UN6501N870-T20F

ROHS

N-Channel Enhancement Mode MOSFET

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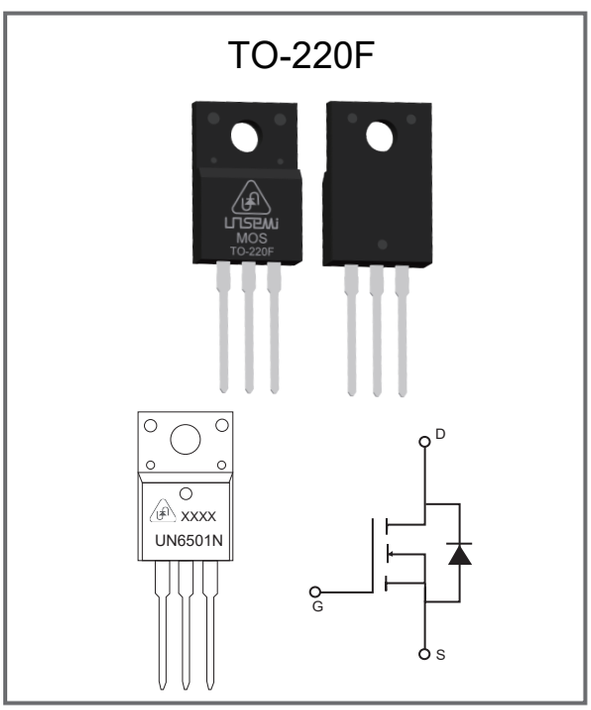
Product Summary

V_{DS}	650V
I_D(Tc=25℃)	10A
$R_{DS(ON)}$(@V_{GS}=10V I_D=5A)	≤1.0Ω

TO-220F



Features

- 100% Avalanche Tested
- Low Gate Charge
- Low Ciss
- Fast Switching
- Improved dv/dt Capability
- Reliable and Rugged
- RoHS Compliant

Applications

- LED Driver
- Power Factor Correction
- Switching Mode Power Supplies

Package Marking And Ordering information

Part Number	Package Type	Packaging	Reel(pcs)
UN6501N870-T20F	TO-220F	Tube	50

Absolute Maximum Ratings Tc = 25℃ unless otherwise specified

Parameter	Symbol	Max.	Units
Drain to Source Voltage	V_{DS}	650	V
Continuous Drain Current [1)]	I_D	10	A
Pulsed Drain Current [2)]	I_{DM}	40	A
Gate-Source Voltage	V_{GS}	±30	V
Single Pulse Avalanche Energy [3)]	E_{AS}	172	mJ
Power Dissipation	P_D	40.3	W
Junction and Storage Temperature Range	T_J,Tstg	-55~+150	℃

Thermal Characteristics

Parameter		Symbol	Typ.	Max.	Units
Junction-to-Ambient Thermal Resistance	Steady State	$R_{\theta JA}$	-	74	℃/W
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	-	3.1	℃/W

Notes:

1). The maximum current rating is silicon wafer limited.

2). Single pulse width limited by junction temperature .

3). Limited by $T_{J(MAX)}$, starting T_J=25℃ , Rg=25Ω, L=10mH.

4). Design parameters,Guaranteed by design, not subject to production.

Electrical Characteristics at Tc = 25℃ unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
STATIC PARAMETERS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250μA	650			V
Drain-Source Leakage Current	I_{DSS}	V_{DS} = 650V , V_{GS} = 0V			1.0	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS} = ±30V , V_{DS} = 0V			±100	nA
Gate-Source Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS} , I_D = 250μA	2.0	3.0	4.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS} = 10V , I_D = 5.0A		0.87	1.0	Ω
BODY-DIODE PARAMETERS						
Drain-Source Diode	V_{SD}	I_S = 1.0A , V_{GS} = 0V		0.7	1.5	V
Reverse Recovery Time	trr	I_S = 5.0A di/dt = 100A/μs		223		nS
Reverse Recovery Charge	Qrr			892		nC
DYNAMIC PARAMETERS [4]						
Input Capacitance	Ciss	V_{GS} = 0V V_{DS} = 50V F = 1MHz		1542		pF
Output Capacitance	Coss			85		pF
Reverse Transfer Capacitance	Crss			7.5		pF
Gate Charge Total	Qg	V_{GS} = 10V V_{DS} = 480V I_D = 5.0A		29		nC
Gate to Source Charge	Qgs			9.8		nC
Gate to Drain Charge	Qgd			7.2		nC
SWITCHING PARAMETERS [4]						
Turn-On Delay Time	$t_{d(ON)}$	V_{DS} = 325V V_{GS} = 10V R_G = 4.7Ω I_D = 5.0A		10.1		nS
Turn-On Rise Time	tr			2.5		nS
Turn-Off Delay Time	$t_{d(OFF)}$			45.6		nS
Turn-Off Fall Time	tf			33		nS

Electrical Characteristics Curves

Fig 1. Output Characteristics

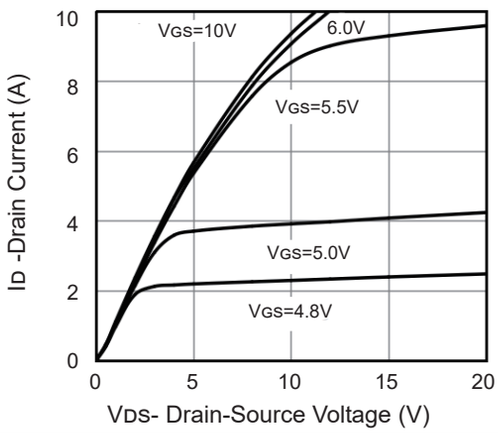


Fig 2. Typical Tansfer Characeristic

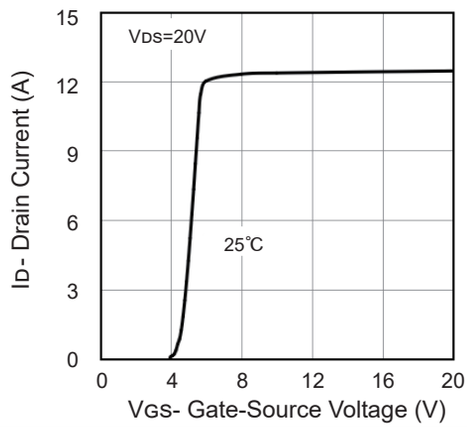


Fig 3. On-Resistance Vs Drain Current

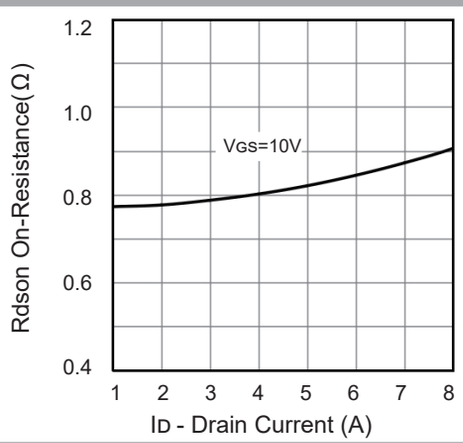


Fig 4. On-Resistance Vs JunctionTemperature

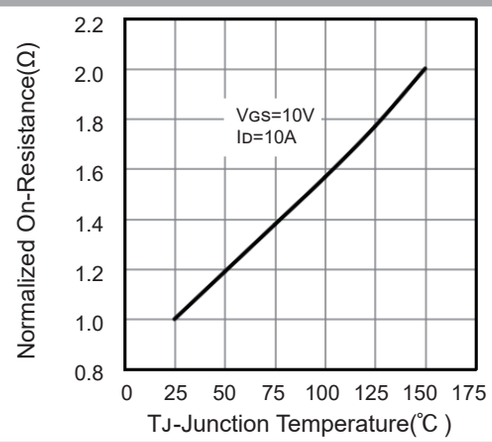


Fig 5. Body-Diode Characteristics

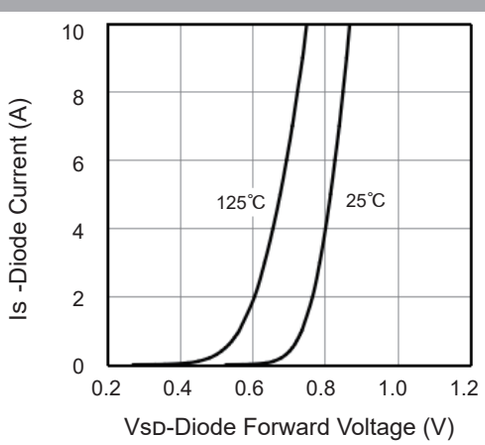
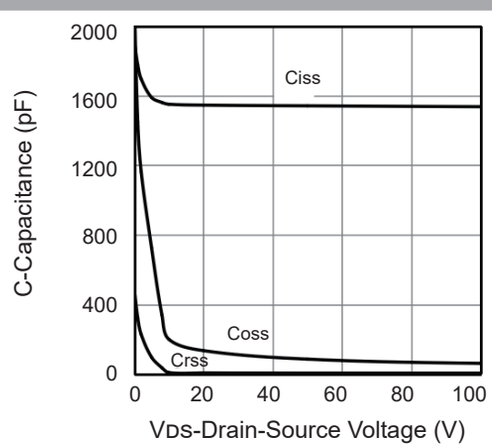


Fig 6. Capacitance Vs Drain-Source Voltage



Electrical Characteristics Curves

Fig 7. Safe Operation Area

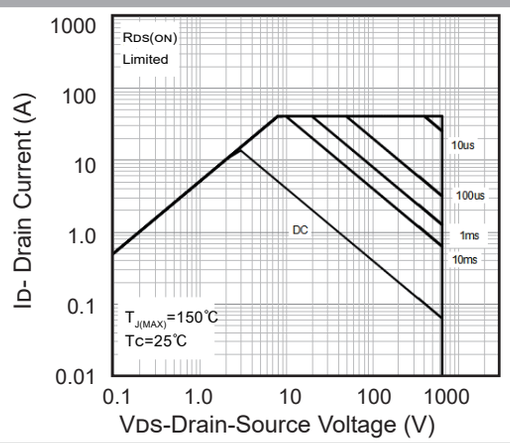


Fig 8. Power Derating

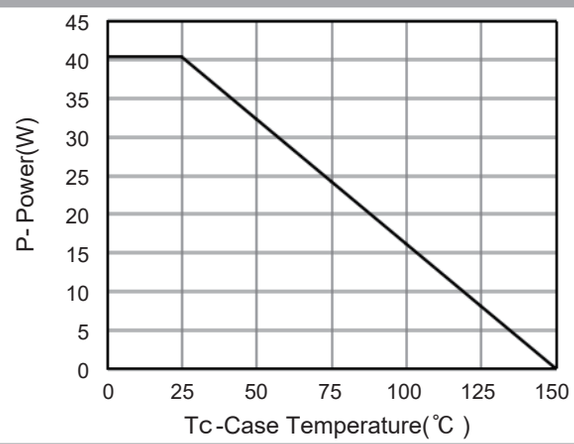


Fig 9. Gate Charge Characteristics

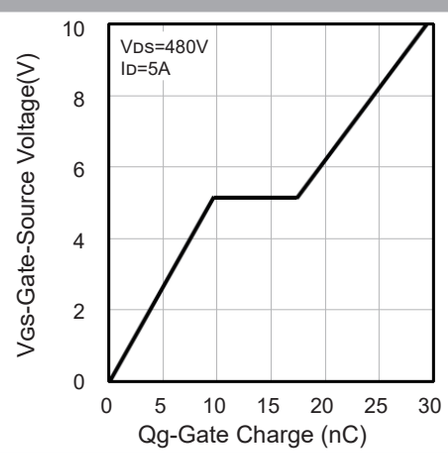
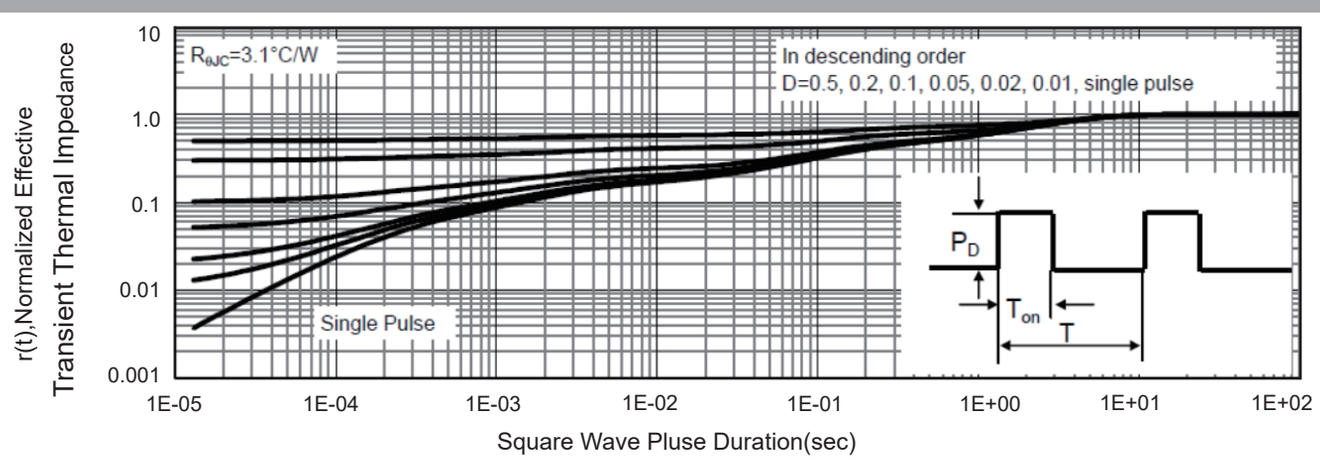
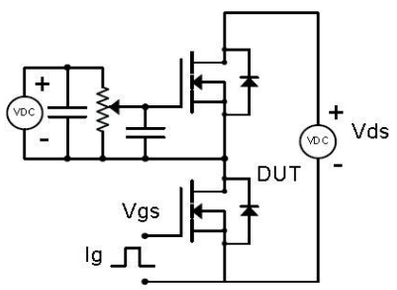


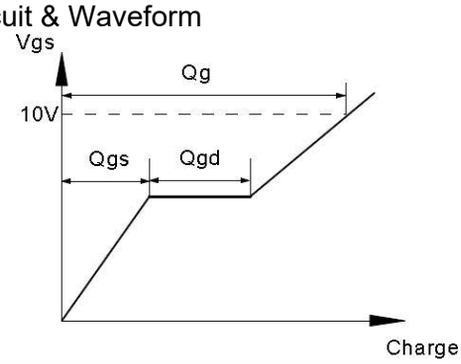
Fig 10. Safe Normalized Maximum Transient Thermal Impedance



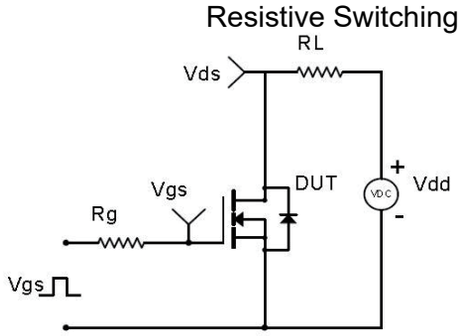
Test Circuit

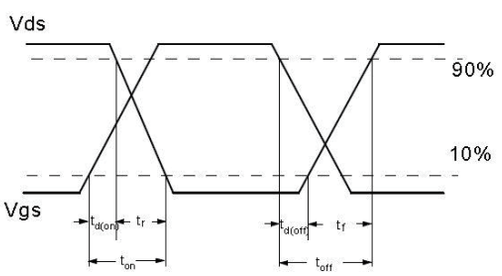
Gate Charge Test Circuit & Waveform



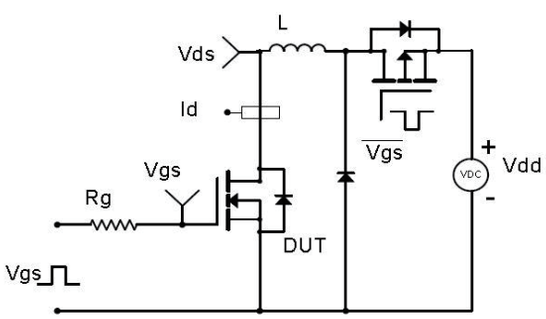


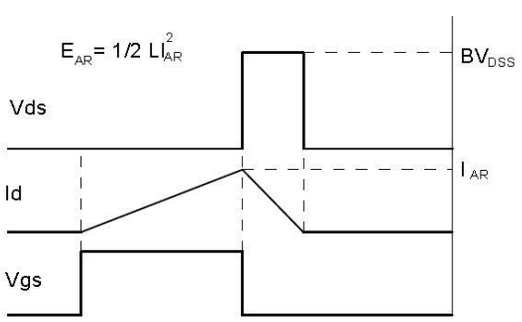
Resistive Switching Test Circuit & Wav eforms



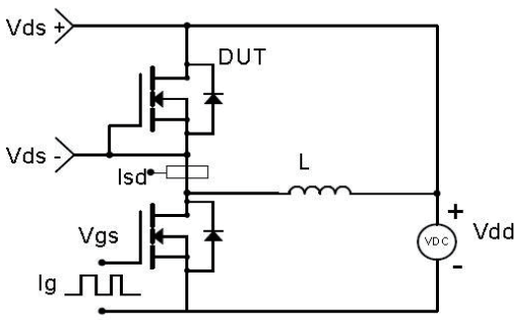


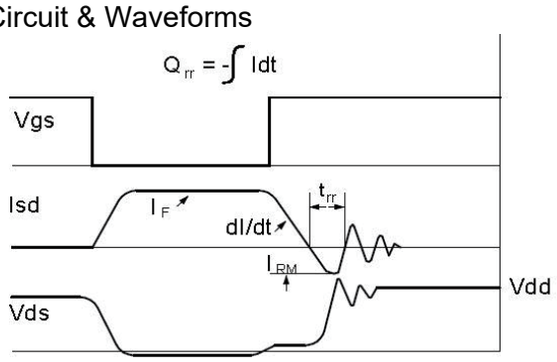
Unclamped Inductive Switching (UIS) T est Circuit & Waveforms



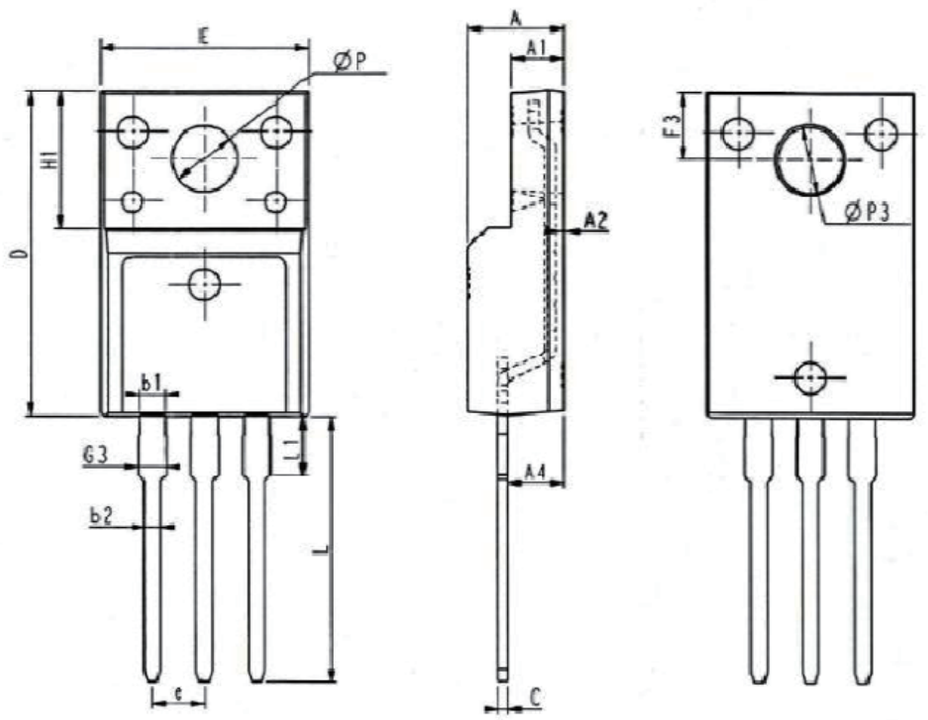


Diode Recovery Test Circuit & Waveforms





TO-220F Package Outline & Dimensions (Units: mm / in)



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min	Nom	Max	Min	Min	Max
E	9.96	10.16	10.36	0.392	0.400	0.408
A	4.50	4.70	4.90	0.177	0.185	0.193
A1	2.34	2.54	2.74	0.092	0.100	0.108
A2	0.30	0.45	0.60	0.012	0.002	0.024
A4	2.65	2.76	2.96	0.104	0.109	0.117
C	0.40	0.50	0.65	0.016	0.020	0.026
D	15.57	15.87	16.17	0.613	0.625	0.637
H1	6.70REF			0.264REF		
e	2.54BSC			0.100BSC		
ØP	3.03	3.18	3.38	0.119	0.125	0.133
L	12.68	12.98	13.28	0.499	0.511	0.523
L1	2.88	3.03	3.18	0.113	0.119	0.125
ØP3	3.150REF			0.124REF		
F3	3.15	3.30	3.45	0.124	0.130	0.136
G3	1.25	1.35	1.55	0.049	0.053	0.061
b1	1.18	1.28	1.43	0.046	0.050	0.056
b2	0.70	0.80	0.95	0.028	0.031	0.037

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