

## 800V 27A 0.28Ω N-ch Power MOSFET

### Description

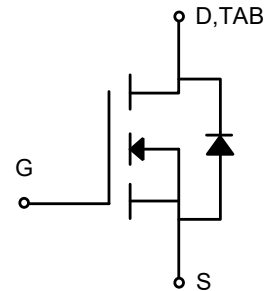
WMOS™ D1 is Wayon's 1<sup>st</sup> generation VDMOS family that is dramatic reduction in on-resistance and ultra-low gate charge for applications requiring high power density and high efficiency. And it is very robust and RoHS compliant.

### Features

- Typ. $R_{DS(on)}=0.28\Omega@V_{GS}=10V$
- 100% avalanche tested
- Pb-free, Halogen free

### Applications

- SMPS
- Charger
- DC-DC



### Absolute Maximum Ratings (T<sub>c</sub>=25°C)

Parameter	Symbol	WMJ10N100D1	Unit
Drain-source voltage	V <sub>DSS</sub>	800	V
Gate-source voltage	V <sub>GS</sub>	±30	V
Continuous drain current	I <sub>D</sub>	27	A
Pulsed drain current	I <sub>DM</sub>	108	A
Avalanche energy, single pulse	E <sub>AS</sub>	4200	mJ
Power dissipation	P <sub>D</sub>	650	W
Derate above 25°C		5.2	W/°C
Operating junction temperature	T <sub>j</sub>	-55~150	°C
Storage temperature	T <sub>stg</sub>	-55~150	°C
Continuous diode forward current	I <sub>S</sub>	27	A
Diode pulse current	I <sub>Spulse</sub>	108	A

### Thermal Characteristic

Thermal resistance,junction-to-case	R <sub>θJC</sub>	0.192	°C/W
Thermal resistance,junction-to-ambient	R <sub>θJA</sub>	55	°C/W

### Electrical Characteristics of MOSFET

				Min.	Typ.	Max.	
Drain-source break down voltage	$BV_{DSS}$	$I_D=250\mu A, V_{GS}=0V$	$T_C=25^\circ C$	800	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$I_D=250\mu A, V_{DS}=V_{GS}$	$T_J=25^\circ C$	2.5	-	4.5	V
Drain-source leakage current	$I_{DSS}$	$V_{DS}=800V, V_{GS}=0V$	$T_J=25^\circ C$	-	-	1	$\mu A$
		$V_{DS}=640V, V_{GS}=0V$	$T_J=125^\circ C$	-	-	250	$\mu A$
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	$R_{DS(ON)}$	$V_{GS}=10V, I_D=13.5A$	$T_J=25^\circ C$	-	0.28	0.35	$\Omega$
Transconductance	$G_{fs}$	$V_{DS}=10V$	$T_J=25^\circ C$	-	18	-	S

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

				Min.	Typ.	Max.	
Input capacitance	$C_{iss}$	$f=1MHz, V_{DS}=25V, V_{GS}=0V$		-	7300	-	pF
Output capacitance	$C_{oss}$			-	650	-	pF
Reverse transfer capacitance	$C_{rss}$			-	33	-	pF
Gate to source charge	$Q_{gs}$	$V_{DD}=400V$		-	40	-	nC
Gate to drain charge	$Q_{gd}$	$I_D=13A$		-	60	-	nC
Total gate charge	$Q_g$	$V_{GS}=0$ to 10V		-	180	-	nC

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

				Min.	Typ.	Max.	
Turn-on delay time	$t_{d on}$	$V_{DS}=400V, I_D=13A,$ $R_G=10\Omega, V_{GS}=0$ to 10V		-	55	-	ns
Rise time	$t_r$			-	100	-	ns
Turn-off delay time	$t_{d off}$			-	80	-	ns
Fall time	$t_f$			-	95	-	ns

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

				Min.	Typ.	Max.	
Forward voltage	$V_{SD}$	$I_{SD}=27A, V_{GS}=0V$		-	-	1.5	V
Reverse recovery time	$t_{rr}$	$V_{DS}=400V, I_S=27A, V_{GS}=10V$ $di/dt=100A/us$		-	900	-	ns
Reverse recovery current	$I_{rr}$			-	4.4	-	A
Recovery charge	$Q_{rr}$			-	2	-	$\mu C$

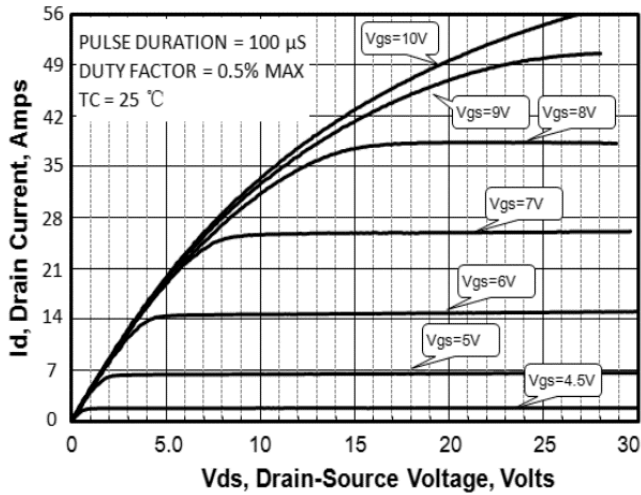


Figure 1. On-Region Characteristics

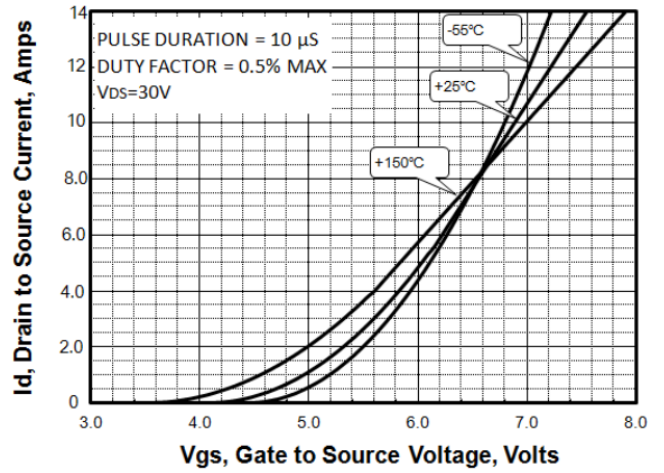


Figure 2. Transfer Characteristics

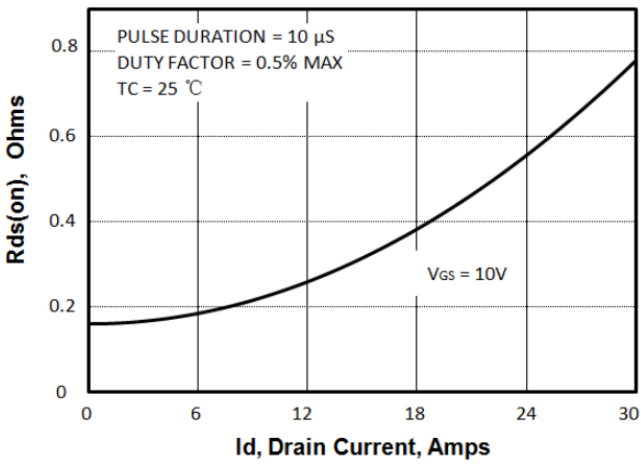


Figure 3. Static Drain-Source On Resistance

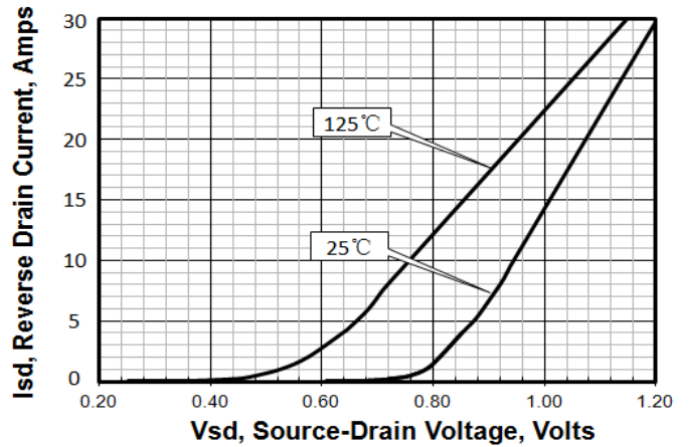


Figure 4. Typical Body Diode Transfer Characteristics

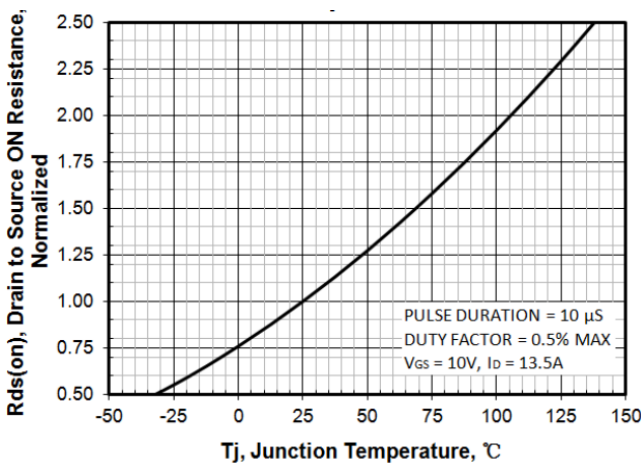


Figure 5. Normalized  $R_{DS(on)}$  vs. Temperature

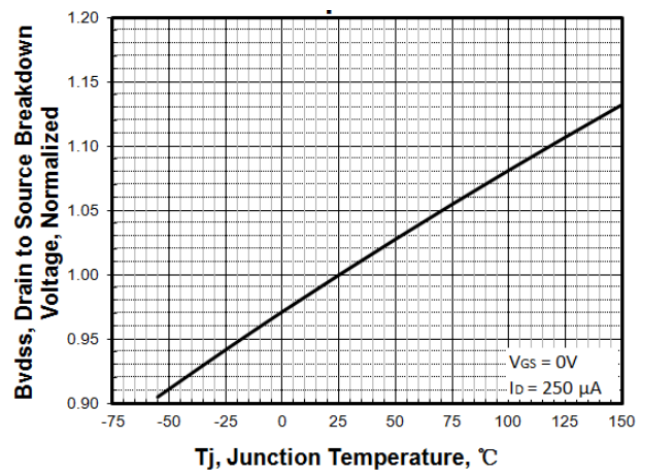


Figure 6. Normalized  $BV_{DSS}$  vs. Temperature

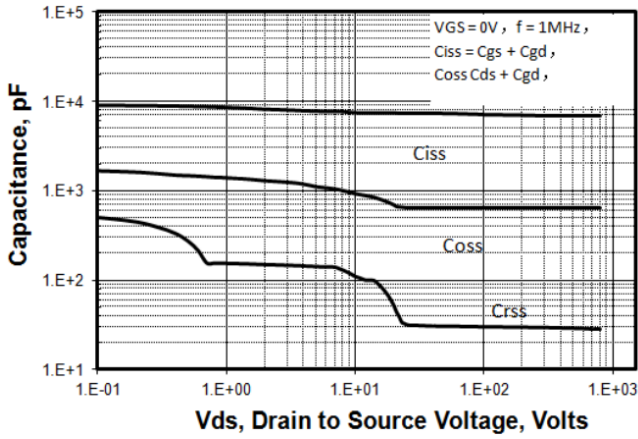


Figure 7. Capacitance Characteristics

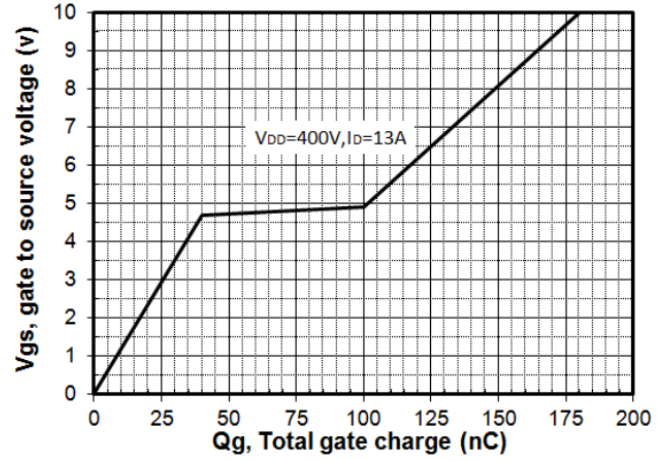


Figure 8. Gate Charge Characteristics

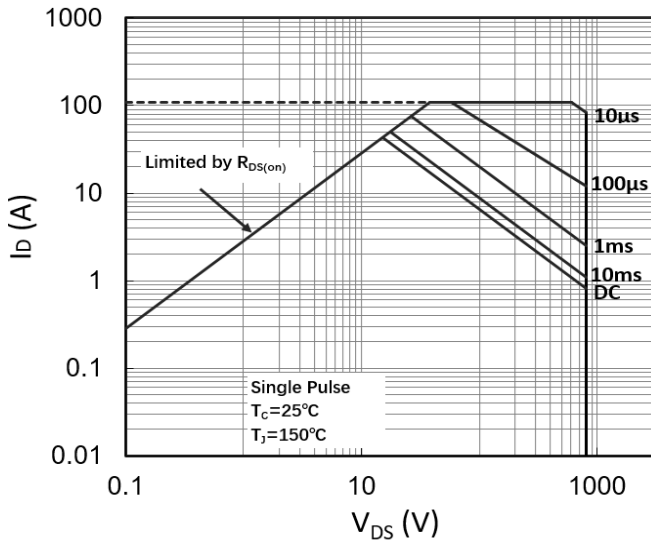


Figure 9. Maximum Safe Operating Area (TO-247)

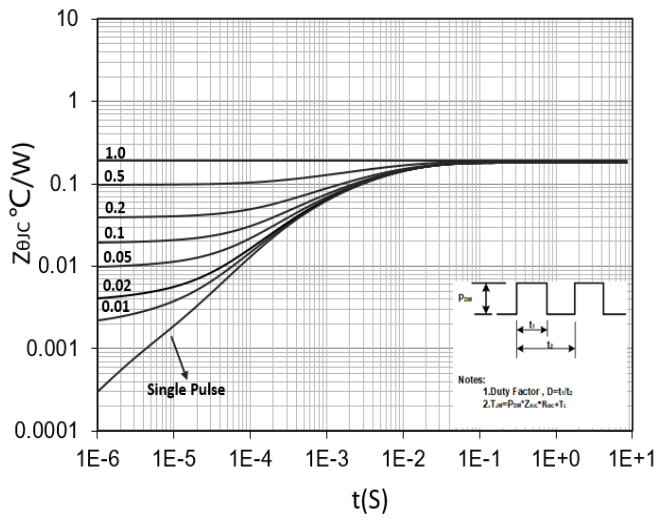
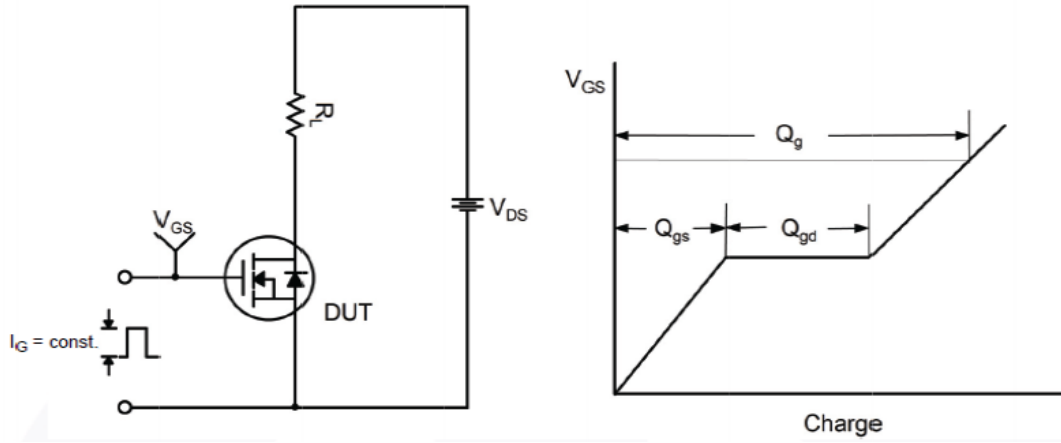
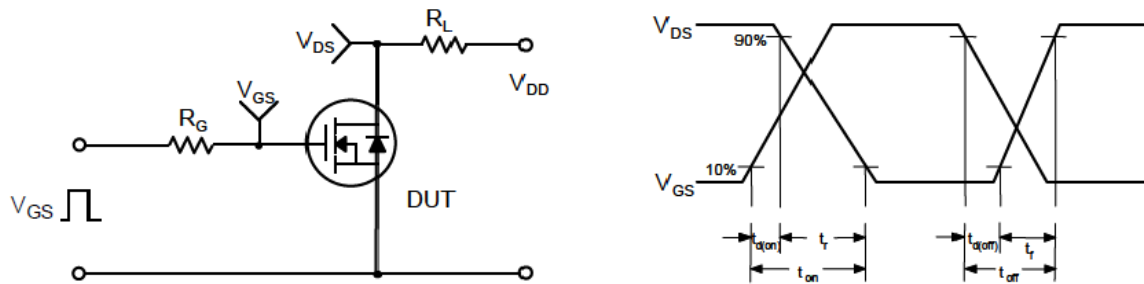


Figure 10. Transient Thermal Response Curve (TO-247)

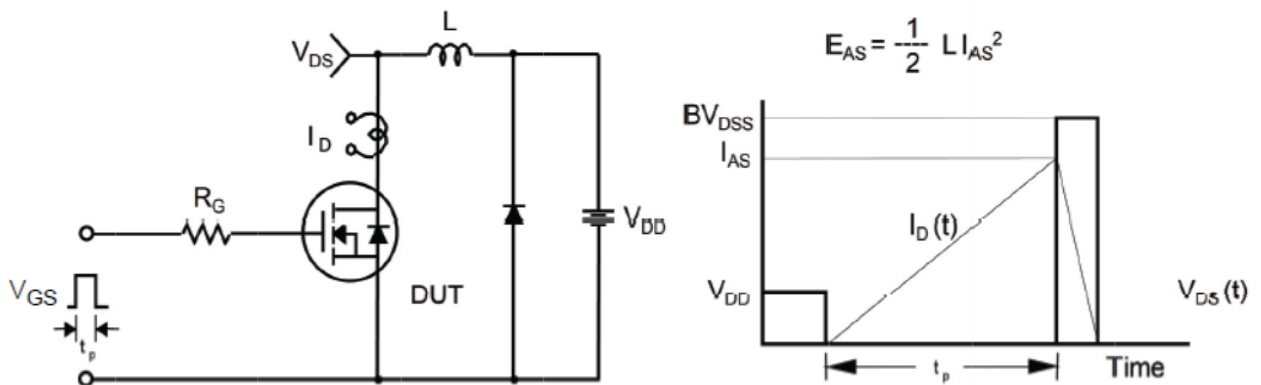
Gate Charge Test Circuit & Waveform



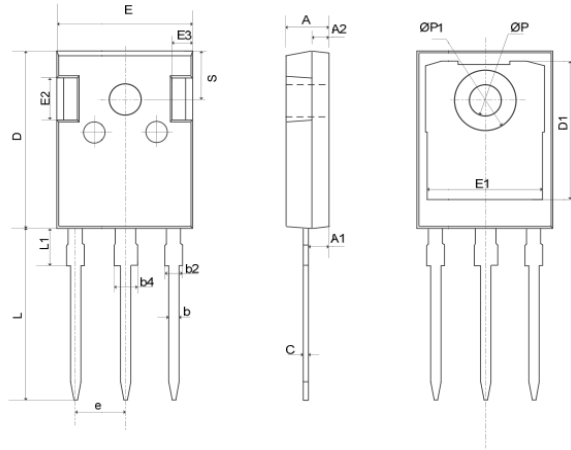
Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



## Mechanical Dimensions for TO-247



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	4.80	5.20
A1	2.21	2.61
A2	1.85	2.15
b	1.11	1.36
b2	1.91	2.21
b4	2.91	3.21
c	0.51	0.75
D	20.70	21.30
D1	16.25	16.85
E	15.50	16.10
E1	13.00	13.60
E2	4.80	5.20
E3	2.30	2.70
e	5.44BSC	
L	19.62	20.22
L1	—	4.30
ØP	3.40	3.80
ØP1	—	7.30
S	6.15BSC	

## Ordering Information

Part	Package	Marking	Packing method
WMJ27N80D1	TO-247	WMJ27N80D1	Tube

## Contact Information

No.1001, Shiwan(7) Road, Pudong District, Shanghai, P.R.China.201202

Tel: 86-21-50310888 Fax: 86-21-50757680 Email: [market@way-on.com](mailto:market@way-on.com)

WAYON website: <http://www.way-on.com>

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