

N-channel 250V 295mΩ Power MOSFET

Description

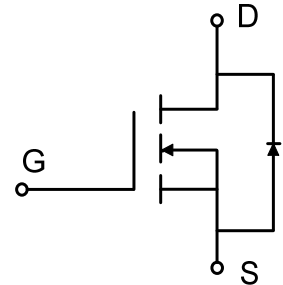
WMOSTM JN is suitable for applications which require superior power density and outstanding efficiency.

Features

- Gate charge minimized
- Typ. $R_{DS(on)} = 295\text{ m}\Omega$
- 100% UIS tested
- Pb-free plating, Halogen free

Applications

Switching applications



Absolute Maximum Ratings

Parameter	Symbol	WMF09N25JN	Unit
Drain-source voltage	V _{DSS}	250	V
Continuous drain current ¹⁾ (T _C = 25°C)	I _D	7	A
		4.2	A
(T _C = 100°C)			
Pulsed drain current ²⁾	I _{DM}	21	A
Gate-source voltage	V _{GS}	±20	V
Avalanche energy, single pulse ³⁾	E _{AS}	17	mJ
Avalanche energy, repetitive ²⁾	E _{AR}	0.1	mJ
Avalanche current, repetitive ²⁾	I _{AR}	0.7	A
Power dissipation (T _C = 25°C)	P _D	6.9	W
		0.06	W/°C
- Derate above 25°C			
Operating and storage temperature range	T _I , T _{stg}	-55 to +150	°C
Continuous diode forward current	I _S	7	A
Diode pulse current	I _{S,pulse}	21	A

Thermal Characteristics

Parameter	Symbol	WMF09N25JN	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	18	$^\circ\text{C/W}$
Thermal resistance, junction-to-ambient	$R_{\theta JA}$	80	$^\circ\text{C/W}$

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 =1 mA	250	-	-	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} =250 V, V _{GS} =0V, T _J = 25°C T _J = 125°C	- -	- 30	1 -	μA
Gate leakage current, forward	I _{GSSF}	V _{GS} =20V, V _{DS} =0V	-	-	500	nA
Drain-source on-state resistance	R _{DS(on)}	V _{GS} =10 V, I _D =3A T _J = 25°C	- -	 295	 360	 mΩ
Dynamic characteristics						
Input capacitance	C _{iss}	V _{DS} = 100V, V _{GS} = 0V, f = 1 MHz	-	191	-	pF
Output capacitance	C _{oss}		-	8	-	
Reverse transfer capacitance	C _{rss}		-	0.4	-	
Turn-on delay time	t _{d(on)}	V _{DD} = 100V, I _D = 3A R _G = 4.7Ω, V _{GS} =10V	-	3	-	ns
Rise time	t _r		-	4	-	
Turn-off delay time	t _{d(off)}		-	8	-	
Fall time	t _f		-	3	-	
Gate charge characteristics						
Gate to source charge	Q _{gs}	V _{DD} =160V, I _D =3A, V _{GS} =0 to 10V	-	1.7	-	nC
Gate to drain charge	Q _{gd}		-	0.8	-	
Gate charge total	Q _g		-	3.9	-	
Gate plateau voltage	V _{plateau}		-	5.5	-	V
Reverse diode characteristics						
Diode forward voltage	V _{SD}	V _{GS} =0 V, I _F =3A	-	-	1.2	V
Reverse recovery time	t _{rr}	V _R =50V, I _F =3A, dI _F /dt=100A/μs	-	75	-	ns
Reverse recovery charge	Q _{rr}		-	0.2	-	μC
Peak reverse recovery current	I _{rrm}		-	5.7	-	A

Notes:

1. DPAK equivalent. Limited by T_{j max}. Maximum duty cycle D=0.5.
2. Repetitive rating: pulse width limited by maximum junction temperature.
3. I_{AS} = 0.7A, V_{DD} = 50V, R_G = 25Ω, starting T_j = 25°C.

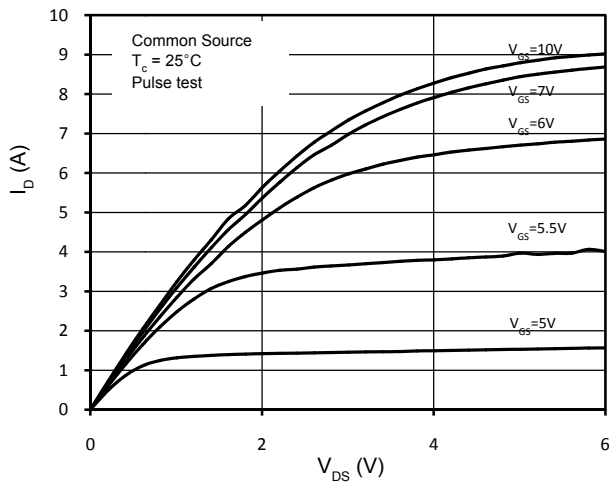


Figure 1. On-Region Characteristics

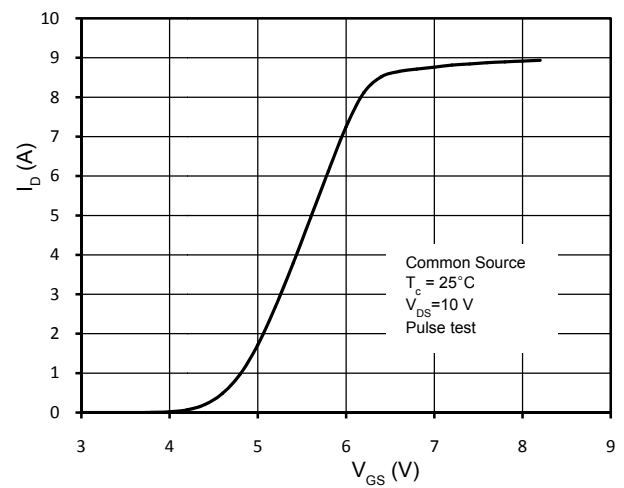


Figure 2. Transfer Characteristics

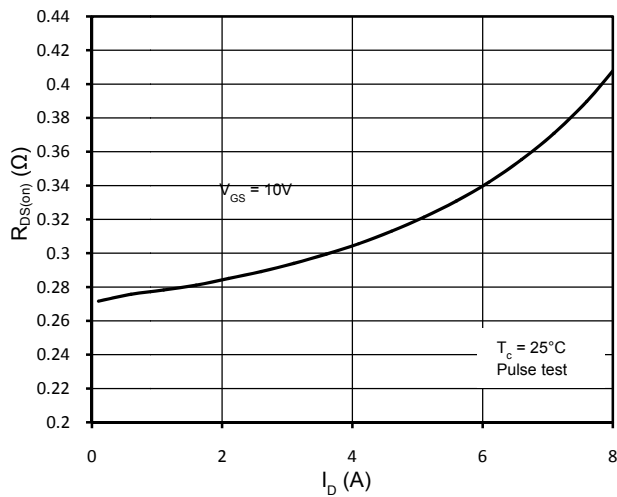


Figure 3. Static Drain-Source On Resistance

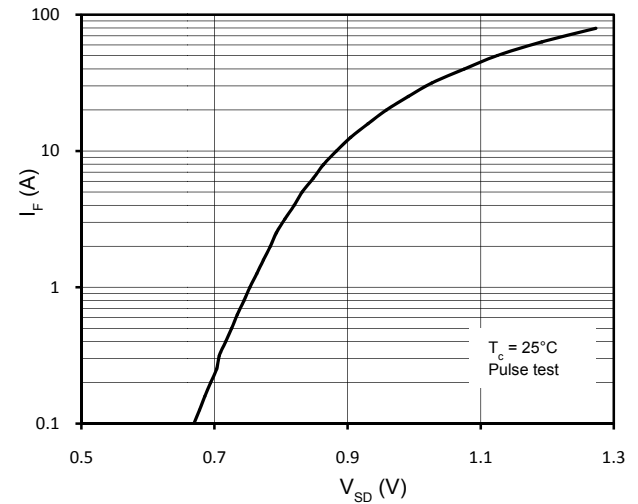
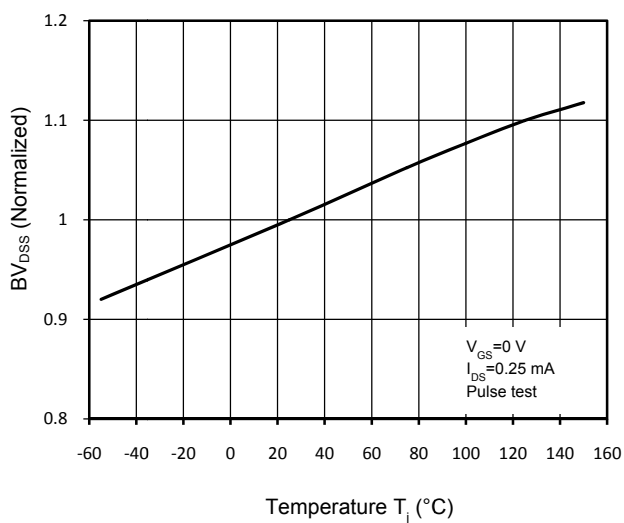
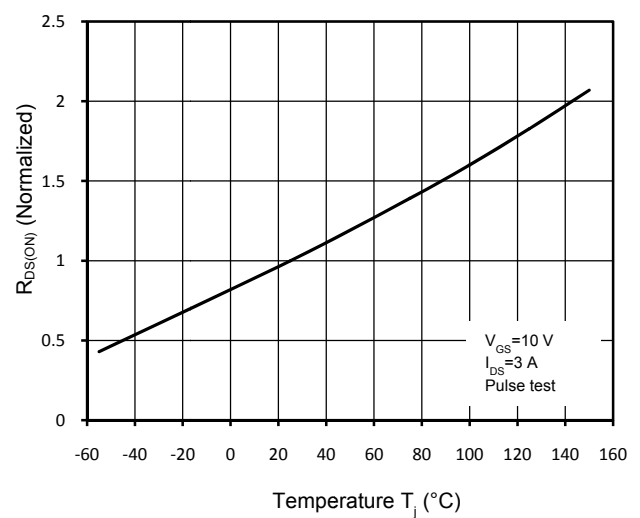


Figure 4. Body-Diode Forward Characteristics

Figure 5. Normalized BV_{DS} vs. TemperatureFigure 6. Normalized $R_{DS(on)}$ vs. Temperature

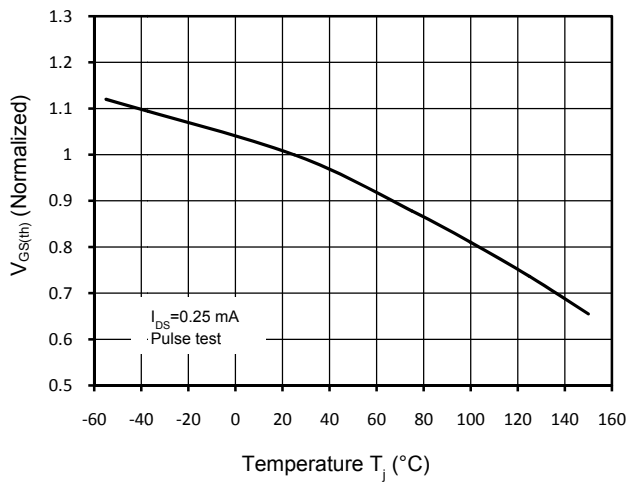


Figure 7. Threshold Voltage vs. Temperature

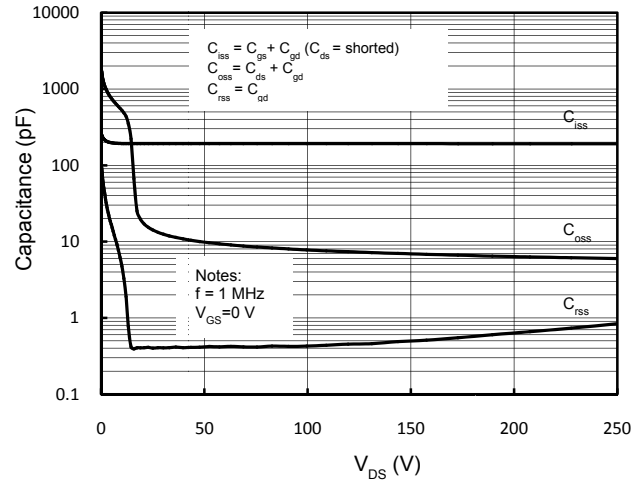


Figure 8. Capacitance Characteristics

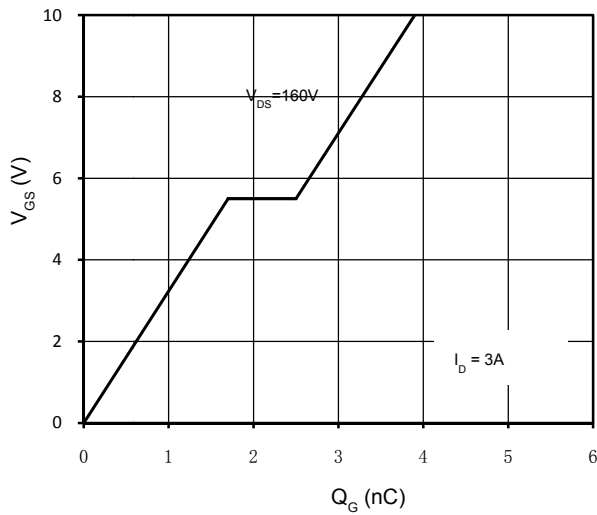


Figure 9. Gate Charge Characteristics

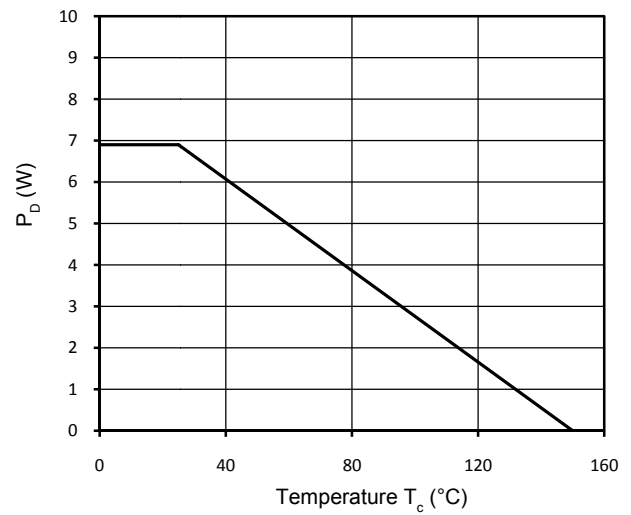


Figure 10. Power Dissipation

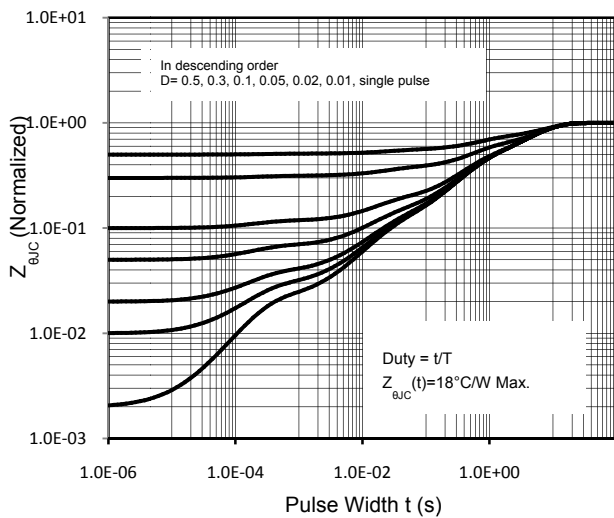


Figure 11. Transient Thermal Response Curve

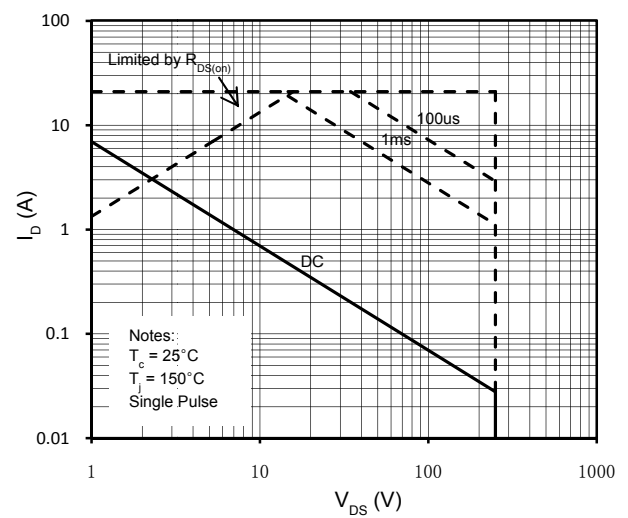
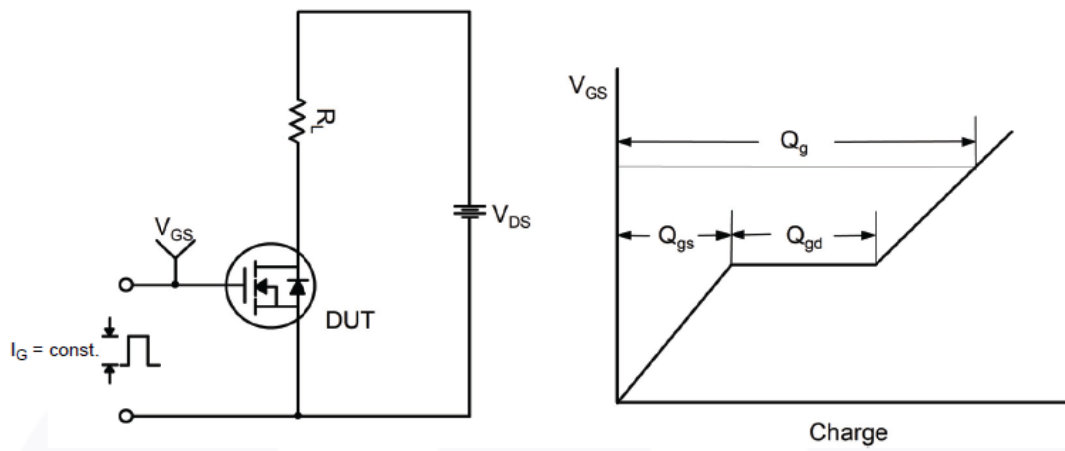
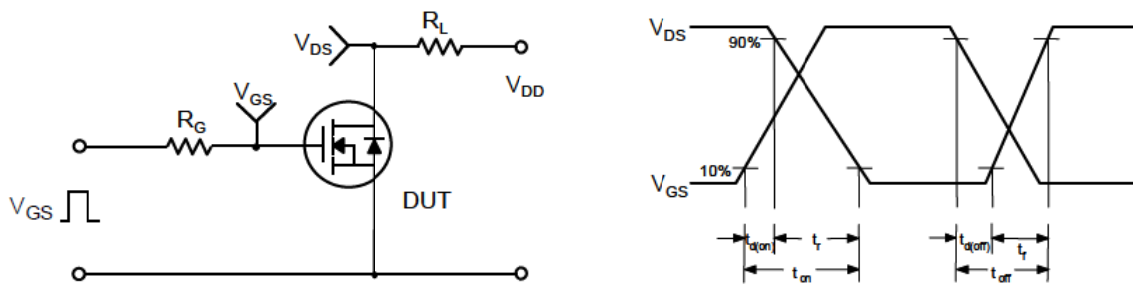


Figure 12. Maximum Safe Operating Area

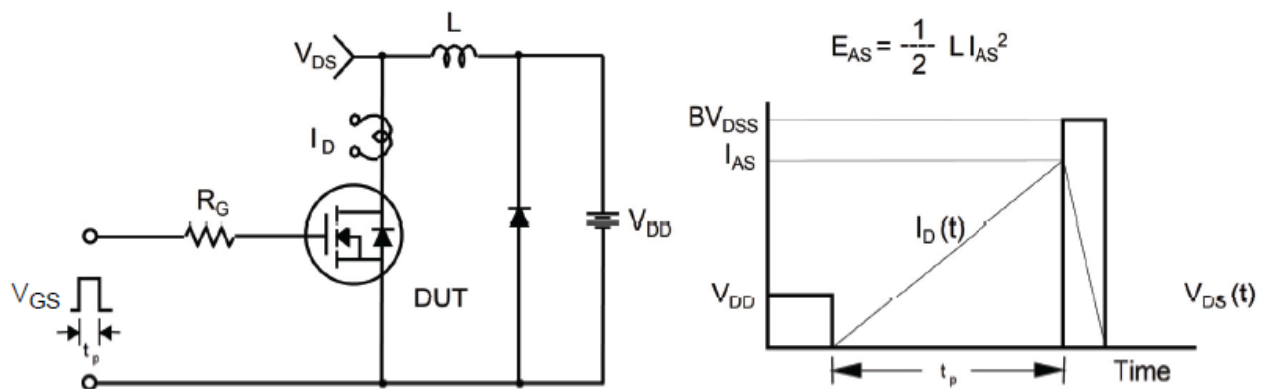
Gate Charge Test Circuit & Waveform



Switching Test Circuit & Waveforms

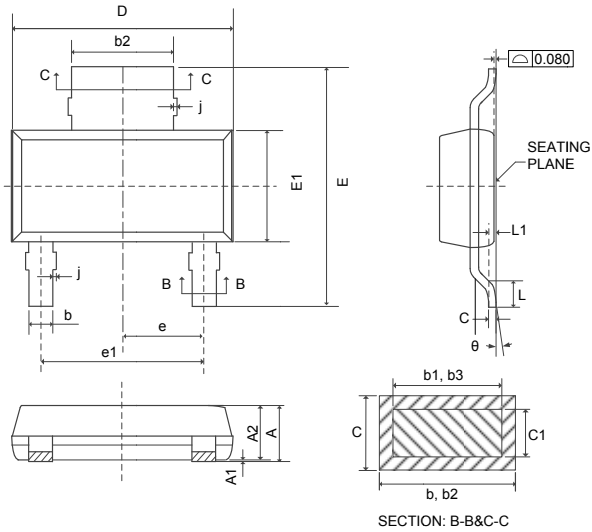


Unclamped Inductive Switching Test Circuit & Waveforms



Mechanical Dimensions for SOT-223-2L

COMMON DIMENSIONS

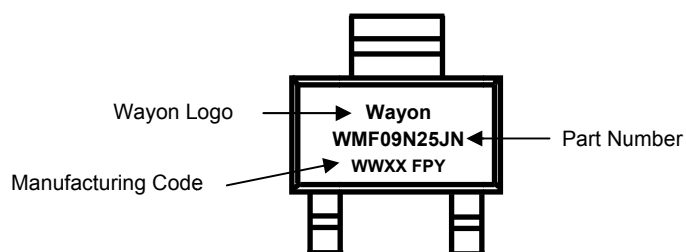


SYMBOL	mm	
	MIN	MAX
A	-	1.80
A1	0.02	0.10
A2	1.50	1.70
b	0.6	0.84
b1	0.6	0.79
b2	2.90	3.10
b3	2.84	3.05
C	0.23	0.35
C1	0.23	0.33
D	6.30	6.95
E	6.70	7.30
E1	3.30	3.70
e	2.30 BSC	
e1	4.60 BSC	
L	0.81	-
L1	0.25 BSC	
θ	0°	10°
j	-	0.15

Ordering Information

Part	Package	Marking	Packing method
WMF09N25JN	SOT-223-2L	WMF09N25JN	Tape and Reel

Marking Information



Contact Information

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