

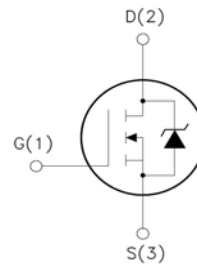
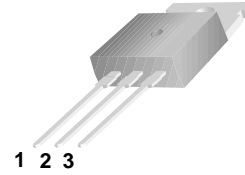
XXWP70N07

10V N-Channel MOSFET

Features:

- Low Intrinsic Capacitances.
- Excellent Switching Characteristics.
- Extended Safe Operating Area.
- Unrivalled Gate Charge : $Q_g = 58\text{nC}$ (Typ.).
- $BV_{DSS} = 70\text{V}, I_D = 70\text{A}$
- $R_{DS(on)} : 10.5\text{m}\Omega$ (Max) @ $V_G = 10\text{V}$
- 100% Avalanche Tested

TO-220 



- 1. Gate (G)
- 2. Drain (D)
- 3. Source (S)

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	70	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	70	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	45	A
I_{DM}	Pulsed Drain Current ¹	240	A
$P_D @ T_C = 25^\circ\text{C}$	Total Power Dissipation	120	W
$P_D @ T_A = 25^\circ\text{C}$	Total Power Dissipation ³	2	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	Value	Units
Rthj-c	Maximum Thermal Resistance, Junction-case	1.05	$^\circ\text{C}/\text{W}$
Rthj-a	Maximum Thermal Resistance, Junction-ambient (PCB mount) ³	62.5	$^\circ\text{C}/\text{W}$

Electrical Characteristics @ $T_j=25^{\circ}\text{C}$ (unless otherwise specified)

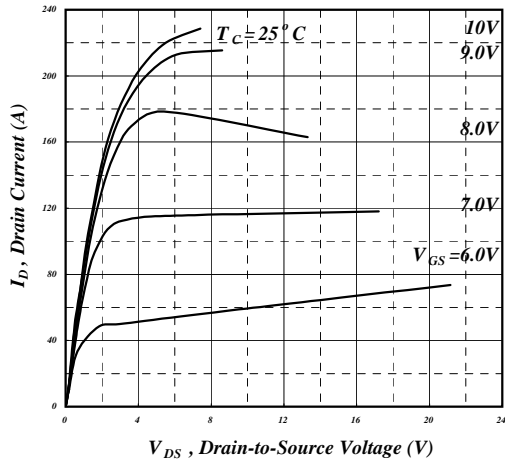
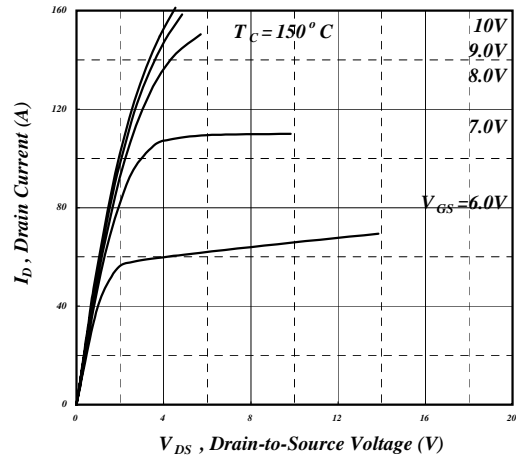
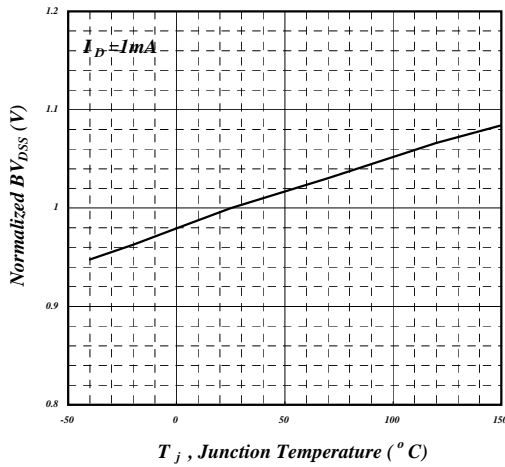
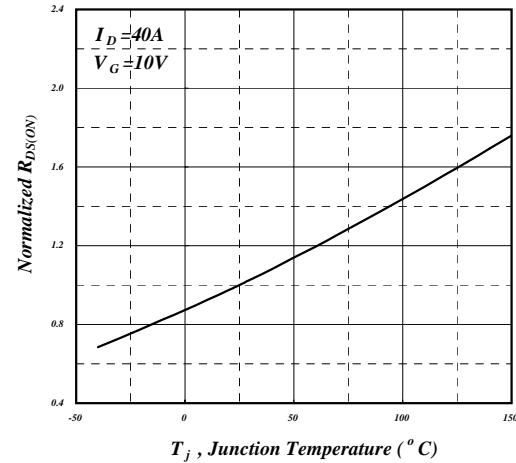
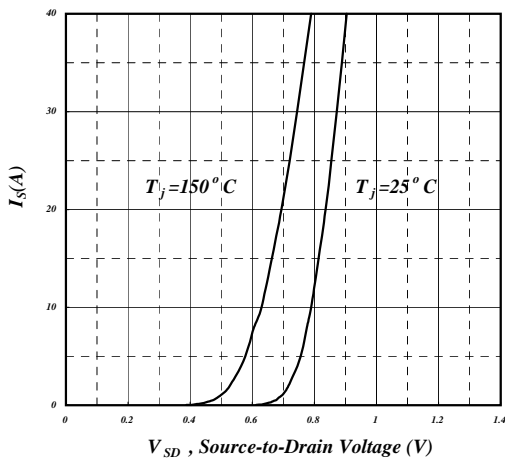
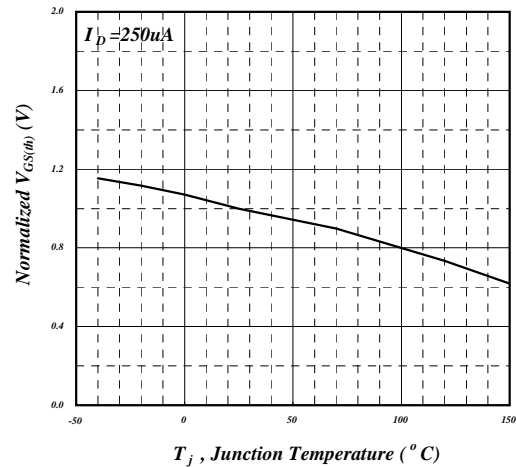
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	70	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=40A$	-	-	10.5	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2	-	4	V
g_{fs}	Forward Transconductance	$V_{DS}=10V, I_D=30A$	-	47	-	S
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=70V, V_{GS}=0V$	-	-	25	μA
I_{GSS}	Gate-Source Leakage	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Q_g	Total Gate Charge ²	$I_D=30A$	-	58	93	nC
Q_{gs}	Gate-Source Charge	$V_{DS}=56V$	-	14	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	$V_{GS}=10V$	-	24	-	nC
$t_{d(on)}$	Turn-on Delay Time ²	$V_{DS}=30V$	-	19	-	ns
t_r	Rise Time	$I_D=30A$	-	65	-	ns
$t_{d(off)}$	Turn-off Delay Time	$R_G=3.3\Omega$	-	30	-	ns
t_f	Fall Time	$V_{GS}=10V$	-	12	-	ns
C_{iss}	Input Capacitance	$V_{GS}=0V$	-	3300	5280	pF
C_{oss}	Output Capacitance	$V_{DS}=25V$	-	300	-	pF
C_{rss}	Reverse Transfer Capacitance	$f=1.0\text{MHz}$	-	185	-	pF
R_g	Gate Resistance	$f=1.0\text{MHz}$	-	1.1	2	Ω

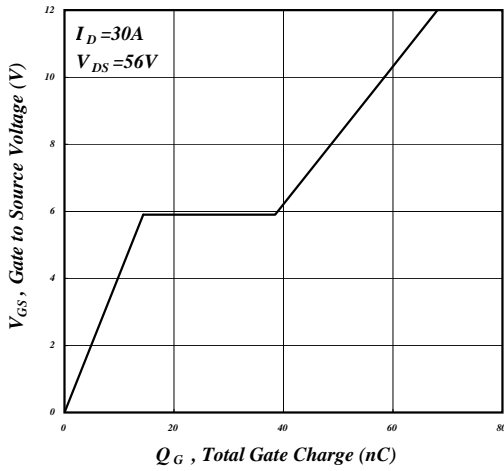
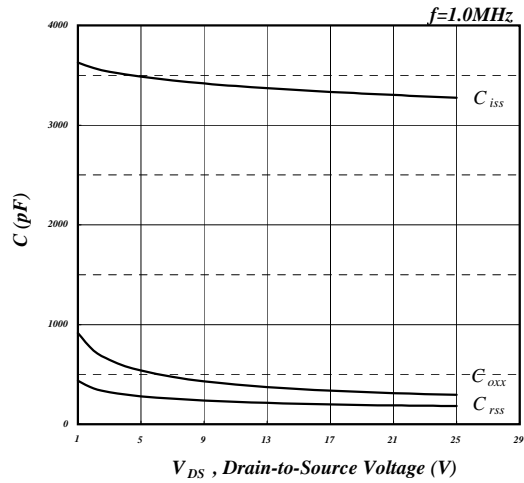
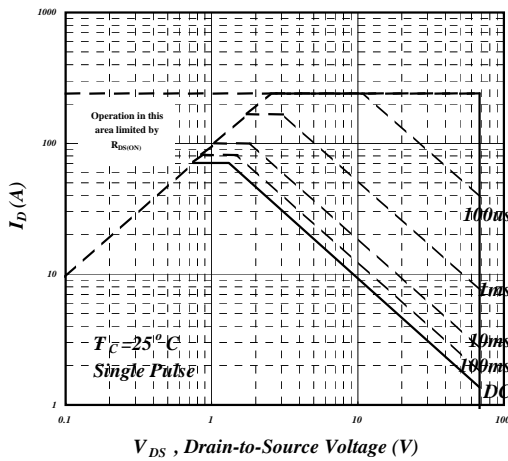
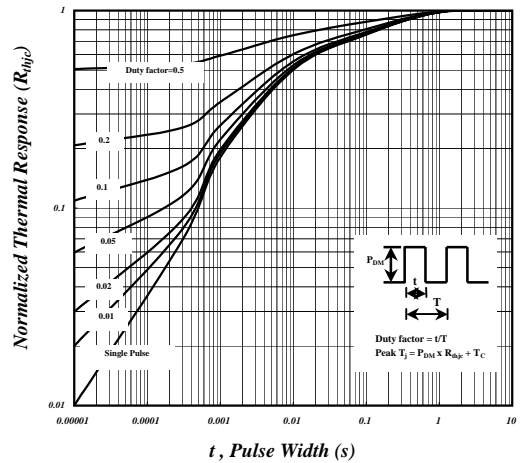
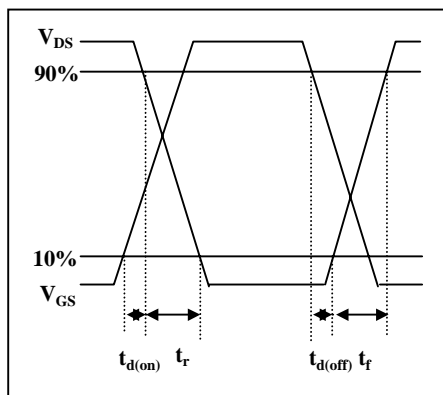
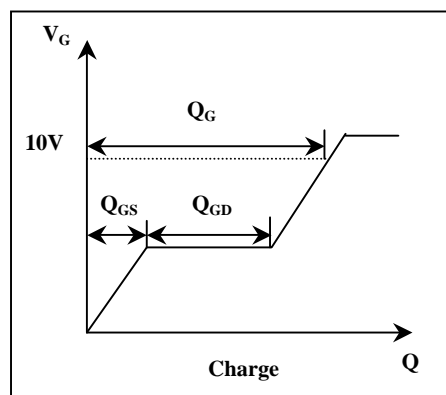
Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage ²	$I_S=40A, V_{GS}=0V$	-	-	1.3	V
t_{rr}	Reverse Recovery Time ²	$I_S=10A, V_{GS}=0V$	-	45	-	ns
Q_{rr}	Reverse Recovery Charge	$di/dt=100A/\mu s$	-	85	-	nC

Notes:

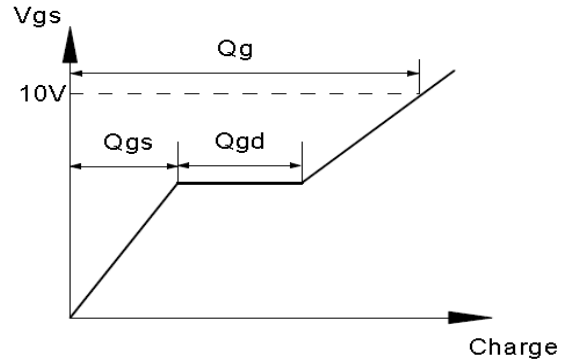
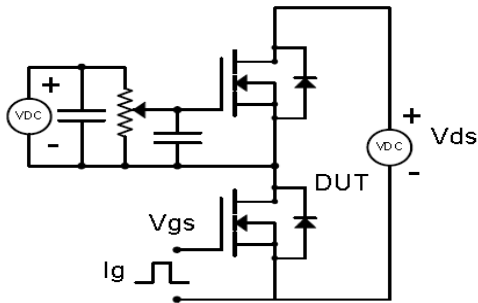
1. Pulse width limited by Max. junction temperature.
2. Pulse test
3. Surface mounted on 1 in² copper pad of FR4 board


Fig 1. Typical Output Characteristics

Fig 2. Typical Output Characteristics

Fig 3. Normalized BV_{DSS} v.s. Junction Temperature

Fig 4. Normalized On-Resistance v.s. Junction Temperature

Fig 5. Forward Characteristic of Reverse Diode

Fig 6. Gate Threshold Voltage v.s. Junction Temperature

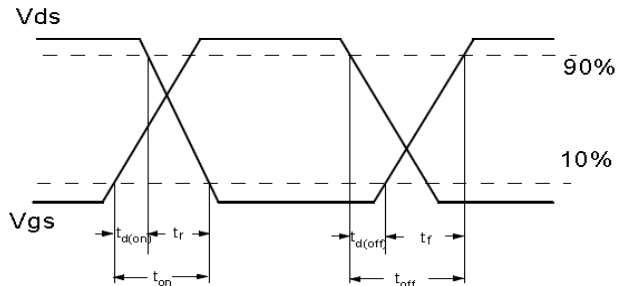
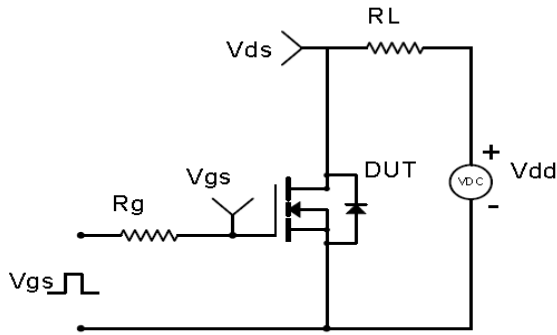

Fig 7. Gate Charge Characteristics

Fig 8. Typical Capacitance Characteristics

Fig 9. Maximum Safe Operating Area

Fig 10. Effective Transient Thermal Impedance

Fig 11. Switching Time Waveform

Fig 12. Gate Charge Waveform

Test Circuit & Waveform

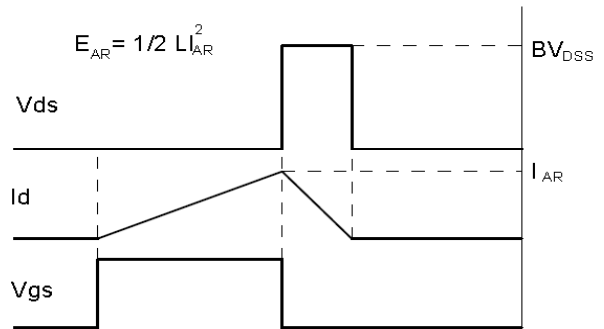
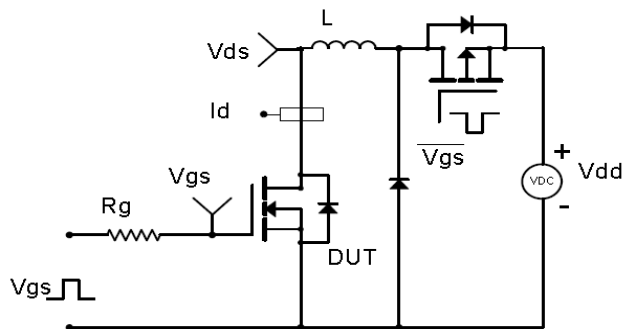
Gate Charge Test Circuit & Waveform



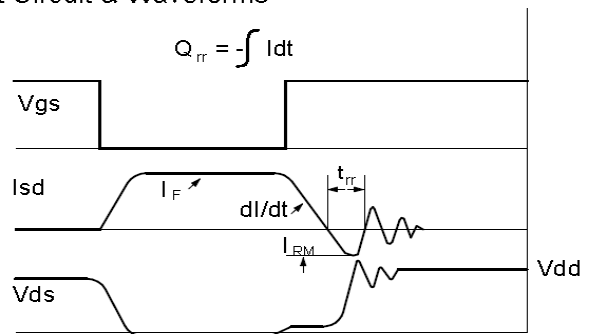
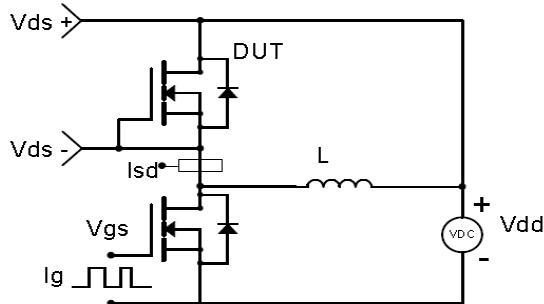
Resistive Switching Test Circuit & Waveforms



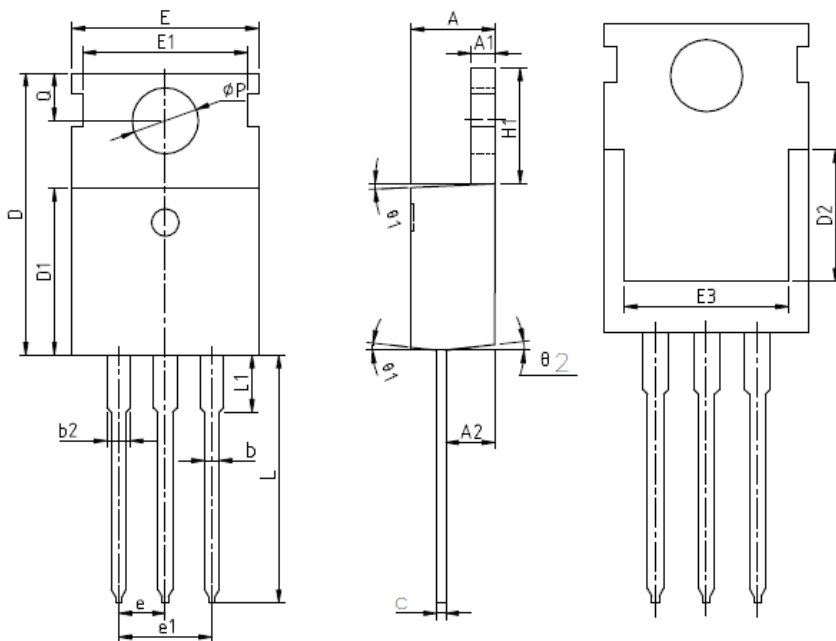
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Dimension

TO-220


SYMBOL	MIN	NOM	MAX
A	4.27	4.57	4.87
A1	1.15	1.30	1.45
A2	2.10	2.40	2.70
b	0.70	0.80	1.00
b2	1.17	1.27	1.50
c	0.40	0.50	0.65
D	15.10	15.60	16.10
D1	8.80	9.10	9.40
D2	5.70	6.70	7.00
E	9.70	10.00	10.30
E1	-	8.70	-
E2	9.65	10.00	10.35
E3	7.00	8.00	8.40
e	2.54 BSC		
e1	5.08 BSC		
H1	6.00	6.50	6.85
L	12.75	13.50	13.90
L1	-	3.10	3.40
ΦP	3.45	3.60	3.75
Q	2.60	2.80	3.00
θ 1	4°	7°	10°
θ 2	0	3°	6°