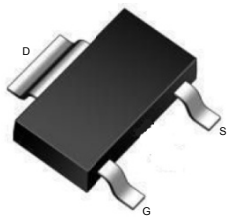
700V 1.2Ω Zener-protected Power MOSFET

Description

WMOS^{TM} MM is Wayon's new generation super junction MOSFET family that is utilizing charge balance technology for extremely low on-resistance and low gate charge performance. WMOS^{TM} MM is suitable for applications which require superior power density and outstanding efficiency.

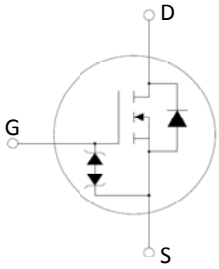


SOT-223-2L

Features

- V_{DS} =750V @ $T_{j,max}$
- Typ. $R_{DS(on)}$ =1.2Ω
- Ultra low gate charge (Typ. Q_g = 5.3nC)
- Zener-protected

RoHS compliant



Application

LED Lighting, Charger, Adapter, PC, LCD TV

Absolute Maximum Ratings

Parameter	Symbol	WMF05N70MM	Unit
Drain-Source Voltage	V_{DSS}	700	V
Continuous drain current [1] (T_C = 25°C)	I_D	5.4	A
(T_C = 100°C)		3.2	A
Pulsed drain current[2]	I_{DM}	8.8	A
Gate-Source voltage	V_{GSS}	±30	V
Avalanche energy, single pulse[3]	E_{AS}	35	mJ
Avalanche energy, repetitive	E_{AR}	0.1	mJ
Avalanche current, repetitive	I_{AR}	0.6	A
Power Dissipation (T_C = 25°C)	P_D	5	W
- Derate above 25°C		0.04	W/°C
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C
Continuous diode forward current[1]	I_S	5.4	A
Diode pulse current[2]	$I_{S,pulse}$	8.8	A

Thermal Characteristics

Parameter	Symbol	WMF05N70MM	Unit
Thermal Resistance, Junction-to-Solder point	$R_{\theta JS}$	24	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	75	°C/W

Electrical Characteristics T_c = 25°C unless otherwise noted

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0 V, I_D=0.25 mA	700	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=0.25mA	2.5	3.5	4.5	V
Drain cut-off current	I_{DSS}	V_{DS}=700 V, V_{GS}=0 V,				μA
		T_j = 25°C	-	-	1	
		T_j = 125°C	-	80	-	
Gate leakage current, Forward	I_{GSSF}	V_{GS}=20 V, V_{DS}=0 V	-	-	1	μA
Gate leakage current, Reverse	I_{GSSR}	V_{GS}=-20 V, V_{DS}=0 V	-	-	-1	μA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=0.8A	-			
		T_j = 25°C	-	1.2	1.55	Ω
Dynamic characteristics						
Input capacitance	C_{iss}	V_{DS}= 100 V, V_{GS}= 0 V,	-	227	-	
Output capacitance	C_{oss}	f = 1 MHz	-	11	-	pF
Reverse transfer capacitance	C_{rss}		-	0.9	-	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 300V, I_D = 2A	-	8	-	
Rise time	t_r	R_G = 25Ω, V_{GS}=10V	-	23	-	ns
Turn-off delay time	$t_{d(off)}$		-	49	-	
Fall time	t_f		-	18	-	
Gate charge characteristics						
Gate to source charge	Q_{gs}	V_{DD}=480 V, I_D=2A,	-	1.3	-	
Gate to drain charge	Q_{gd}	V_{GS}=0 to 10 V	-	2.1	-	nC
Gate charge total	Q_g		-	5.3	-	
Gate plateau voltage	$V_{plateau}$		-	5	-	V
Reverse diode characteristics						
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=1A	-	-	1.2	V
Reverse recovery time	t_{rr}	V_R=50 V, I_F=2A,	-	135	-	ns
Reverse recovery charge	Q_{rr}	dI_F/dt=100 A/μs	-	0.65	-	μC
Peak reverse recovery current	I_{rrm}		-	7.5	-	A

Notes:

1. DPAK equivalent. Limited by $T_{J\,max}$. Maximum duty cycle D=0.5

2. Pulse width t_p limited by $T_{J\,max}$

3. I_{AS} = 0.6A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C

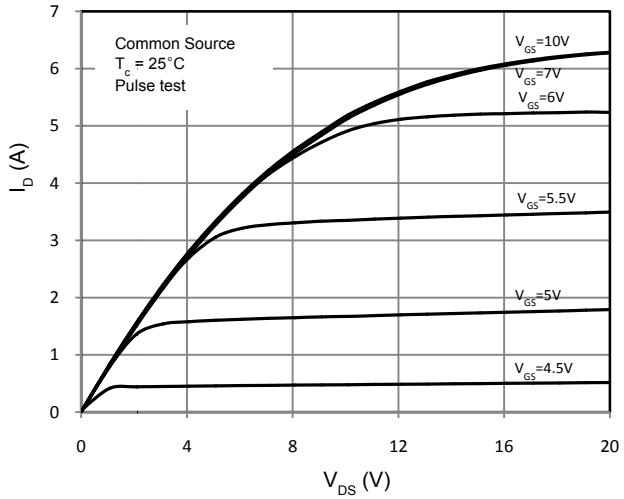


Figure 1.On-Region Characteristics

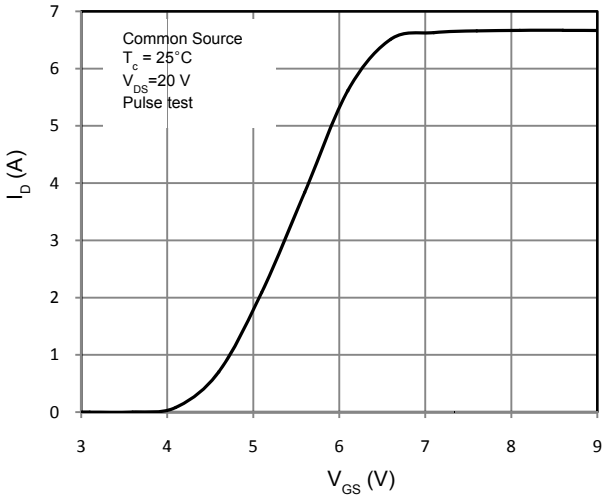


Figure 2. Transfer Characteristics

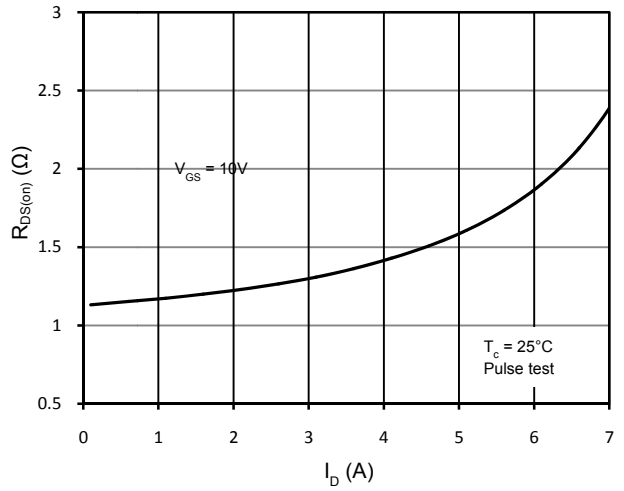


Figure 3. Static Drain-Source On Resistance

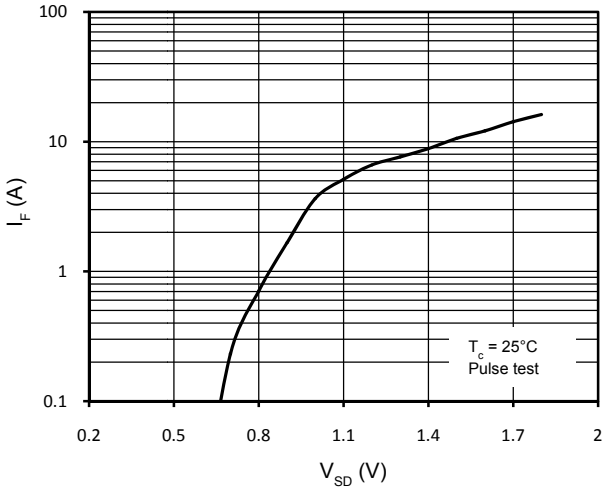


Figure 4. Body- Diode Forward Characteristics

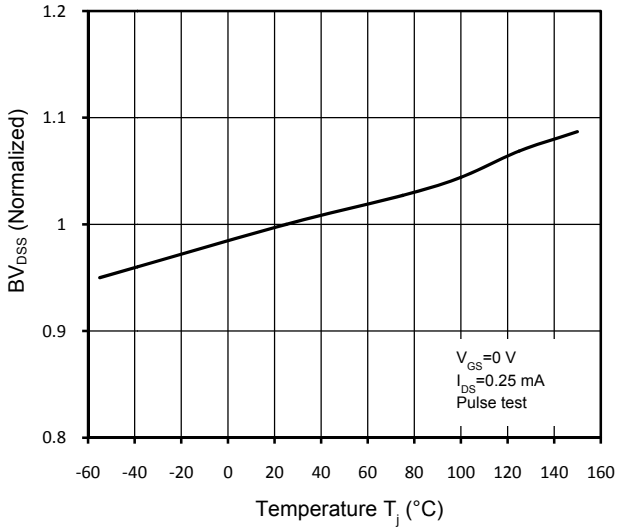


Figure 5. Normalized BV_{DSS} vs. Temperature

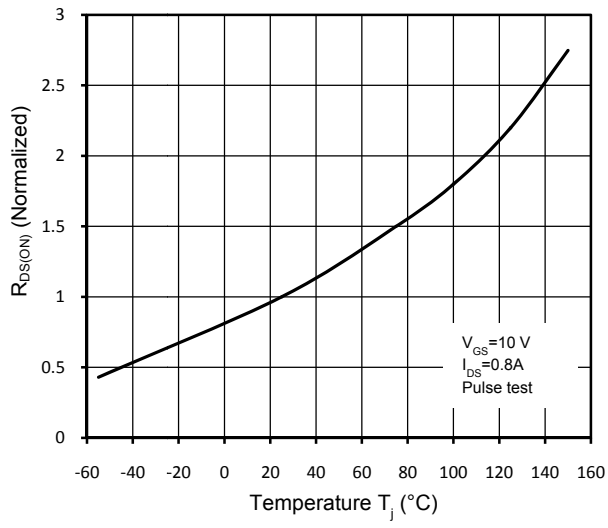


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

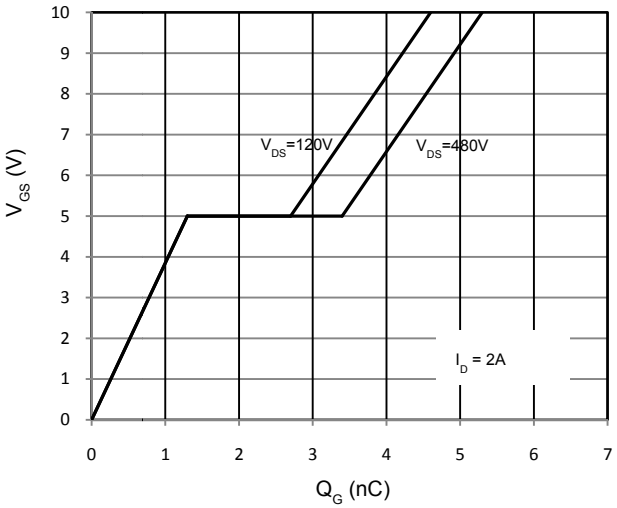


Figure 7. Gate Charge Characteristics

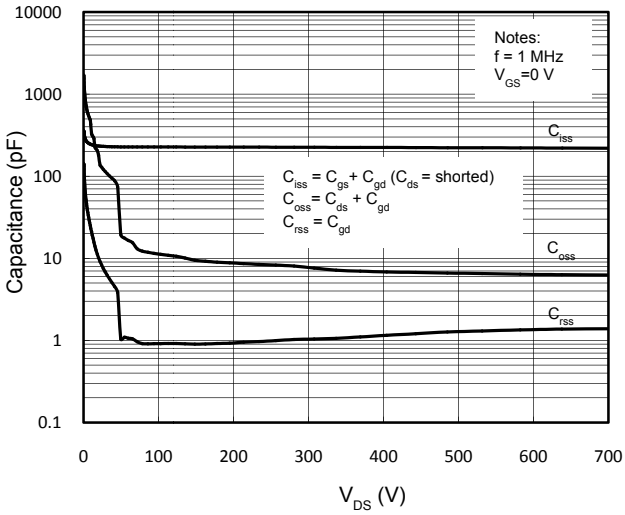


Figure 8. Capacitance Characteristics

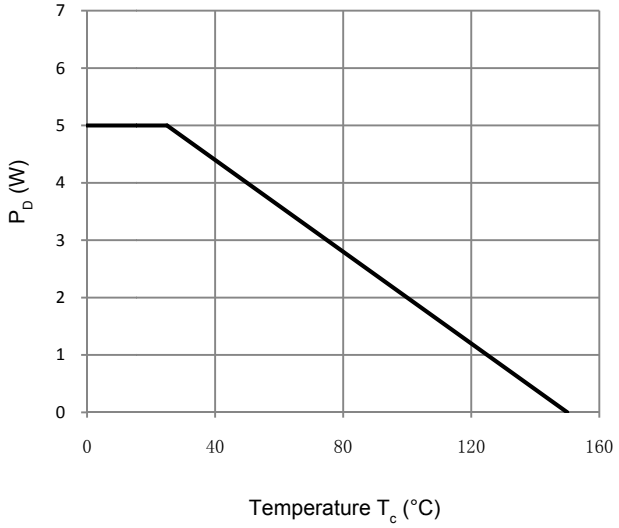


Figure 9. Power Dissipation

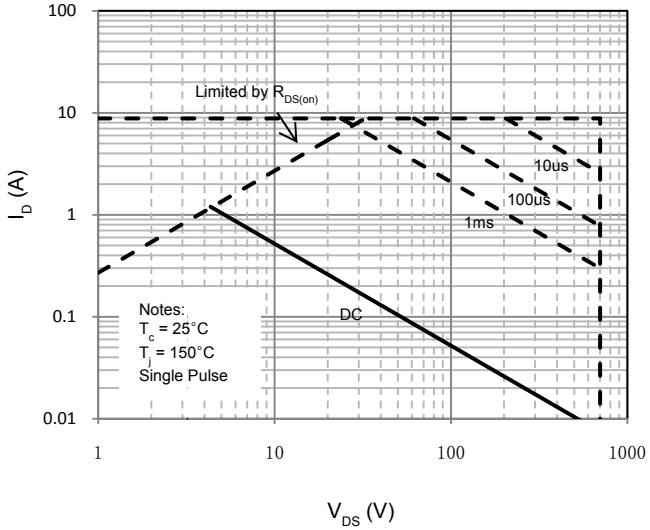


Figure 10. Maximum Safe Operating Area

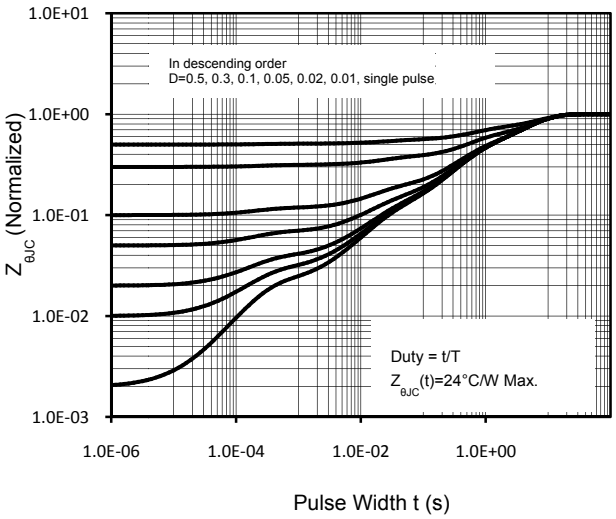
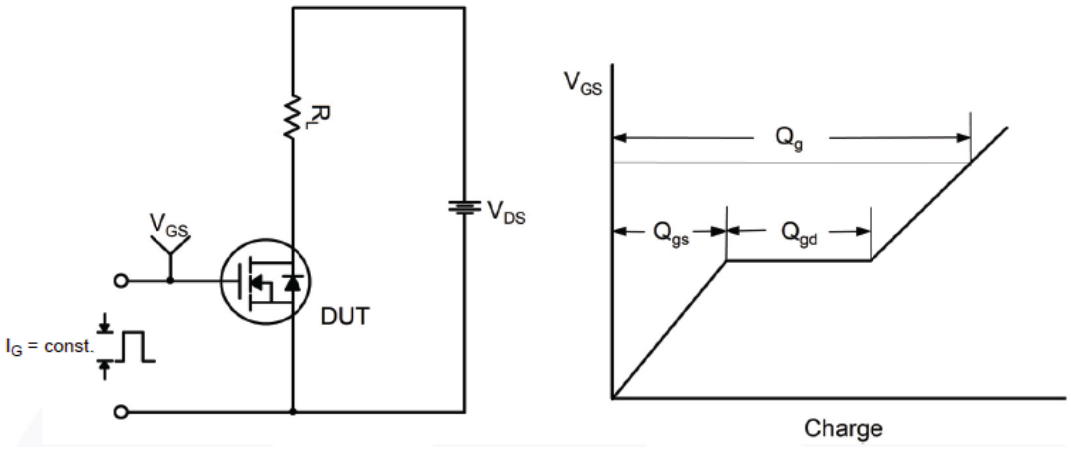
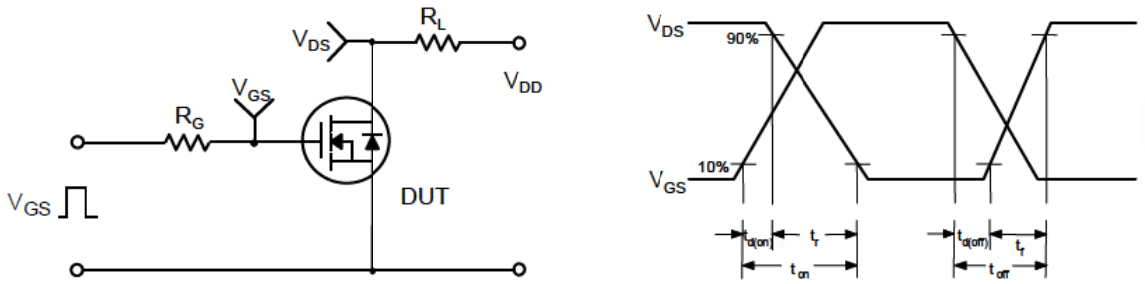


Figure 11. Transient Thermal Response Curve

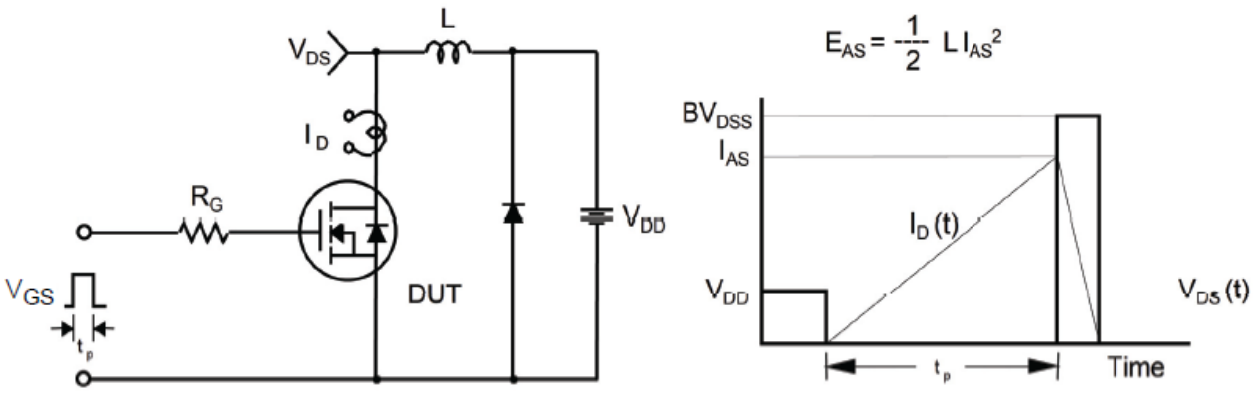
Gate Charge Test Circuit & Waveform



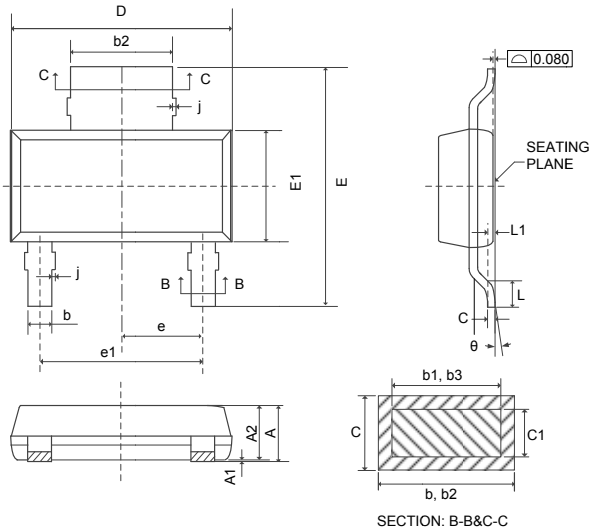
Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



Mechanical Dimensions for SOT-223-2L



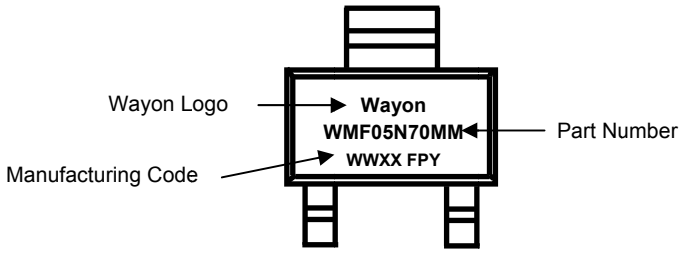
COMMON DIMENSIONS

SYMBOL	mm	
	MIN	MAX
A	-	1.80
A1	0.02	0.10
A2	1.50	1.70
b	0.6	0.84
b1	0.6	0.79
b2	2.90	3.10
b3	2.84	3.05
C	0.23	0.35
C1	0.23	0.33
D	6.30	6.95
E	6.70	7.30
E1	3.30	3.70
e	2.30 BSC	
e1	4.60 BSC	
L	0.81	-
L1	0.25 BSC	
θ	0°	10°
j	-	0.15

Ordering Information

Part	Package	Marking	Packing method
WMF05N70MM	SOT-223-2L	WMF05N70MM	Tape and Reel

Marking Information



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