WLPA2P5R310PA

Datasheet

General Description

WLPA2P5R310PA MOSFET is based on VMD Semiconductor's unique device design to achieve low $R_{DS(ON)}$, low gate charge, fast switching and excellent avalanche characteristics. The low V_{th} series is specially optimized for synchronous rectification systems with low driving voltage.

Symbol

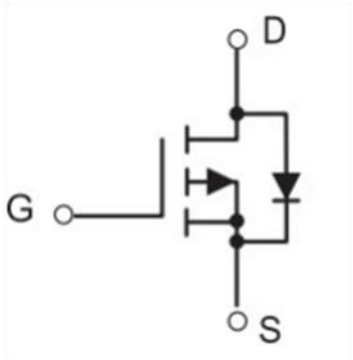


Figure 1 Symbol of WLPA2P5R310PA

Features

- $R_{DS(ON)\_TYP}$ = 23.9mΩ@V_{GS} =-4.5V
- Extremely low switching loss
- Stable performance
- Fast switching and soft recovery

Package Type

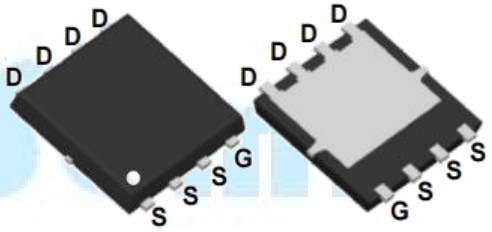


Figure 2 Package Type of WLPA2P5R310PA

Application

- Load Switch
- DC-DC converter
- Switched mode power supply
- Switching voltage regulator

Ordering Information

Product Name	Package
WLPA2P5R310PA	PDFN3.3*3.3-8L

Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	-25	V
Gate-Source Voltage[Note 1]	V_{GSS}	±8	V
Continuous Drain Current[Note 2] T_C=25°C	I_D	-22	A
Pulsed Drain Current[Note 3,] T_C=25°C	I_{DM}	-66	A
Max Power Dissipation[Note 4] T_C=25°C	P_D	19	W
Avalanche Current, Single Pulse	I_{AS}	-50	A
Avalanche Energy, Single Pulse [Note 5]	E_{AS}	124	mJ
Continuous Diode Forward Current[Note 2] T_C=25°C	I_S	-22	A
Diode Pulse Current[Note 3] T_C=25°C	$I_{S.PULSE}$	-66	A
Operation and storage temperature	T_J,T_{STG}	-55 to 150	°C

Thermal Resistance

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$		6.5		°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$		60		

Notes:

1) It is recommended that the value be less than 8V in practice.
2) Calculated continuous current based on maximum allowable junction temperature.
3) Repetitive rating;pulse width limited by max.junction temperature.
4) P_D is based on max.junction temperature,using junction-case thermal resistance.
5) V_{DS}=-24V,V_{GS}=-4.5 V, L=0.1 mH,starting T_J=25 °C.

Electrical Characteristics (T_J= 25 ºC, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Statistic Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=-250uA	-25			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-20V, V_{GS}=0V			-1	uA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±8V, V_{DS}=0V			±100	nA
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=-250uA	-0.4		-1.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-15A		23.9	31	mΩ
		V_{GS}=-6V, I_D=-15A		21.6	26.8	mΩ
Gate Resistance	R_G	f=1MHz, Open Drain		0.2		Ω
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{DS}=-10V		937		pF
Output Capacitance	C_{OSS}	V_{GS}=0V		418		pF
Reverse Transfer Capacitance	C_{RSS}	f=1MHz		275		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=-15V		5.4		ns
Rise Time	t_r	I_D=-15A		27.6		
Turn-off Delay Time	$t_{d(off)}$	R_G=4.7Ω		23.9		
Fall Time	t_f	V_{GS}=-4.5V		32.8		
Gate Charge Characteristics						
Gate to Source Charge	Q_{gs}	V_{DS}=-15V		2.1		nC
Gate to Drain Charge	Q_{gd}	I_D=-15A		6.6		
Gate Charge Total	Q_g	V_{GS}=-4.5V		16.2		
Gate Plateau Voltage	$V_{Plateau}$			-1.7		V
Reverse Diode Characteristics						
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_{SD}=-15A		-1.0		V
Reverse Recovery Time	t_{rr}	V_R=15V		22.7		ns
Reverse Recovery Charge	Q_{rr}	I_F=1A		14		nC
Peak Reverse Recovery Current	I_{rrm}	dI_F/dt=100A/us		1.2		A

Typical Performance Characteristics

Figure 3: Drain Current

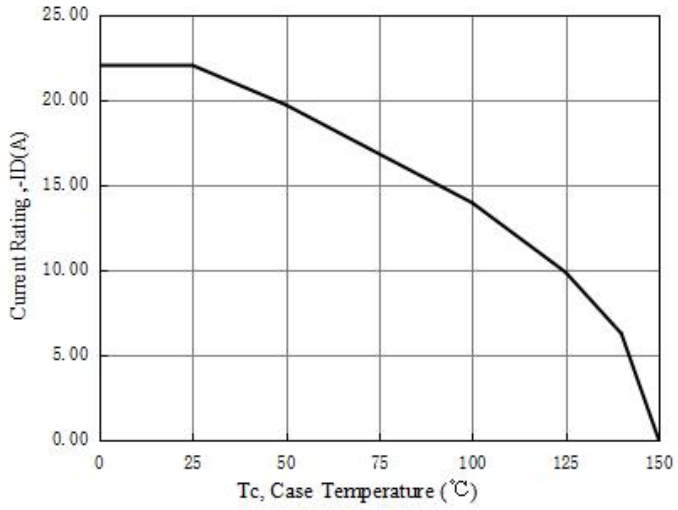


Figure 4: Typ. Output Characteristics

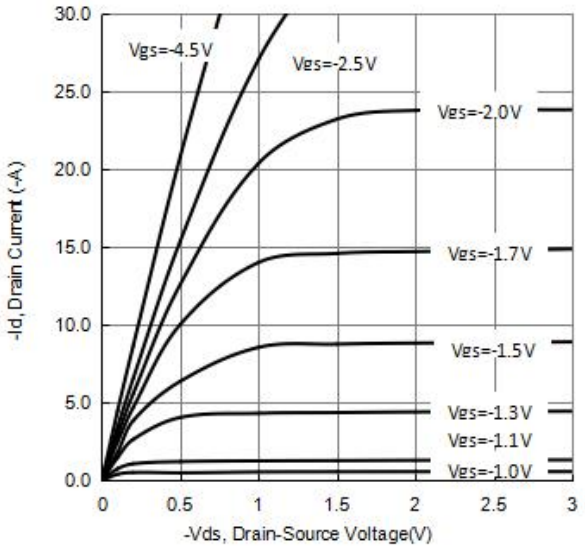


Figure 5: Drain-Source On-State Resistance

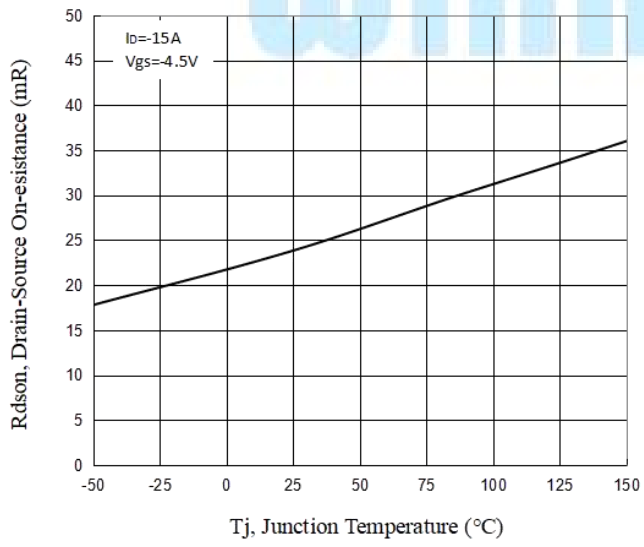


Figure 6: Typ. Gate Charge

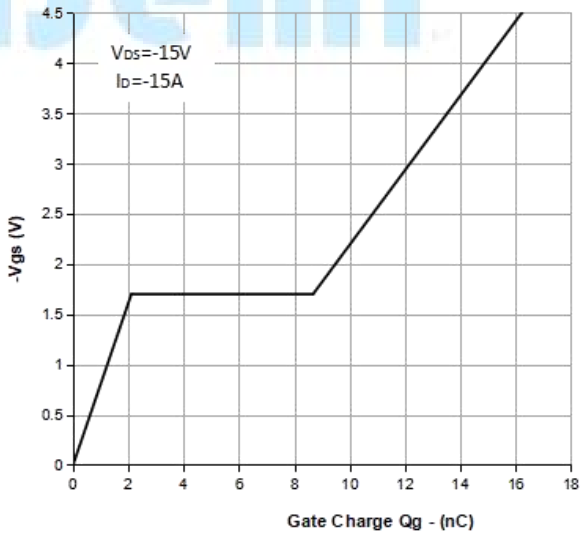


Figure 7: Typ. Capacitance

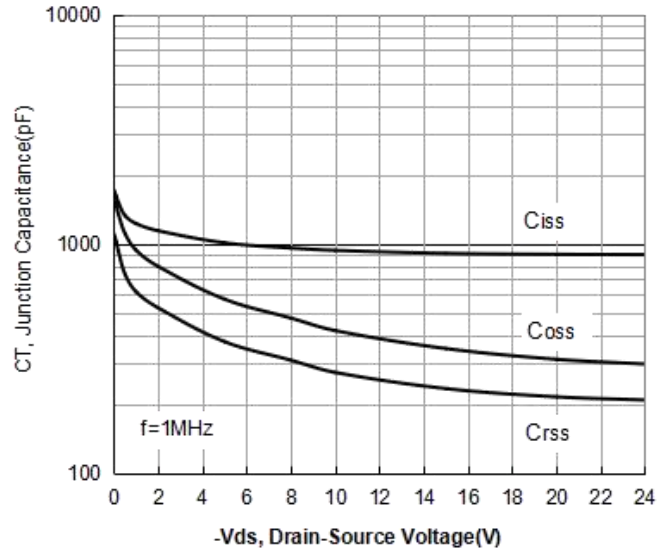


Figure 8: Forward Characteristics of Body Diode

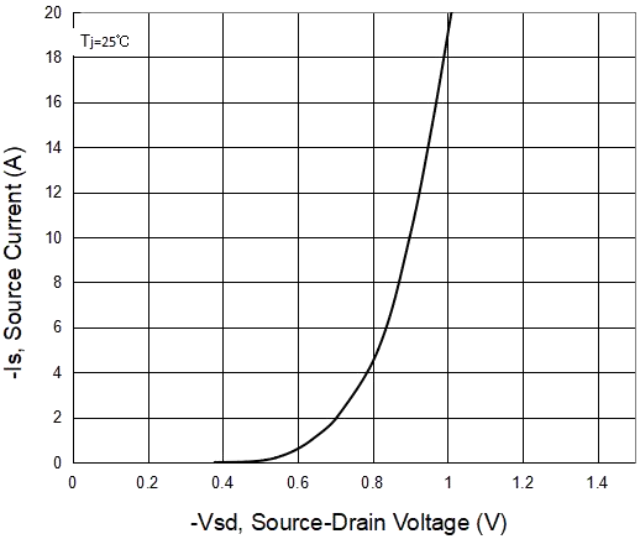


Figure 9: Typ. transfer characteristics

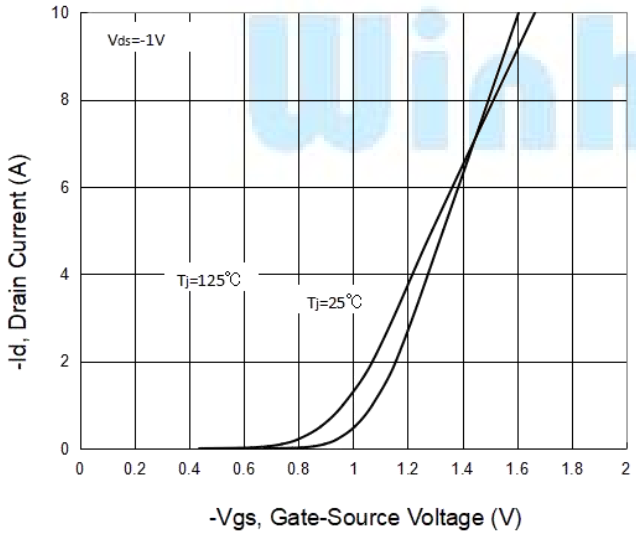


Figure 10: Max Power Dissipation

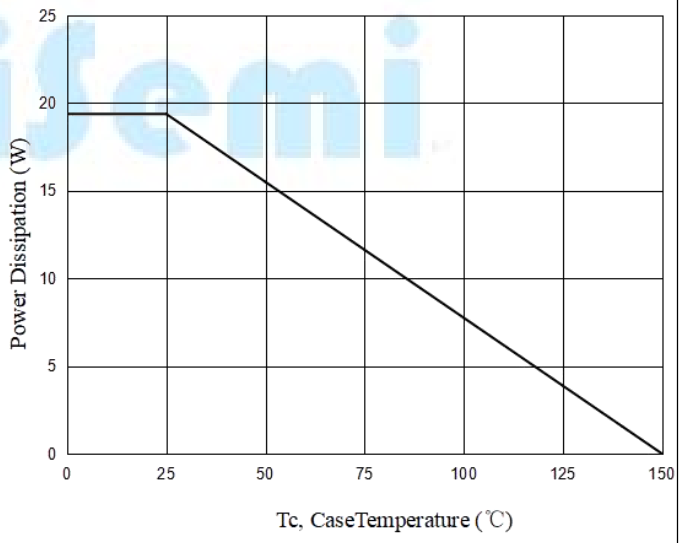


Figure 11: Max. transient thermal impedance

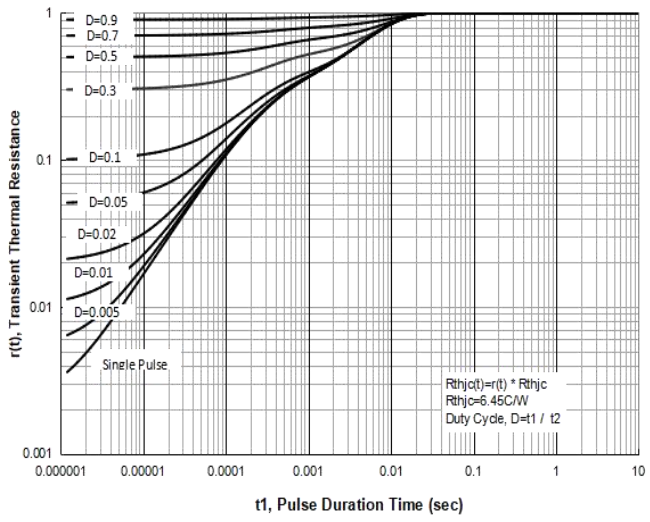


Figure 12: Safe Operating Area

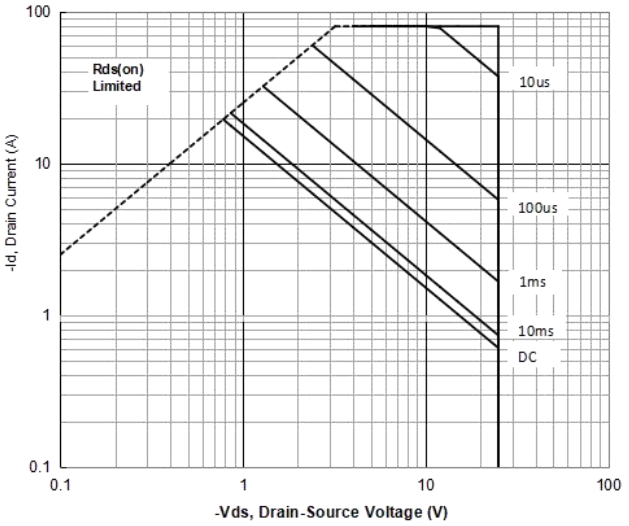
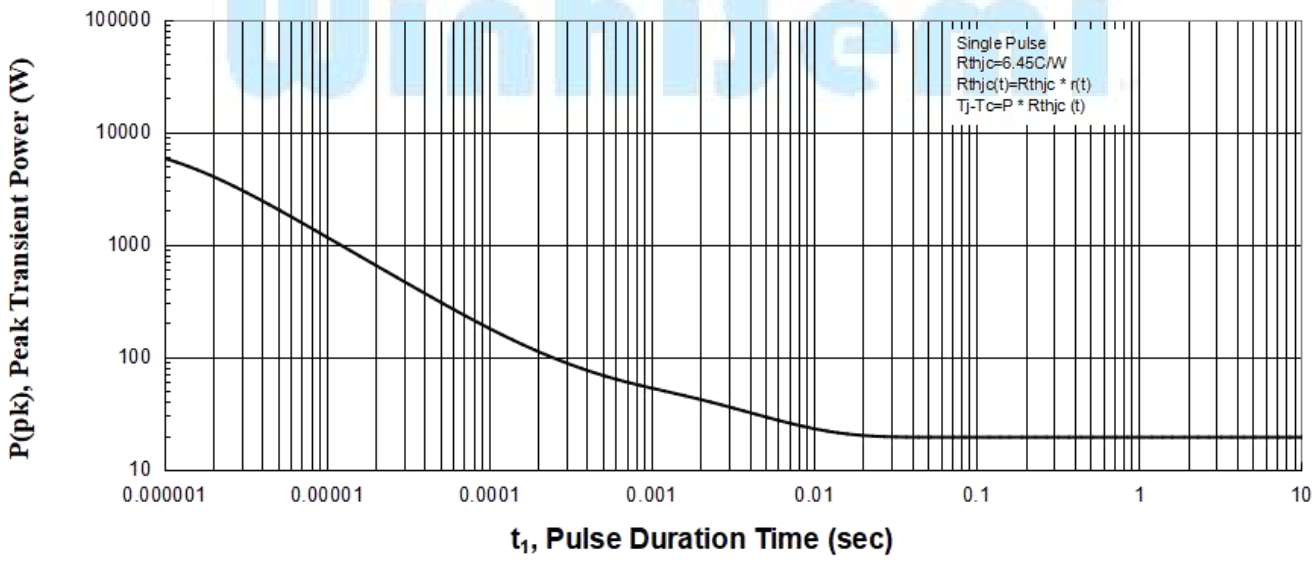
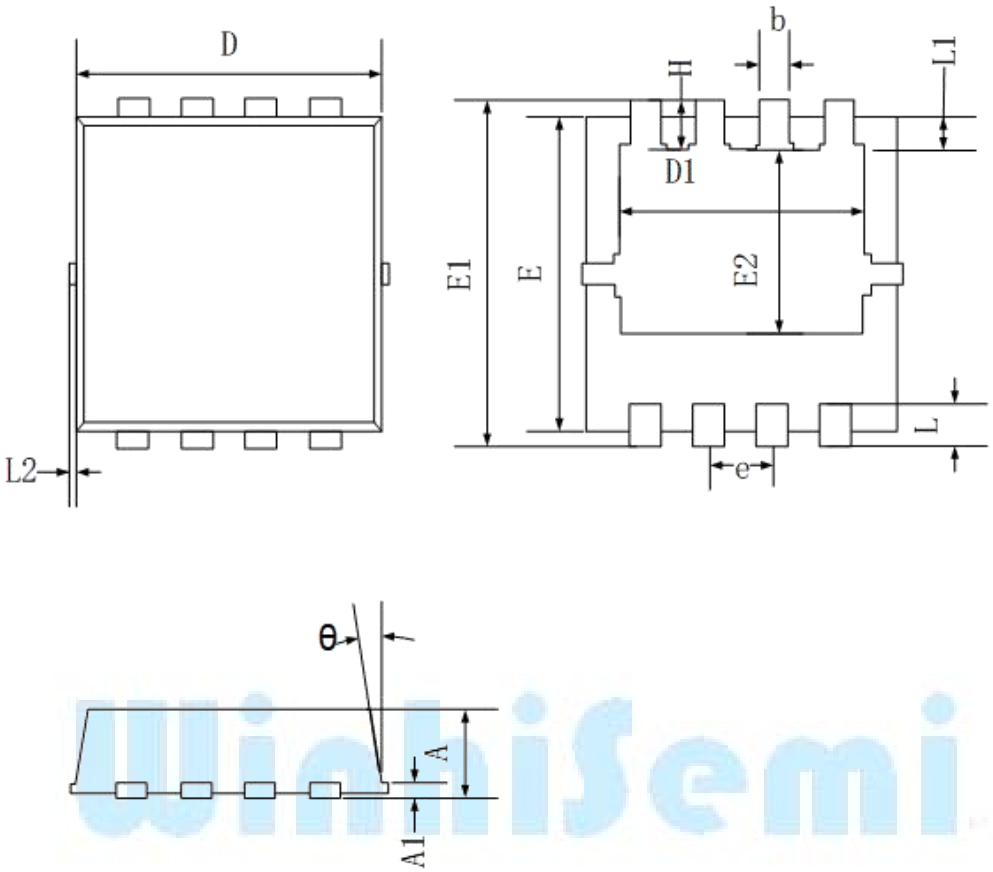


Figure 13: Single pulse power rating, Junction to case



Mechanical Dimensions (PDFN3.3*3.3 Unit: mm)



Symbol	Dimensions(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	1.35	2.20
b	0.20	0.40
e	0.65BSC	
L	0.30	0.50
L1	0.13BSC	
L2	0.00	0.20
H	0.15	0.65
θ	0°	14°

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Chengdu Winhi Semiconductor Co., LTD

Main Sites:

- **Headquarters**

Hangzhou Via-Media Semiconductor Co., LTD.
1305-1306, Building 71, No. 90, Wensan Road, Xihu District, Hangzhou, Zhejiang Province, P.R. China
Tel: +86-0571-8515 0563

- **Chengdu Office**

Chengdu Winhi Semiconductor Co., LTD.
Floor 15, Building 5, No. 171, Hele 2nd Street, Chengdu, Sichuan Province, P.R. China
Tel: +86-028-8505 0771

- **Shanghai**

Shanghai R&D Center.
1506~1508, Xinyin Building, 888 Yishan Road, Shanghai, P.R of China
Tel: +86- 021-54201999

- **Shenzhen**

Shenzhen Sales Center.
17B, No.1 Phoenix Building, 2008 Shennan Road, Shenzhen, P.R of China
Tel: +86-0755- 82570682

- **Xi'an**

Xi'an R&D Center
1703B, Building A, Greenland Center, Jinye Road, High-Tech Zone, Xi'an, Shaanxi, P.R of China