

800V 7A 1.4Ω N-ch Power MOSFET

Description

WMOS D1 is Wayon's 1st generation VDMOS family that is dramatic reduction in on-resistance and ultra-low gate charge for applications requiring high power density and high efficiency. And it is very robust and RoHS compliant.

TO-220F

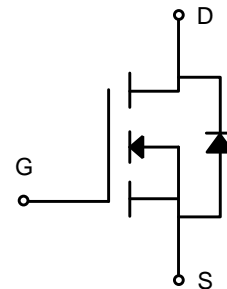


Features

- Typ. $R_{DS(on)}=1.4\Omega@V_{GS}=10V$
- 100% avalanche tested
- RoHS Compliant

Applications

- SMPS
- Charger
- DC-DC



Absolute Maximum Ratings ($T_c=25^\circ\text{C}$)

Parameter	Symbol	WML7N80D1	Unit
Drain-source voltage	V_{DSS}	800	V
Gate-source Voltage	V_{GS}	± 30	V
Continuous drain current	I_D	7	A
Pulsed draincurrent ¹	I_{DM}	28	A
Avalanche energy, single pulse ²	E_{AS}	61	mJ
Power dissipation	P_D	52	W
Derate above 25°C		0.41	W/°C
Operating junction temperature	T_j	-55~150	°C
Storage temperature	T_{stg}	-55~150	°C
Continuous diode forward current	I_S	7	A
Diode pulse current ¹	I_{Spulse}	28	A

Thermal Characteristic

Thermal resistance,junction-to-case	$R_{\theta JC}$	2.4	°C/W
Thermal resistance,junction-to-ambient	$R_{\theta JA}$	62	°C/W

Electrical Characteristics of MOSFET

				Min.	Typ.	Max.	
Drain-source breakdown Voltage	BV_{DSS}	$I_D=250\mu A, V_{GS}=0V$	$T_C=25^\circ C$	800	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$I_D=250\mu A, V_{DS}=V_{GS}$	$T_J=25^\circ C$	2	-	4	V
Drain-source leakage current	I_{DSS}	$V_{DS}=800V, V_{GS}=0V$	$T_J=25^\circ C$	-	-	1	μA
		$V_{DS}=640V, V_{GS}=0V$	$T_J=125^\circ C$	-	-	100	μA
Gate-source leakage current,forward	I_{GSSF}	$V_{DS}=0V, V_{GS}=30V$	$T_J=25^\circ C$	-	-	100	nA
Gate-source leakage current,reverse	I_{GSSR}	$V_{DS}=0V, V_{GS}=-30V$	$T_J=25^\circ C$	-	-	-100	nA
Drain-source on-state resistance ³	$R_{DS(ON)}$	$V_{GS}=10V, I_D=3.5A$	$T_J=25^\circ C$	-	1.4	1.6	Ω
Transconductance ³	G_{fs}	$V_{DS}=20V, I_D=3A$	$T_J=25^\circ C$	-	5	-	S

Dynamic Characteristics of MOSFET ($T_C=25^\circ C$)

				Min.	Typ.	Max.	
Input capacitance	C_{iss}	$f=1MHz, V_{DS}=25V, V_{GS}=0V$		-	1080	-	pF
Output capacitance	C_{oss}			-	100	-	pF
Reverse transfer capacitance	C_{rss}			-	6	-	pF
Gate to source charge	Q_{gs}	$V_{DD}=500V$		-	6	-	nC
Gate to drain charge	Q_{gd}	$I_D=7A$		-	7	-	nC
Total gate charge	Q_g	$V_{GS}=0$ to 10V		-	23	-	nC

Switching Characteristics of MOSFET ($T_C=25^\circ C$)

				Min.	Typ.	Max.	
Turn-on delay time	t_{don}	$V_{DS}=500V, I_D=7A, R_C=4.7\Omega, V_{GS}=0$ to 10V		-	18	-	ns
Rise time	t_r			-	26	-	ns
Turn-off delay time	t_{doff}			-	68	-	ns
Fall time	t_f			-	27	-	ns

Characteristics of Body Diode ($T_C=25^\circ C$)

				Min.	Typ.	Max.	
Forward voltage	V_{SD}	$I_{SD}=7A, V_{GS}=0V$		-	-	1.5	V
Reverse recovery time	t_{rr}	$V_{DS}=500V, I_F=7A,$		-	410	-	ns
Reverse recovery current	I_{rr}	$V_{GS}=0V$		-	19	-	A
Recovery charge	Q_{rr}	$-di/dt=100A/\mu s$		-	3.9	-	μC

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}=150^\circ C$.
2. The E_{AS} data shows Max. rating . The test condition is $V_{DD}=50V, V_{GS}=10V, L=10mH, I_{AS}=3.5A, T_C=25^\circ C$.
3. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

TYPICAL CHARACTERISTICS

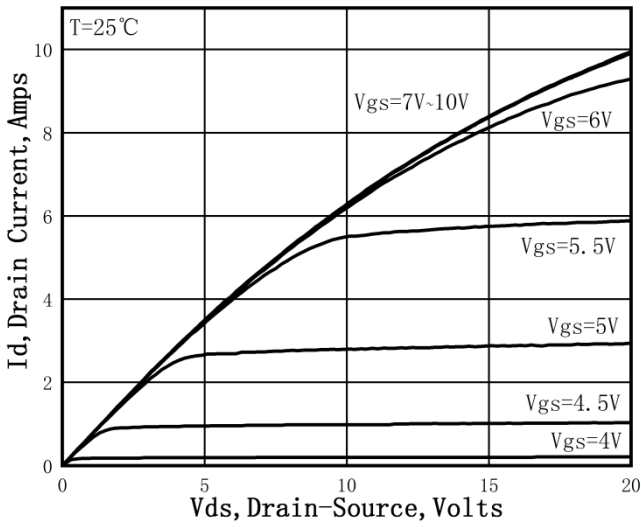


Figure 1. On-Region Characteristics

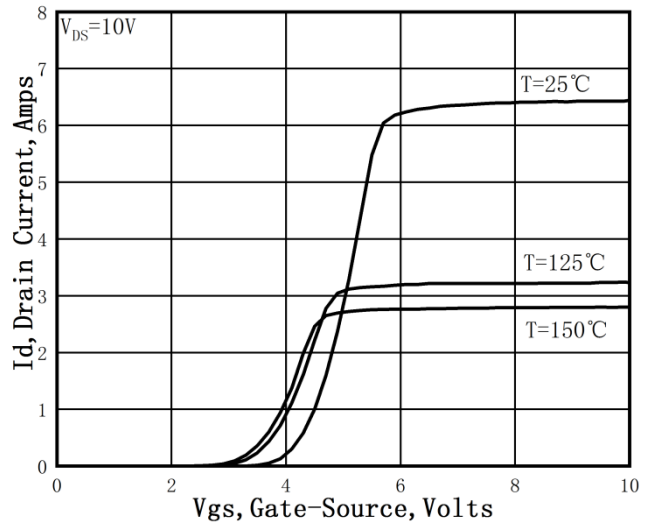


Figure 2. Transfer Characteristics

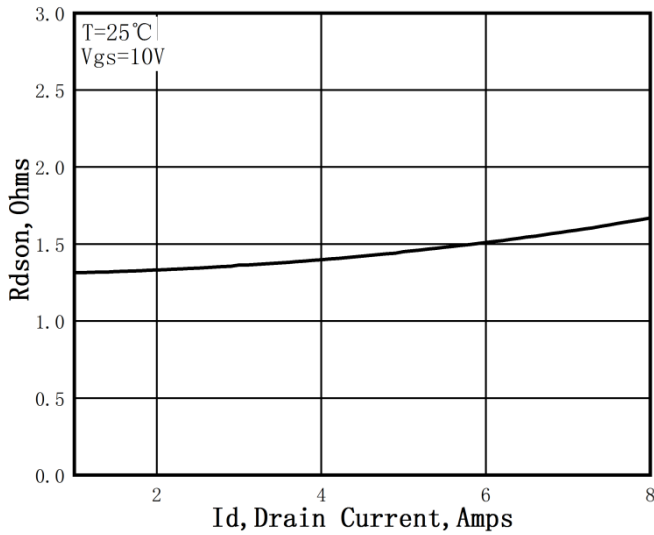


Figure 3. Static Drain-Source On Resistance

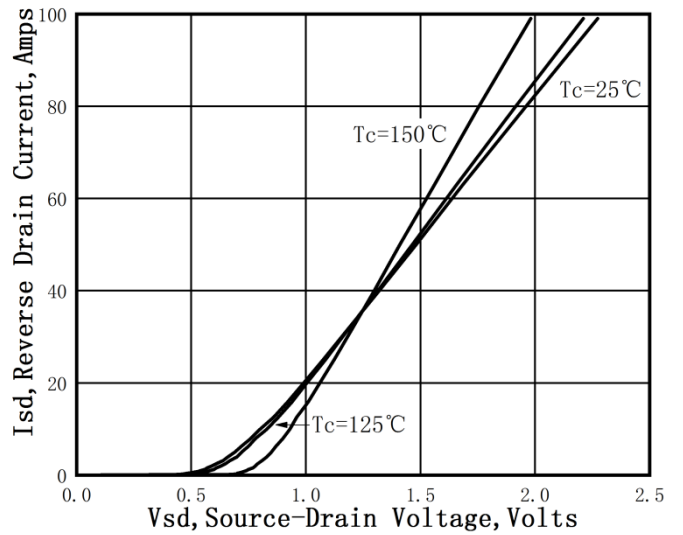


Figure 4. Typical Body Diode Transfer Characteristics

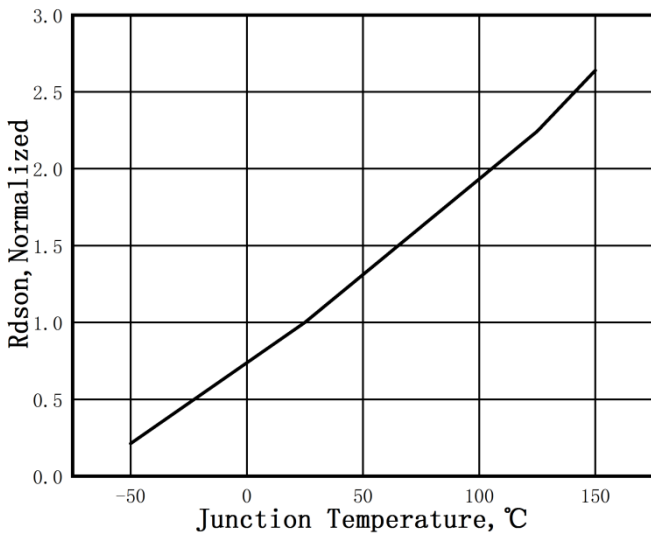


Figure 5. Normalized $R_{DS(on)}$ vs. Temperature

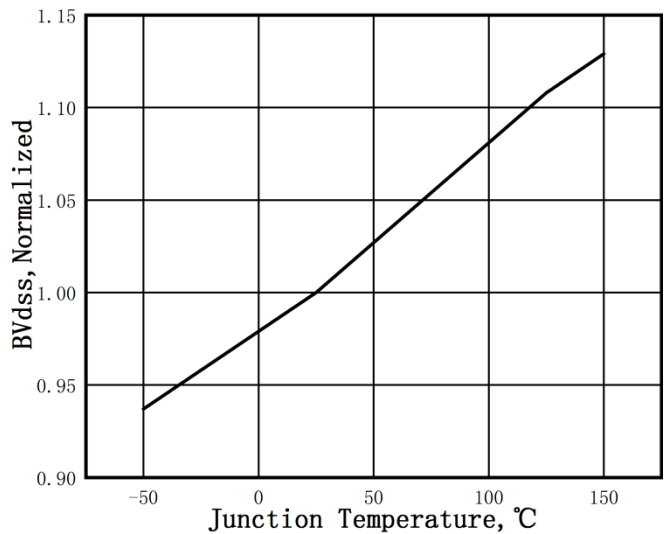


Figure 6. Normalized BV_{DSS} vs. Temperature

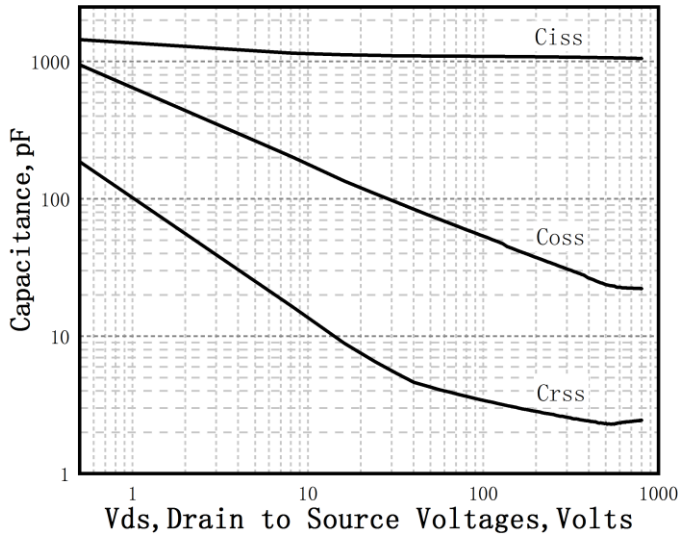


Figure 7. Capacitance Characteristics

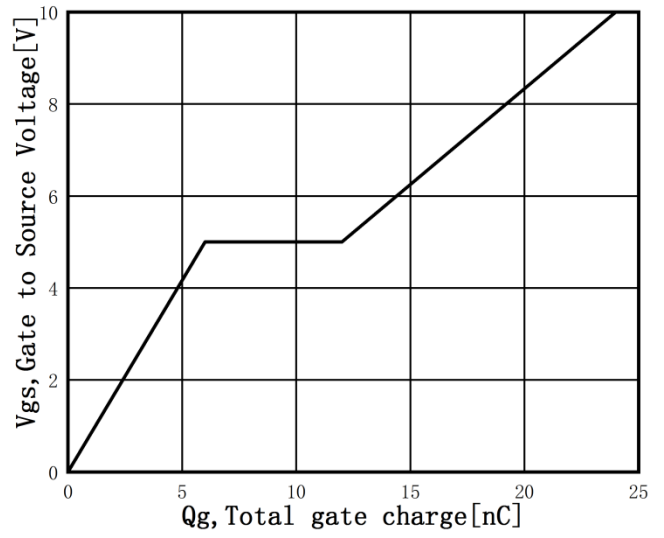


Figure 8. Gate Charge Characteristics

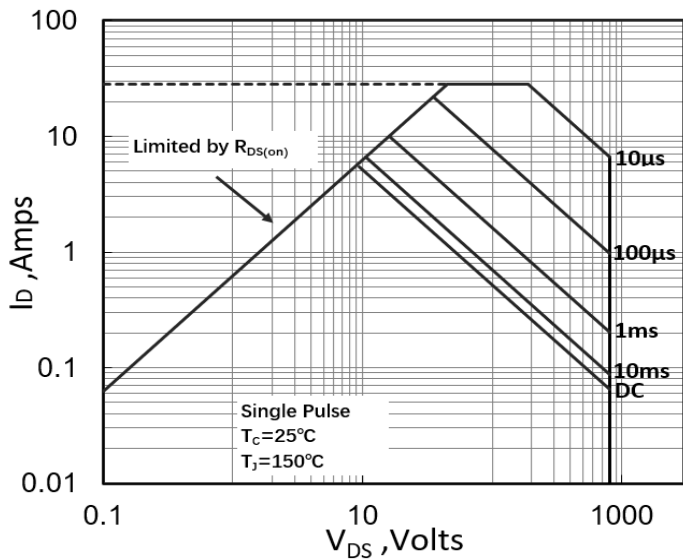


Figure 9. Maximum Safe Operating Area (TO-220F)

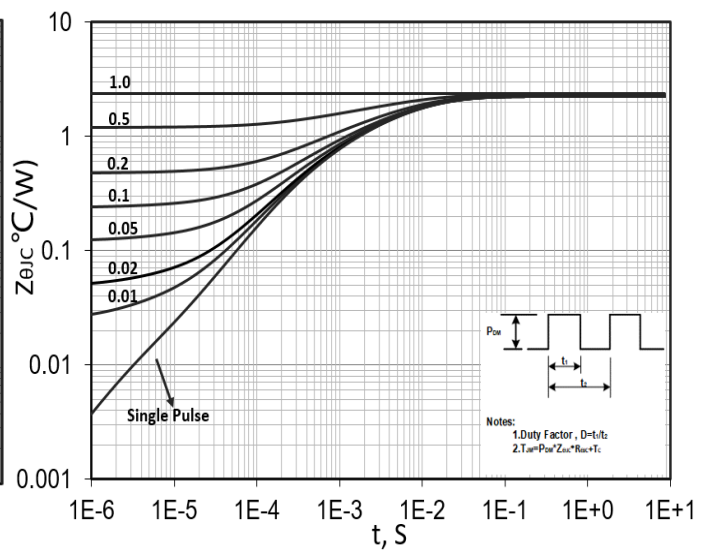
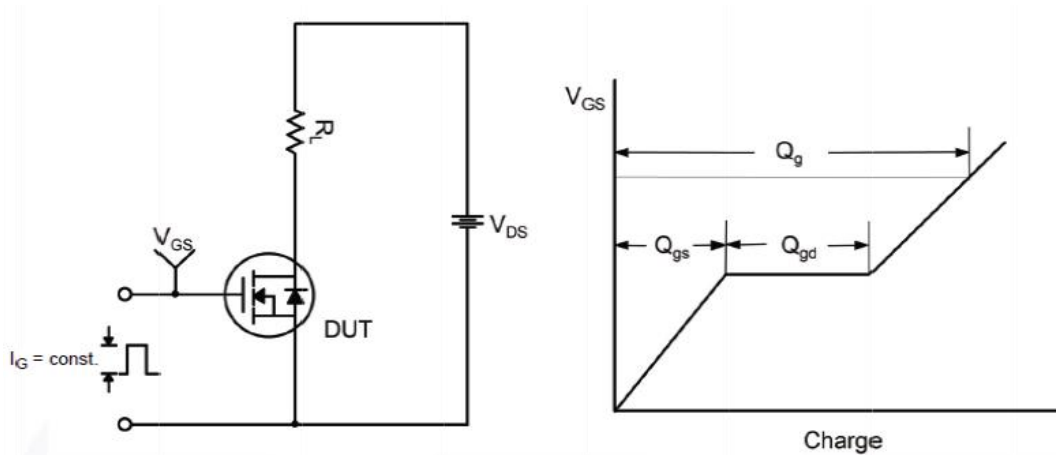


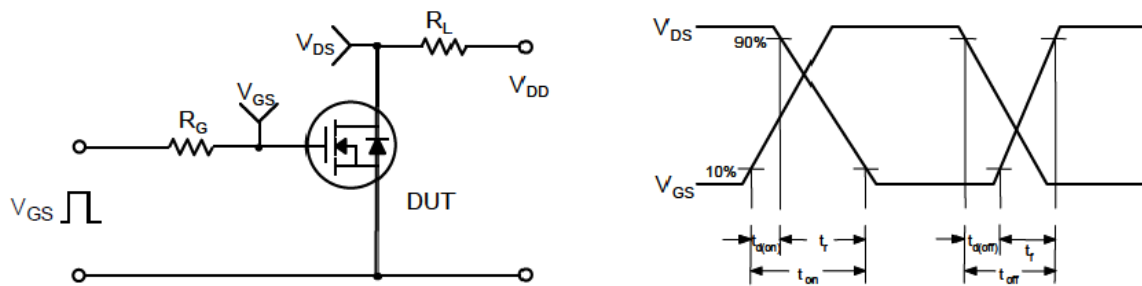
Figure 10. Transient Thermal Response Curve (TO-220F)

Test Circuit

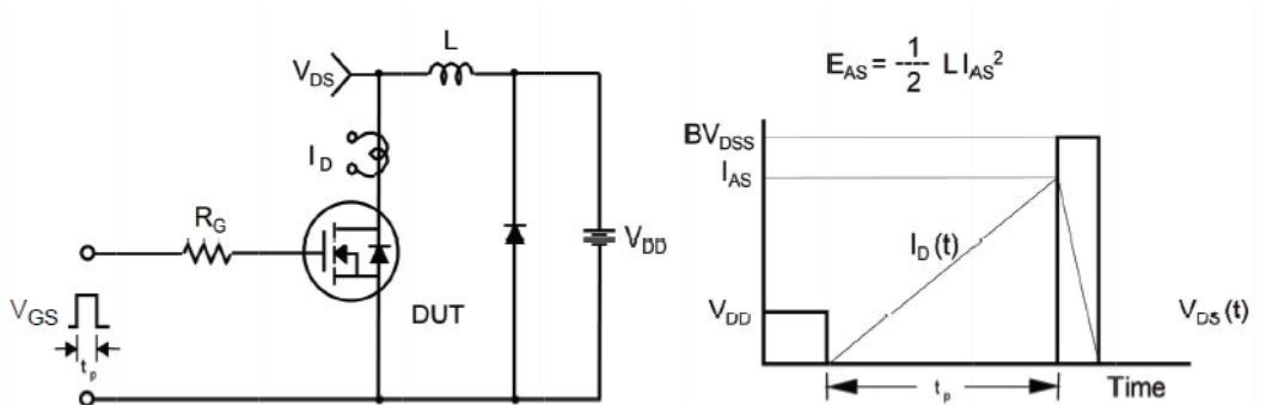
Gate Charge Test Circuit & Waveform



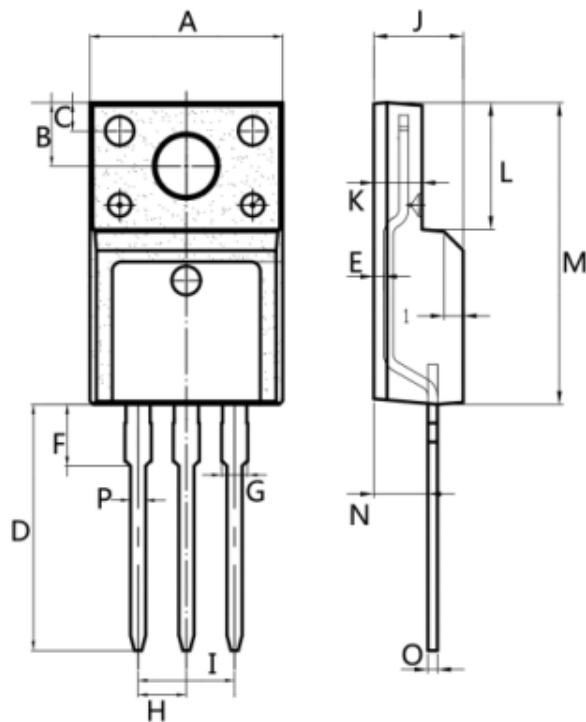
Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



Mechanical Dimensions for TO-220F



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	9.95	10.36
B	2.95	3.55
C	1.25	1.6
D	12.64	13.5
E	0.40	0.60
F	2.80	3.80
G	1.14	1.58
H	2.44	2.64
I	4.88	5.26
J	4.50	4.90
K	2.34	2.80
L	6.48	6.90
M	15.40	16.07
N	2.66	3.50
O	0.40	0.64
P	0.70	0.94

Ordering Information

Part	Package	Marking	Packing method
WML7N80D1	TO-220F	WML7N80D1	Tube


Contact Information

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