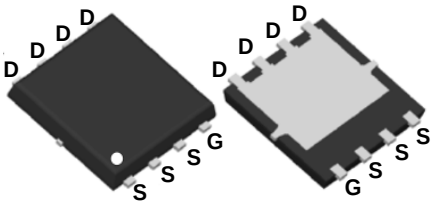
WMQ55P02T1

20V P-Channel Enhancement Mode Power MOSFET

Description

WMQ55P02T1 uses advanced power trench technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

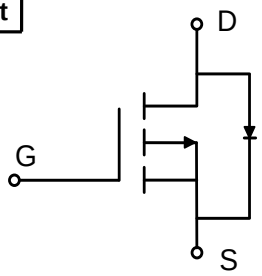


PDFN3030-8L

Features

- V_{DS}= -20V, I_D = -55A
  $R_{DS(on)}$ < 8.2mΩ @ V_{GS} = -4.5V
  $R_{DS(on)}$ < 10mΩ @ V_{GS} = -2.5V
- Green Device Available
- Low Gate Charge
- Advanced High Cell Density Trench Technology
- 100% EAS Guaranteed

RoHS compliant



Applications

- High Current Load Applications
- Load Switching
- Hard Switched And High Frequency Circuits
- Uninterruptible Power Supply

Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	-20	V
Gate-Source Voltage		V_{GS}	±10	V
Continuous Drain Current[1]	T_C=25℃	I_D	-55	A
	T_C=100℃		-35	
Pulsed Drain Current[2]		I_{DM}	-120	A
Single Pulse Avalanche Energy[3]		EAS	20	mJ
Avalanche Current		I_{AS}	-20	A
Total Power Dissipation[4]	T_C=25℃	P_D	39	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[1]	$R_{\theta JA}$	38	°C/W
Thermal Resistance from Junction-to-Case[1]	$R_{\theta JC}$	3.2	°C/W

Electrical Characteristics T_c = 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	-20	-	-	V
Gate-body Leakage current	I_{GSS}	V_{DS} = 0V, V_{GS} = ±10V	-	-	±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -20V, V_{GS} = 0V	-	-	-1	μA
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-0.4	-	-1.0	V
Drain-Source on-Resistance[2]	$R_{DS(on)}$	V_{GS} = -4.5V, I_D = -15A	-	6.8	8.2	mΩ
		V_{GS} = -2.5V, I_D = -10A	-	8.5	10	
		V_{GS} = -1.8V, I_D = -8.0A	-	11.2	15	
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS} = -10V, V_{GS} =0V, f =1MHz	-	4550	-	pF
Output Capacitance	C_{oss}		-	542	-	
Reverse Transfer Capacitance	C_{rss}		-	505	-	
Switching Characteristics						
Total Gate Charge	Q_g	V_{GS} = -4.5V, V_{DS} = -10V, I_D= -20A	-	43	-	nC
Gate-Source Charge	Q_{gs}		-	7	-	
Gate-Drain Charge	Q_{gd}		-	9.2	-	
Turn-on Delay Time	$t_{d(on)}$	V_{GS} = -4.5V, V_{DD} = -10V, R_G = 3Ω, I_D= -12A, R_L = 1Ω,	-	13.5	-	nS
Rise Time	t_r		-	18.8	-	
Turn-off Delay Time	$t_{d(off)}$		-	92	-	
Fall Time	t_f		-	161	-	
Drain-Source Body Diode Characteristics						
Diode Forward Voltage[2]	V_{SD}	I_S = -1A, V_{GS} = 0V	-	-	-1.2	V
Continuous Source Current[1,5]	I_S	V_G=V_D= 0V , Force Current	-	-	-55	A
Body Diode Reverse Recovery Time	t_{rr}	I_F = -12A, dI/dt = 100A/μs	-	24	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}		-	26	-	nC

Note :

1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.

2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤2%

3.The EAS data shows Max. rating . The test condition is V_{DD}= -20V, V_{GS}= -10V, L=0.1mH, I_{AS}= -20A

4.The power dissipation is limited by 150℃ junction temperature

5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

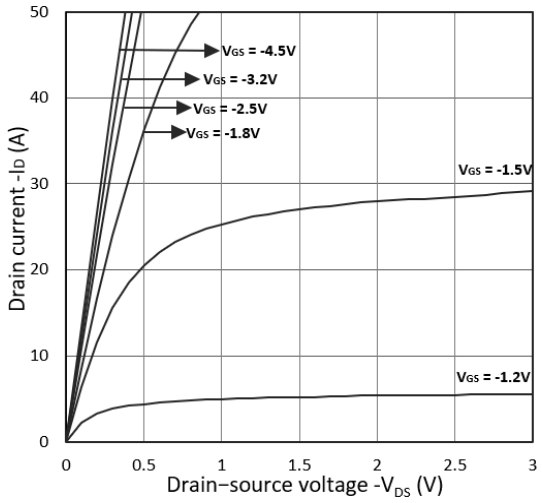


Figure 1. Output Characteristics

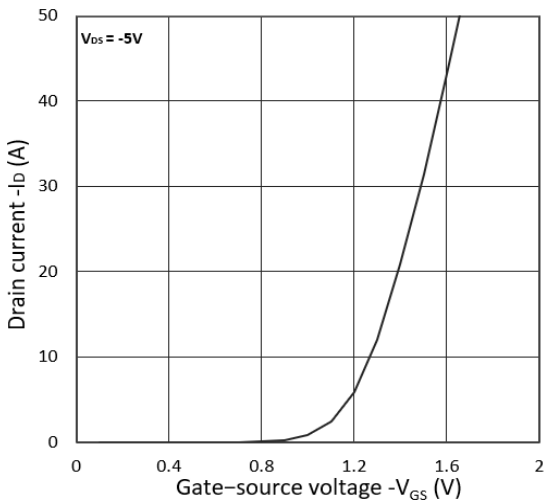


Figure 2. Transfer Characteristics

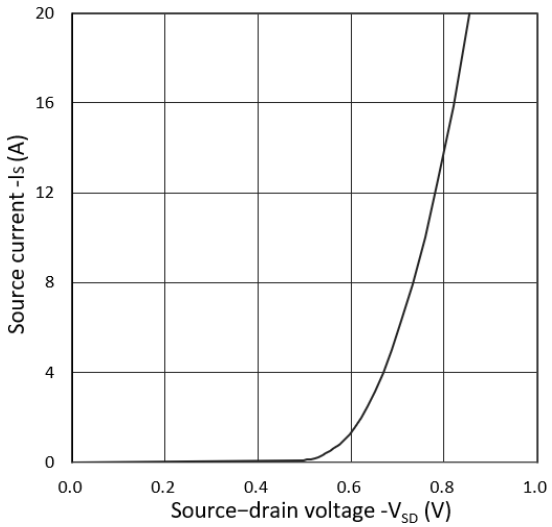


Figure 3. Forward Characteristics of Reverse

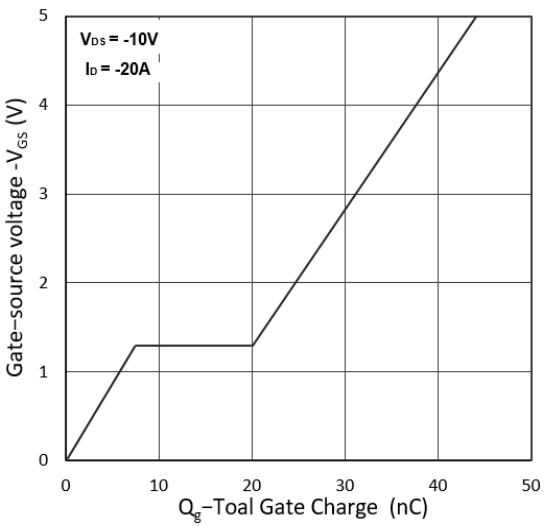


Figure 4. Gate Charge Characteristics

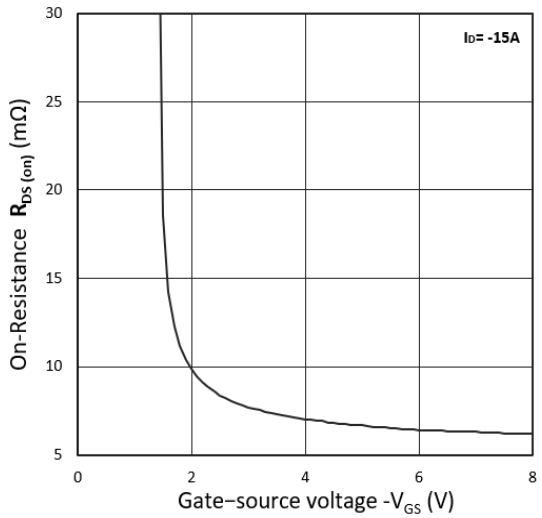


Figure 5. $R_{DS(on)}$ vs. V_{GS}

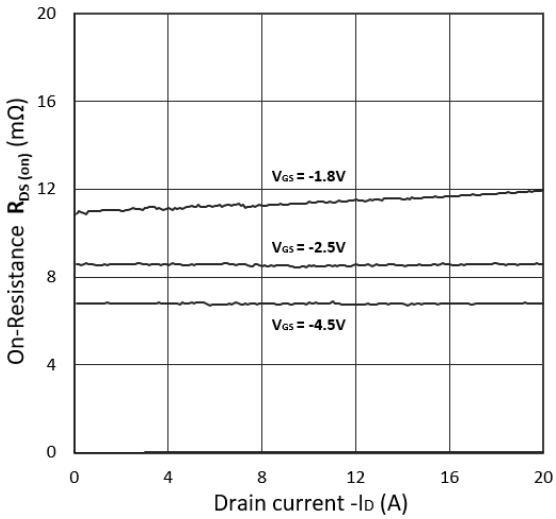


Figure 6. $R_{DS(on)}$ vs. I_D

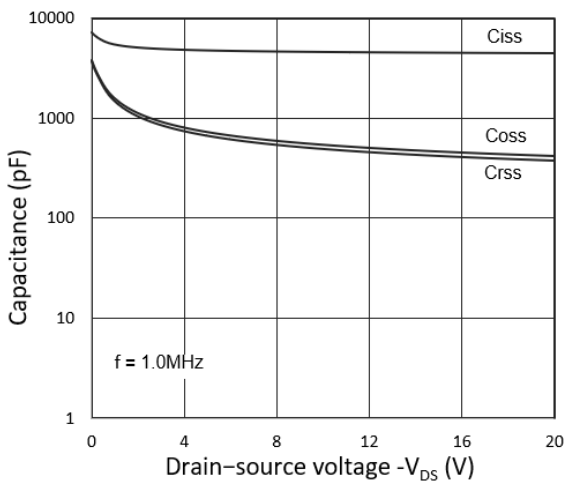


Figure7. Capacitance Characteristics

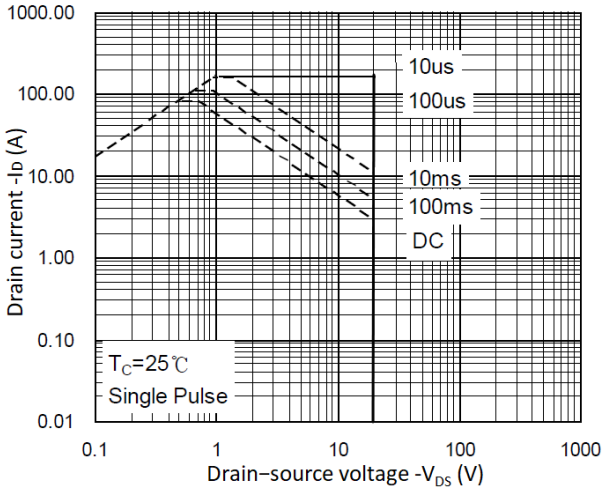


Figure8. Safe Operating Area

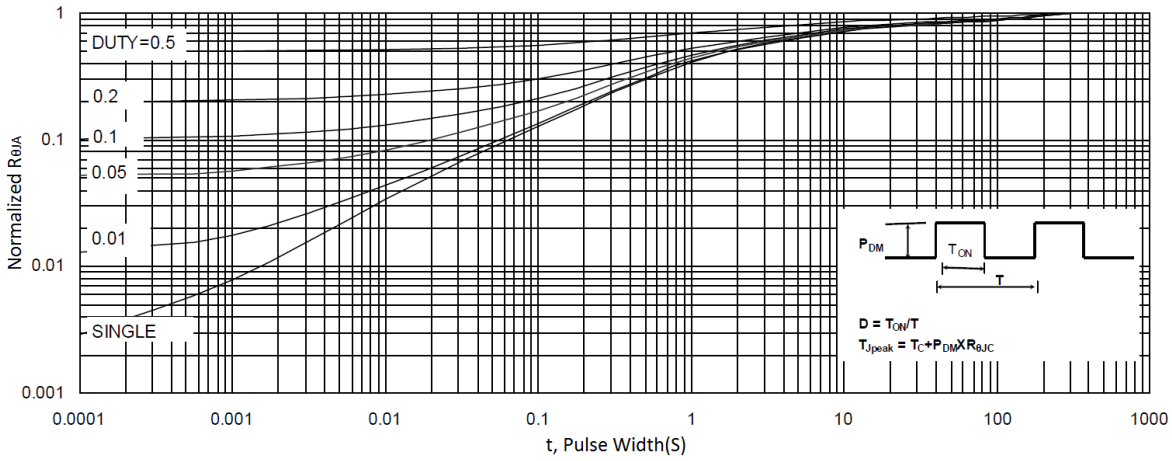


Figure 9. Normalized Maximum Transient Thermal Impedance

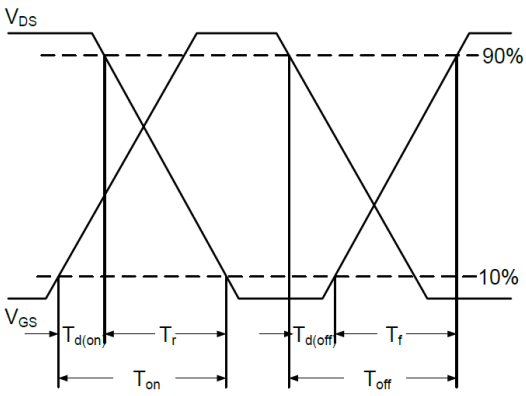


Figure 10. Switching Time Waveform

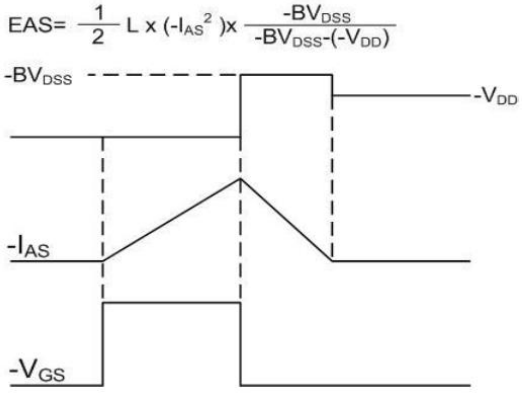
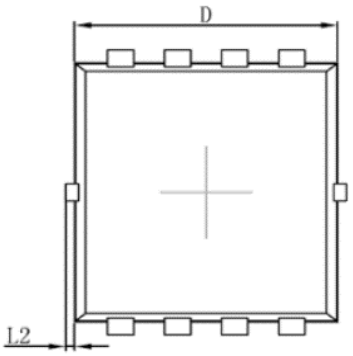
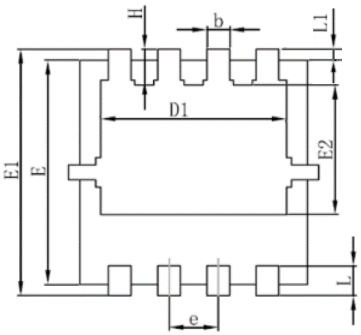


Figure 11. Unclamped Inductive Switching Waveform

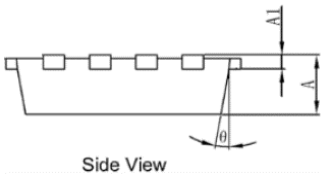
Mechanical Dimensions for PDFN3030-8L



Top View



Bottom View



Side View

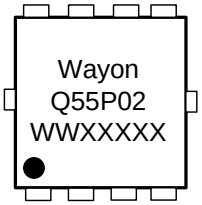
COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	0.70	0.90
A1	0.10	0.25
D	2.90	3.25
D1	2.25	2.69
E	2.90	3.20
E1	3.00	3.60
E2	1.54	2.20
b	0.20	0.40
e	0.60	0.70
L	0.15	0.50
L1	0.13BSC	
L2	0.00	0.20
H	0.15	0.65
θ	0°	14°

Ordering Information

Part	Package	Marking	Packing method
WMQ55P02T1	PDFN3030-8L	Q55P02	Tape and Reel

Marking Information



Q55P02= Device code

WWXXXXX= Date code

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