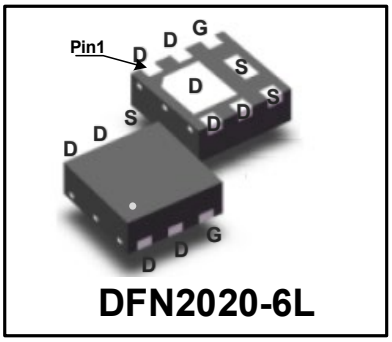
WMR05P04TS

40V P-Channel Enhancement Mode Power MOSFET



DFN2020-6L

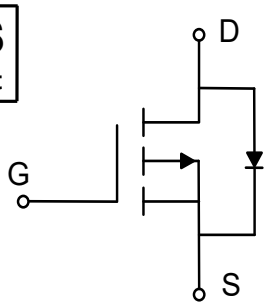
Description

WMR05P04TS uses advanced power trench technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

Features

- V_{DS} = -40V, I_D = -5A
  $R_{DS(on)}$ < 45mΩ @ V_{GS} = -10V
  $R_{DS(on)}$ < 58mΩ @ V_{GS} = -4.5V
- Green Device Available
- High Power and Current Handing Capability

RoHS compliant



Applications

- Power Management Switches
- DC/DC Converter

Absolute Maximum Ratings (T_A = 25°C, unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	-40	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_A=25°C	I_D	-5	A
	T_A=100°C		-3.2	
Pulsed Drain Current[1]		I_{DM}	-20	A
Single Pulse Avalanche Energy[2]		EAS	28.8	mJ
Total Power Dissipation	T_A=25°C	P_D	1.8	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient[3]	$R_{\theta JA}$	69.4	°C/W

Electrical Characteristics (T_J = 25°C, unless otherwise noted)

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	V_{GS} = 0V, I_D = -250μA	-40	-	-	V
Gate-body Leakage current		I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T_J=25°C	I_{DSS}	V_{DS} = -40V, V_{GS} = 0V	-	-	-1	μA
	T_J=100°C			-	-	-100	
Gate-Threshold Voltage		$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-1	-1.5	-2.5	V
Drain-Source on-Resistance[4]		$R_{DS(on)}$	V_{GS} = -10V, I_D = -4A	-	33	45	mΩ
			V_{GS} = -4.5V, I_D = -2A	-	42	58	
Forward Transconductance[4]		g_{fs}	V_{DS} = -10V, I_D = -4A	-	13	-	S
Dynamic Characteristics[5]							
Input Capacitance		C_{iss}	V_{DS} = -20V, V_{GS} =0V, f =1MHz	-	1035	-	pF
Output Capacitance		C_{oss}		-	87	-	
Reverse Transfer Capacitance		C_{rss}		-	77	-	
Gate Resistance		R_G	f =1MHz	-	10	-	Ω
Switching Characteristics[5]							
Total Gate Charge		Q_g	V_{GS} = -10V, V_{DS} = -20V, I_D= -4A	-	17	-	nC
Gate-Source Charge		Q_{gs}		-	4.2	-	
Gate-Drain Charge		Q_{gd}		-	3.7	-	
Turn-on Delay Time		$t_{d(on)}$	V_{GS} = -10V, V_{DD} = -20V, I_D= -4A, R_G= 3Ω	-	5.9	-	ns
Rise Time		t_r		-	7.1	-	
Turn-off Delay Time		$t_{d(off)}$		-	25	-	
Fall Time		t_f		-	8.2	-	
Drain-Source Body Diode Characteristics							
Diode Forward Voltage[4]		V_{SD}	I_S = -4A, V_{GS} = 0V	-	-	-1.2	V
Continuous Source Current	T_A=25°C	I_S	-	-	-	-5	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C.
2. The EAS data shows Max. rating . The test condition is V_{DD}= -25V, V_{GS}= -10V, L=0.4mH, I_{AS}= -12A.
3. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Characteristics

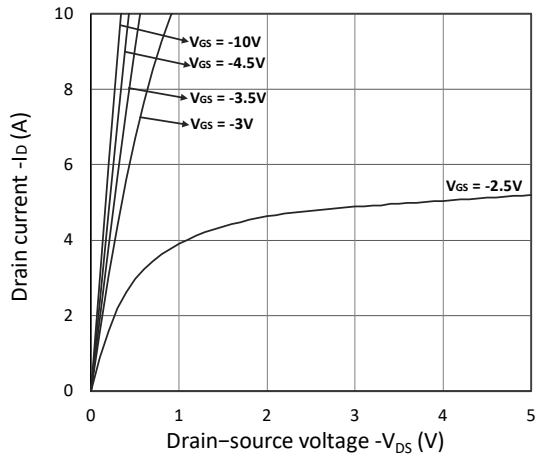


Figure 1. Output Characteristics

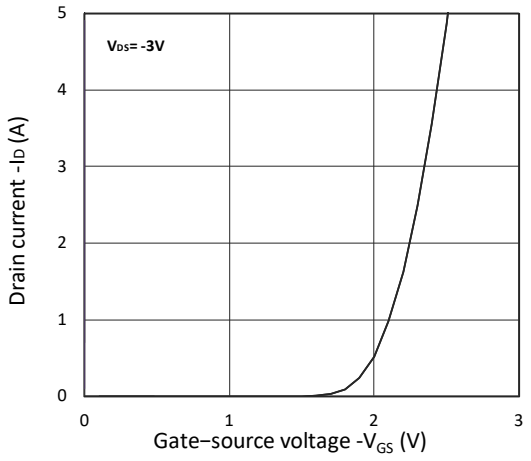


Figure 2. Transfer Characteristics

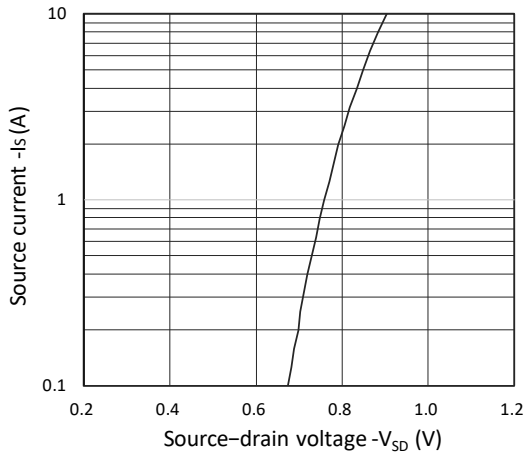


Figure 3. Forward Characteristics of Reverse

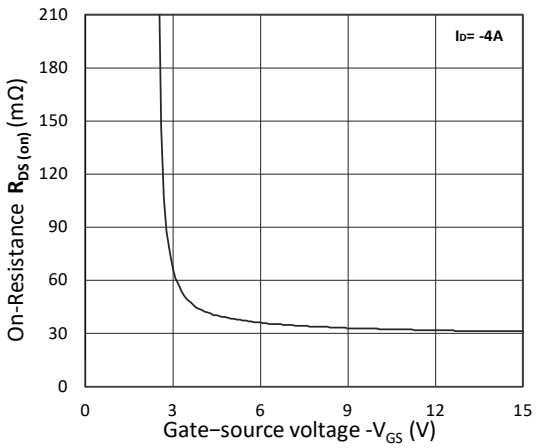


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

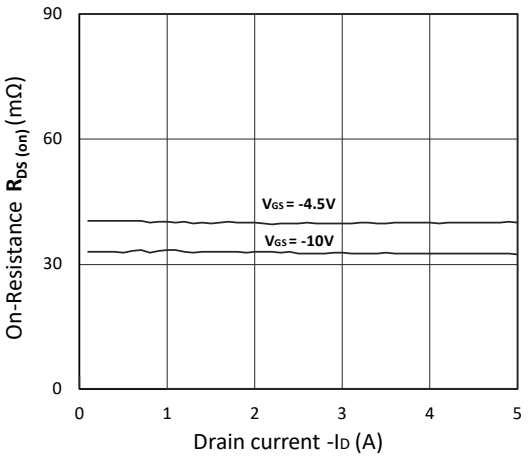


Figure 5. $R_{DS(ON)}$ vs. I_D

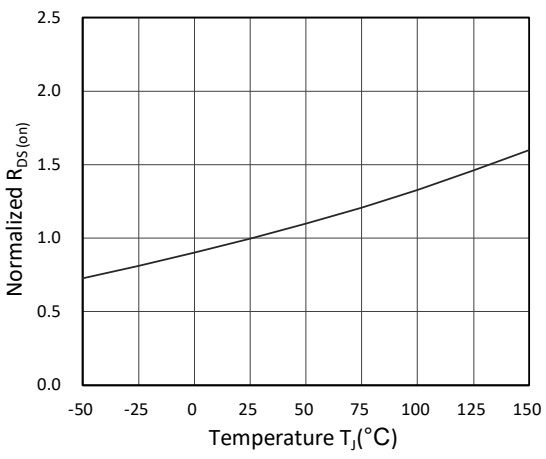


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

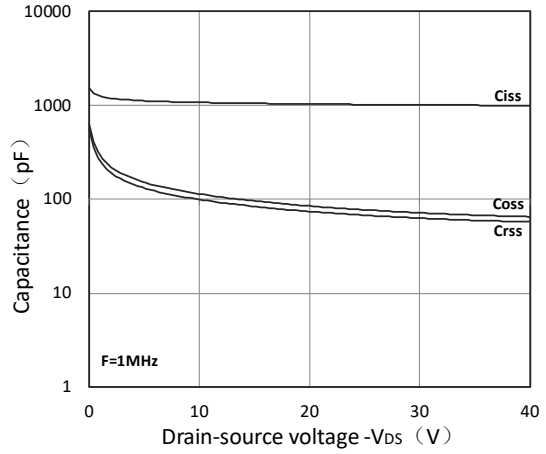


Figure 7. Capacitance Characteristics

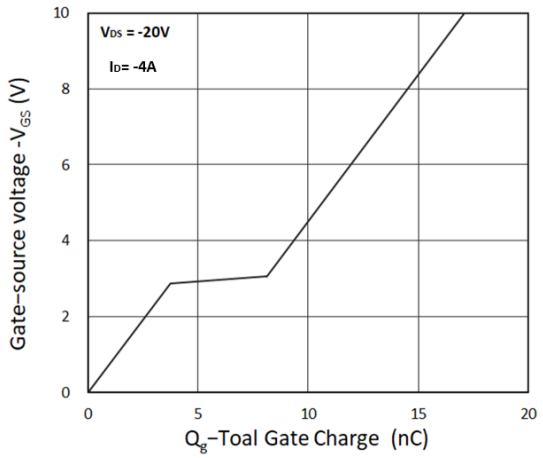


Figure 8. Gate Charge Characteristics

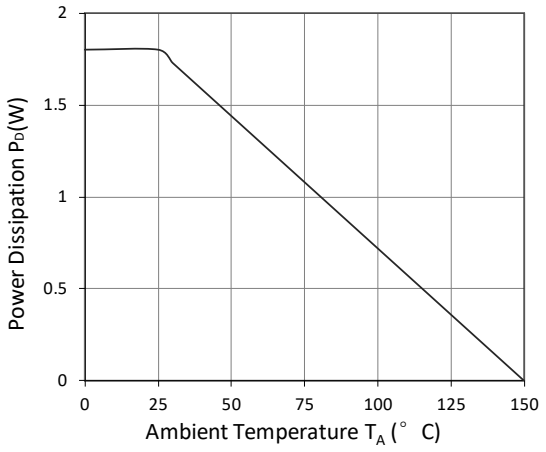


Figure 9. Power Dissipation

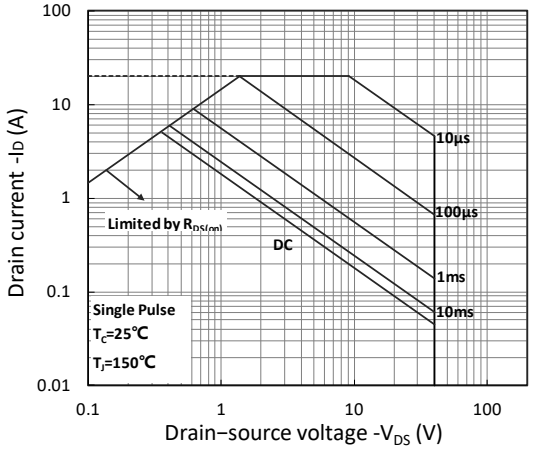


Figure10. Safe Operating Area

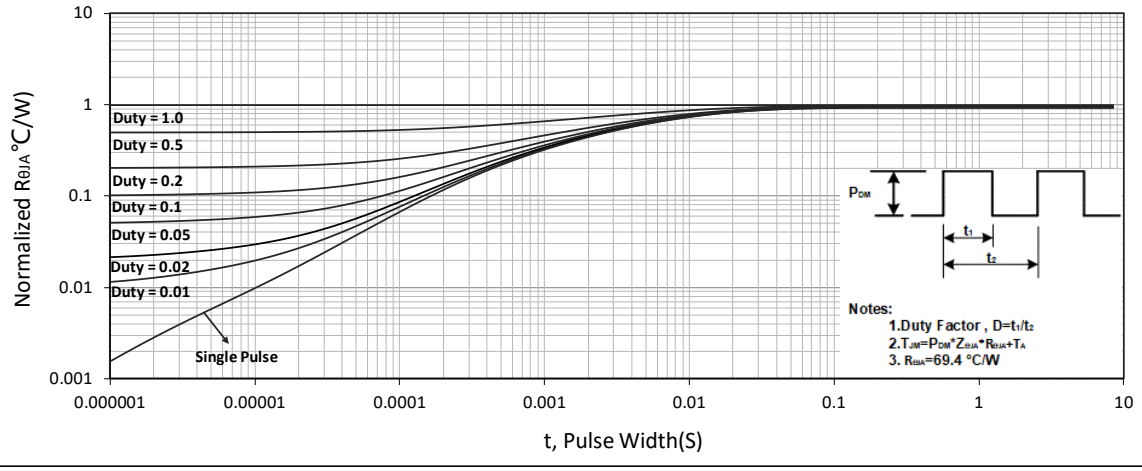


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

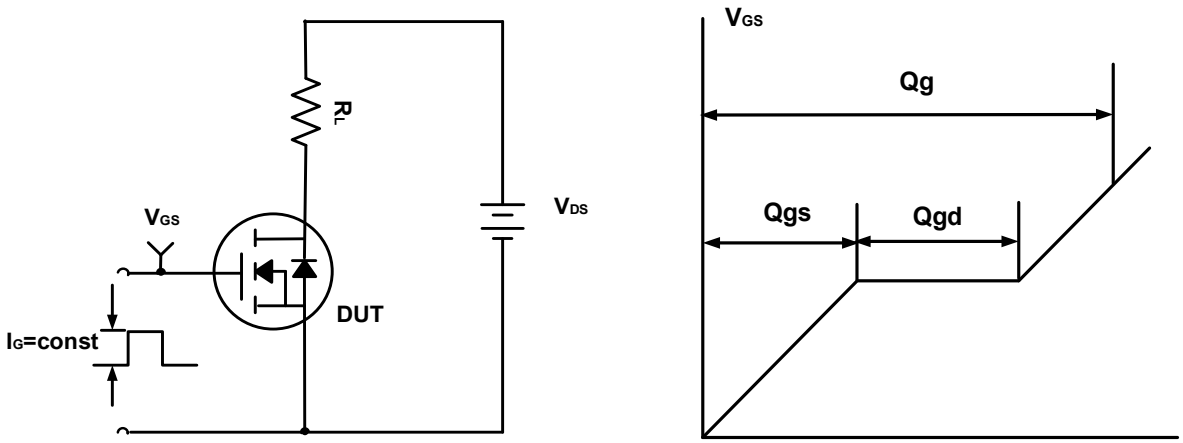


Figure A. Gate Charge Test Circuit & Waveforms

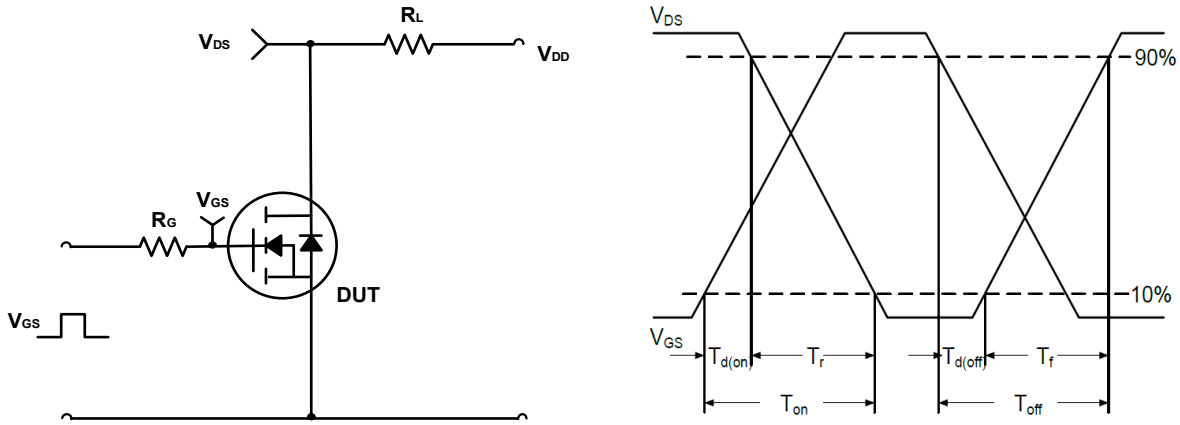


Figure B. Switching Test Circuit & Waveforms

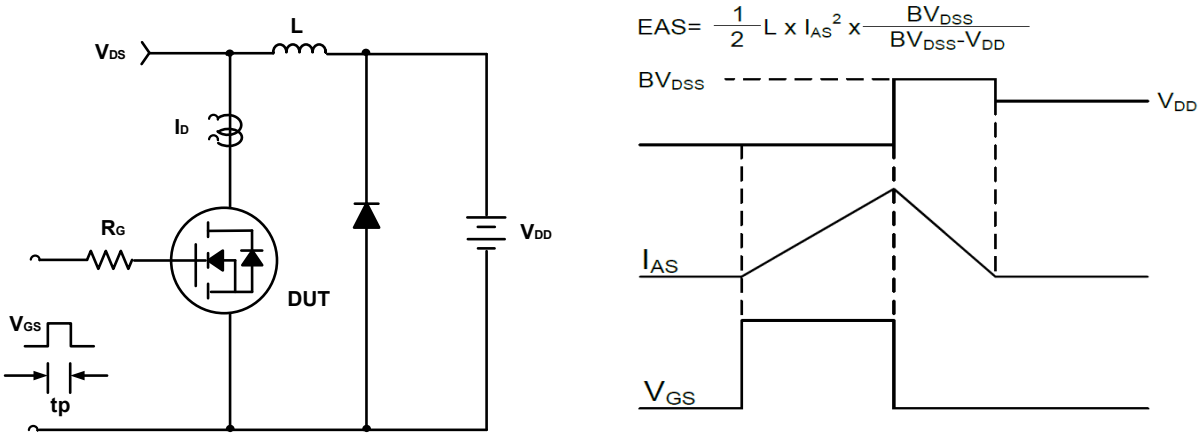
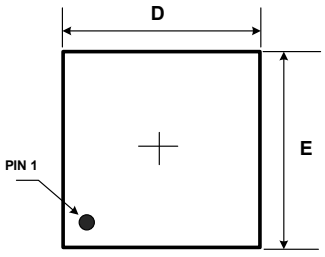
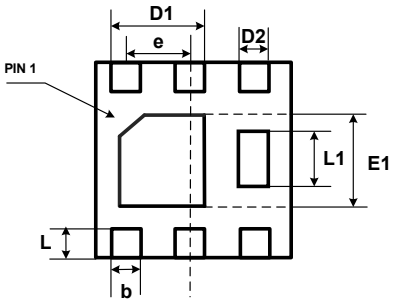
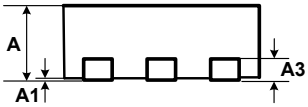


Figure C. Unclamped Inductive Switching Circuit & Waveforms

Mechanical Dimensions for DFN2020-6L







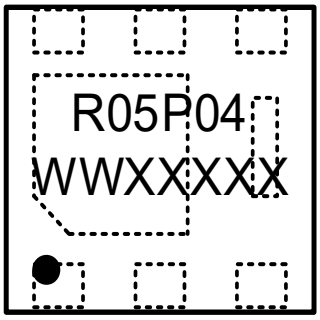
COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	0.50	0.60
A1	0.00	0.05
A3	0.152REF	
b	0.25	0.35
D	1.90	2.10
D1	0.80	1.00
E	1.90	2.10
E1	0.80	1.00
L1	0.46	0.66
e	0.65BSC	
D2	0.25	0.35
L	0.25	0.35

Ordering Information

Part	Package	Marking	Packing method
WMR05P04TS	DFN2020-6L	R05P04	Tape and Reel

Marking Information



R05P04= Device code

WWXXXXX= Date code

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