

650V 9A 0.85Ω N-ch Power MOSFET

Description

WMOST[™] 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-252

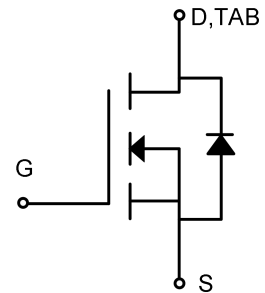


Features

- Typ. $R_{DS(on)}=0.85\Omega@V_{GS}=10V$
- 100% avalanche tested
- Pb-free, Halogen free

Applications

- SMPS
- Charger
- DC-DC



Absolute Maximum Ratings (T_c=25°C)

Parameter	Symbol	WMO9N65D1	Unit
Drain-source voltage	V _{DSS}	650	V
Gate-source voltage	V _{GS}	±30	V
Continuous drain current	I _D	9	A
Pulsed drain current	I _{DM}	36	A
Avalanche energy, single pulse	E _{AS}	802	mJ
Power dissipation	P _D	150	W
Derate above 25°C		1.2	W/°C
Operating junction temperature	T _j	-55~150	°C
Storage temperature	T _{stg}	-55~150	°C
Continuous diode forward current	I _S	9	A
Diode pulse current	I _{Spulse}	36	A

Thermal Characteristic

Thermal resistance,junction-to-case	R _{θJC}	0.83	°C/W
Thermal resistance,junction-to-ambient	R _{θJA}	62.5	°C/W

Electrical Characteristics of MOSFET

				Min.	Typ.	Max.	
Drain-source break down voltage	BV_{DSS}	$I_D=250\mu A, V_{GS}=0V$	$T_C=25^\circ C$	650	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$I_D=250\mu A, V_{DS}=V_{GS}$	$T_J=25^\circ C$	2	3	4	V
Drain-source leakage current	I_{DSS}	$V_{DS}=650V, V_{GS}=0V$	$T_J=25^\circ C$	-	-	1	μA
		$V_{DS}=520V, V_{GS}=0V$	$T_J=125^\circ C$	-	-	100	μA
Gate-source leakage current,forward	I_{GSSF}	$V_{DS}=0V, V_{GS}=30V$	$T_J=25^\circ C$	-	-	100	μA
Gate-source leakage current,reverse	I_{GSSR}	$V_{DS}=0V, V_{GS}=-30V$	$T_J=25^\circ C$	-	-	-100	μA
Drain-source on-state resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=4.5A$	$T_J=25^\circ C$	-	0.85	0.95	Ω
Transconductance	G_{fs}	$V_{DS}=10V$	$T_J=25^\circ C$	-	5.8	-	S

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

				Min.	Typ.	Max.	
Input capacitance	C_{iss}	$f=1MHz, V_{DS}=25V, V_{GS}=0V$		-	1020	-	pF
Output capacitance	C_{oss}			-	118	-	pF
Reverse transfer capacitance	C_{rss}			-	13	-	pF
Gate to source charge	Q_{gs}	$V_{DD}=560V$		-	7	-	nC
Gate to drain charge	Q_{gd}	$I_D=9A$		-	15	-	nC
Total gate charge	Q_g	$V_{GS}=0$ to 10V		-	30	-	nC

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

				Min.	Typ.	Max.	
Turn-on delay time	$t_{d on}$	$V_{DS}=320V, I_D=9A, R_G=25\Omega,$ $V_{GS}=0$ to 10V		-	20	-	ns
Rise time	t_r			-	35	-	ns
Turn-off delay time	$t_{d off}$			-	50	-	ns
Fall time	t_f			-	35	-	ns

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

				Min.	Typ.	Max.	
Forward voltage	V_{SD}	$I_{SD}=9A, V_{GS}=0V$		-	-	1.4	V
Reverse recovery time	t_{rr}	$V_{DS}=320V, I_S=9A, V_{GS}=10V$ $-di/dt=100A/us$		-	500	-	ns
Reverse recovery current	I_{rr}			-	18	-	A
Recovery charge	Q_{rr}			-	4.5	-	μC

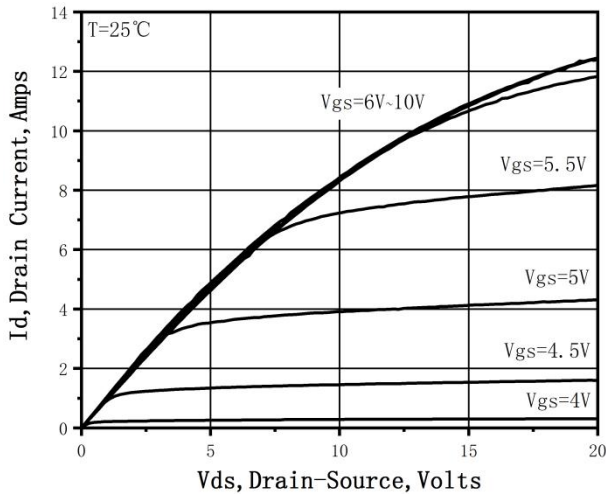


Figure 1. On-Region Characteristics

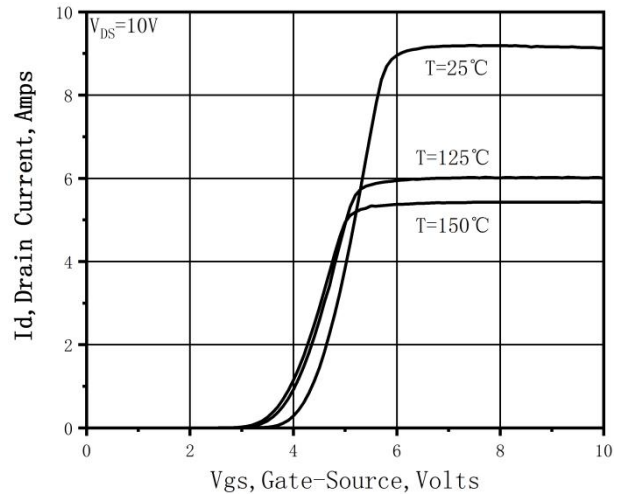


Figure 2. Transfer Characteristics

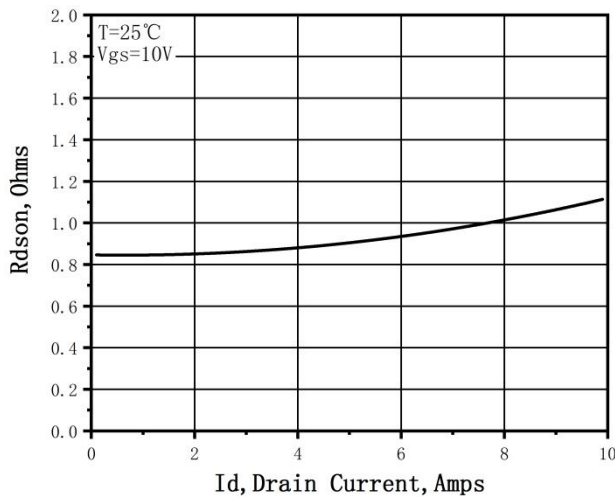


Figure 3. Static Drain-Source On Resistance

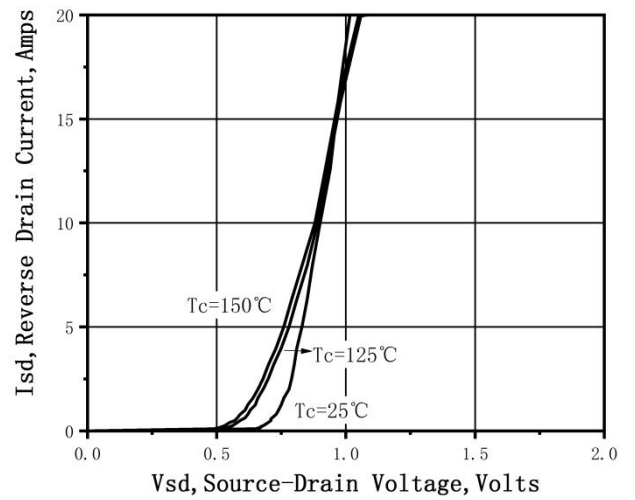


Figure 4. Typical Body Diode Transfer Characteristics

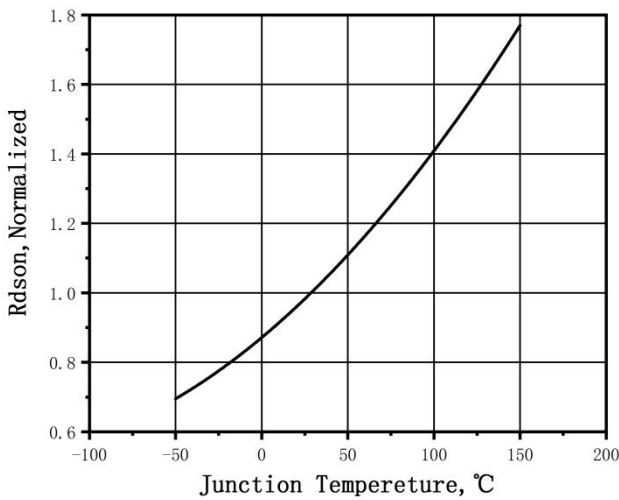


Figure 5. Normalized $R_{DS(on)}$ vs. Temperature

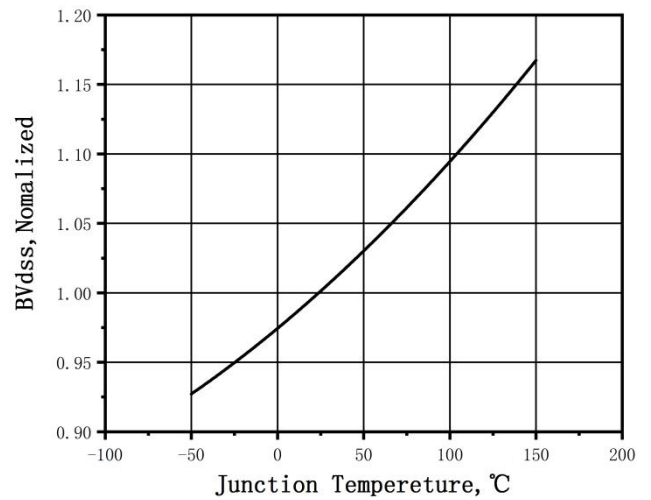


Figure 6. Normalized BV_{DSS} vs. Temperature

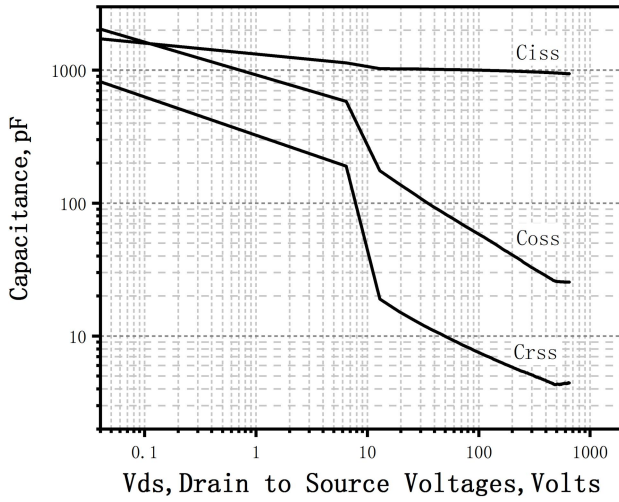


Figure 7. Capacitance Characteristics

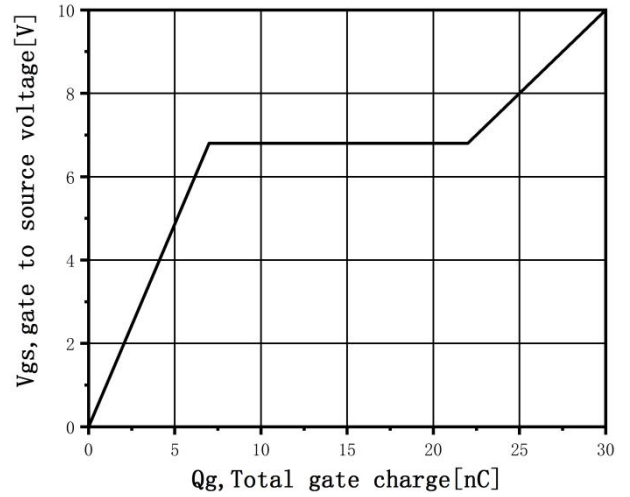


Figure 8. Gate Charge Characteristics

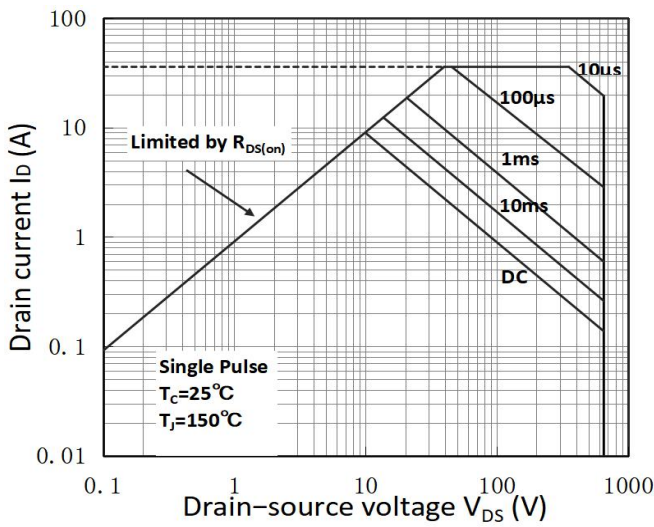
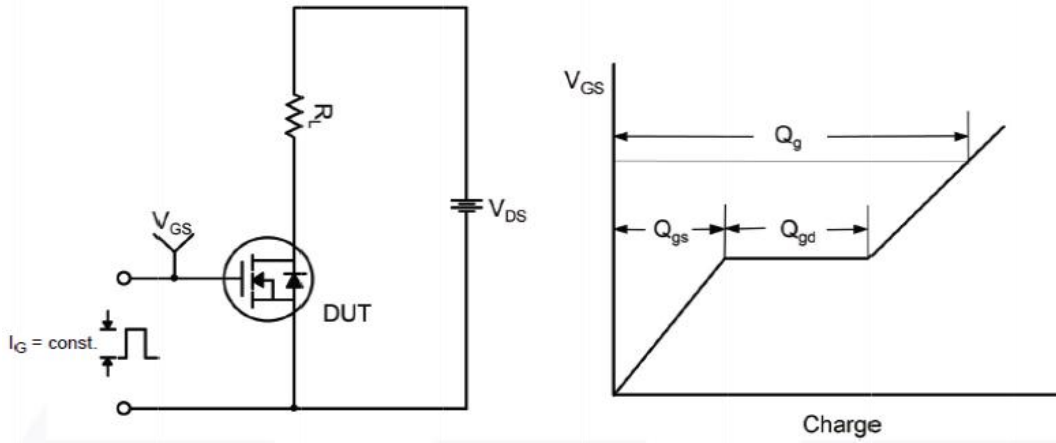
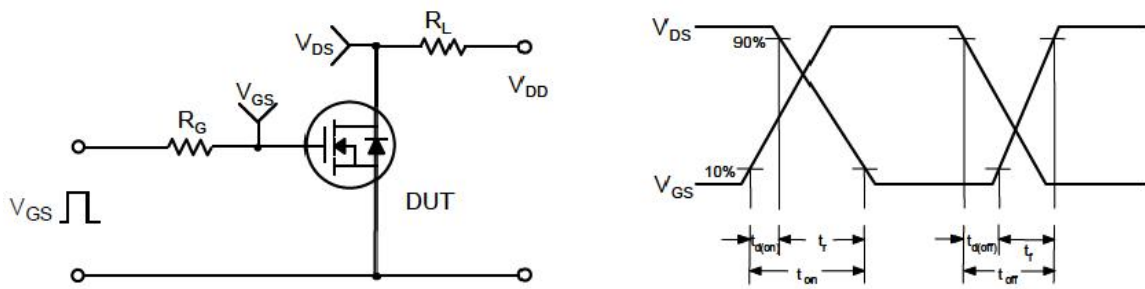


Figure 9. Maximum Safe Operating Area

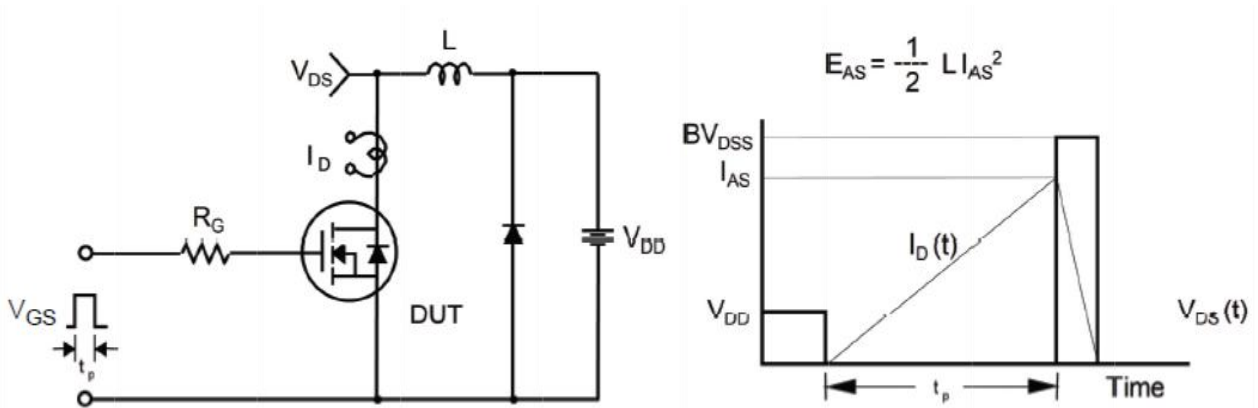
Gate Charge Test Circuit & Waveform



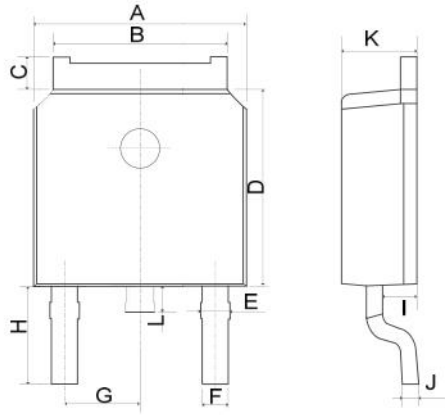
Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



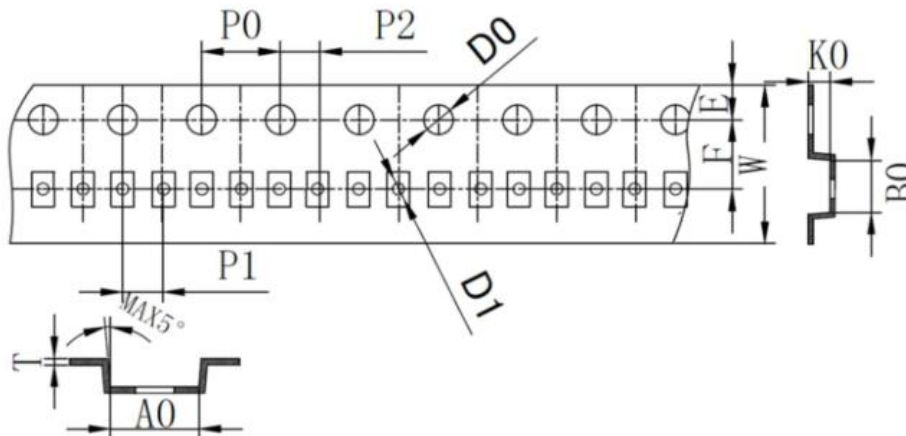
Mechanical Dimensions for TO-252



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	6.40	6.80
B	5.13	5.50
C	0.88	1.28
D	5.90	6.22
E	0.68	1.10
F	0.68	0.91
G	2.29REF	
H	2.90REF	
I	0.85	1.17
J	0.51REF	
K	2.10	2.50
L	0.40	1.00

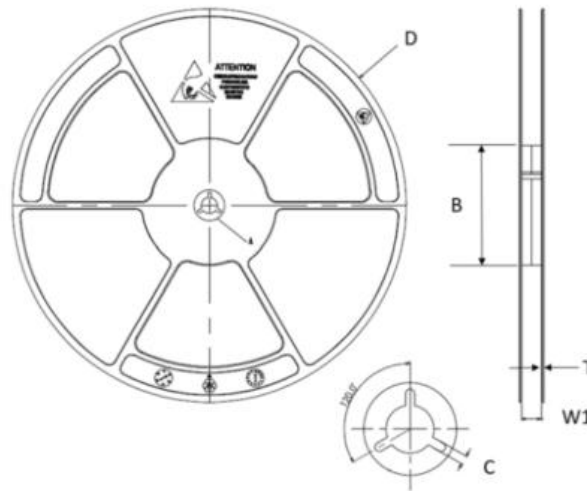
Packaging mechanical data(Tape for TO-252)



单位: mm

A0	B0	K0	D0	D1	P0
6.80~7.00	10.4~10.85	2.55~2.95	1.45~1.65	1.40~1.60	3.90~4.10
P1	P2	W	T	E	F
7.90~8.10	1.90~2.10	15.70~16.30	0.25~0.35	1.65~1.85	7.40~7.60

Packaging mechanical data(Reel for TO-252)



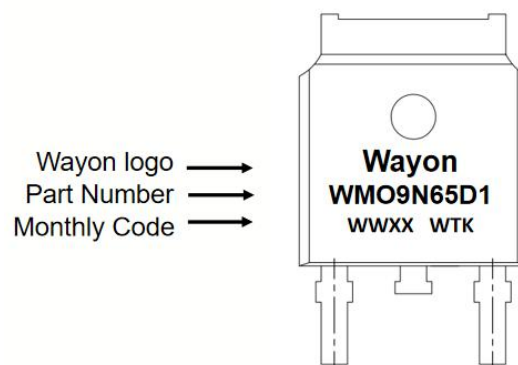
单位: mm

D (卷盘直径)	W1 (卷盘宽度)	T (厚度)	B (内圈直径)	C 卡槽宽度
328~332	16.4~18.4	1.5~3.1	98~102	1.8~3.6

Ordering Information

Part	Package	Marking	Packing method
WMO9N65D1	TO-252	WMO9N65D1	Tape and reel

Marking Information



Contact Information

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