure 9 BV_{DSS} vs Junction Temperature

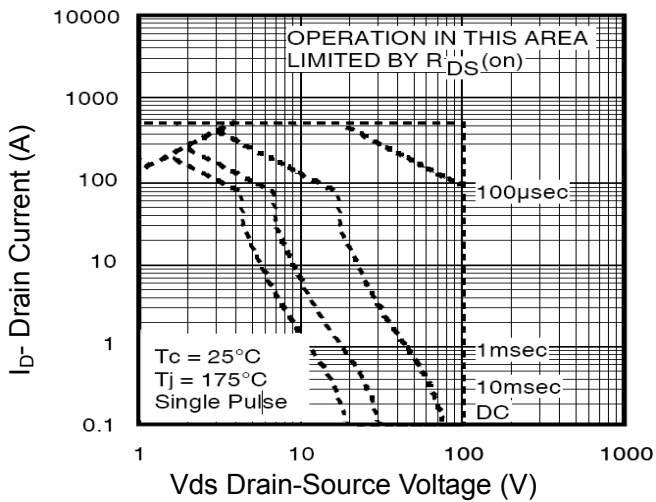


Figure 8 Safe Operation Area

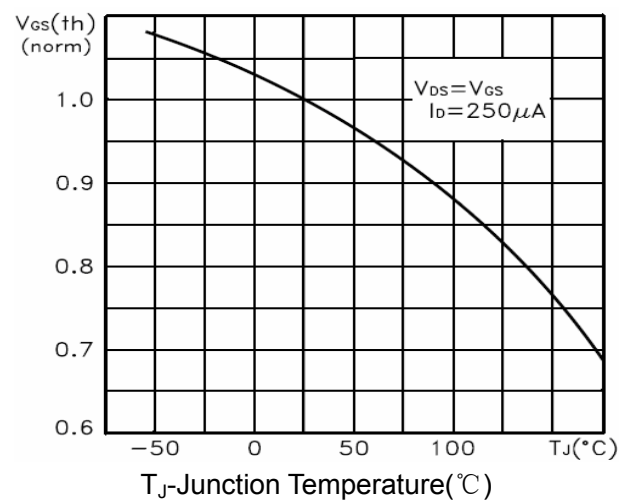


Figure 10 $V_{GS(th)}$ vs Junction Temperature

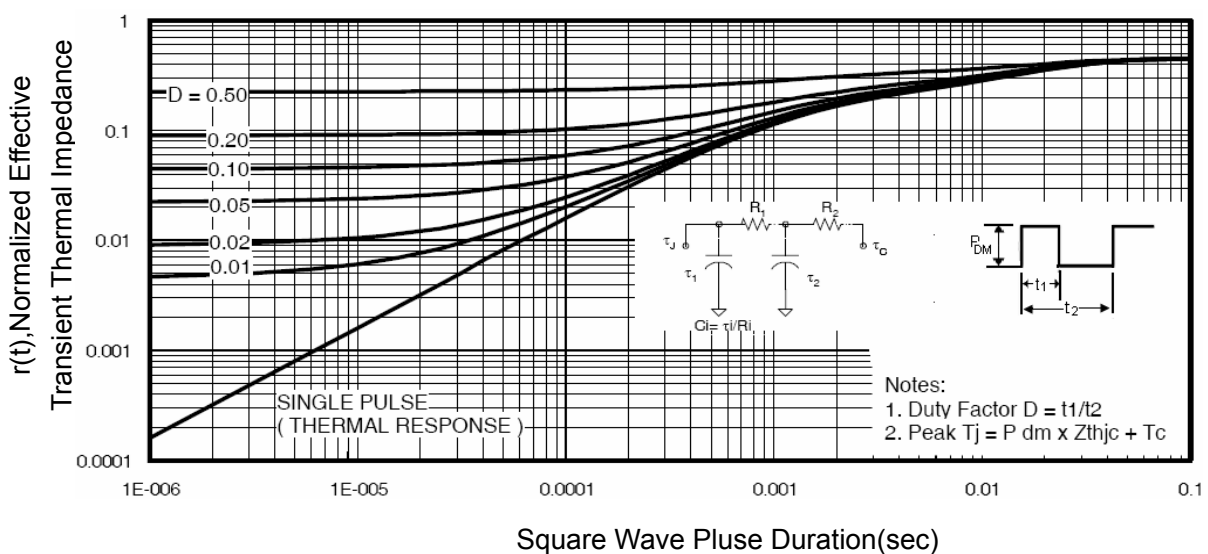


Figure 11 Normalized Maximum Transient Thermal Impedance