

/ Descriptions

VRW5609 Q P RV
Dual N-Channel MOSFET in a SOT23-6 Plastic Package.

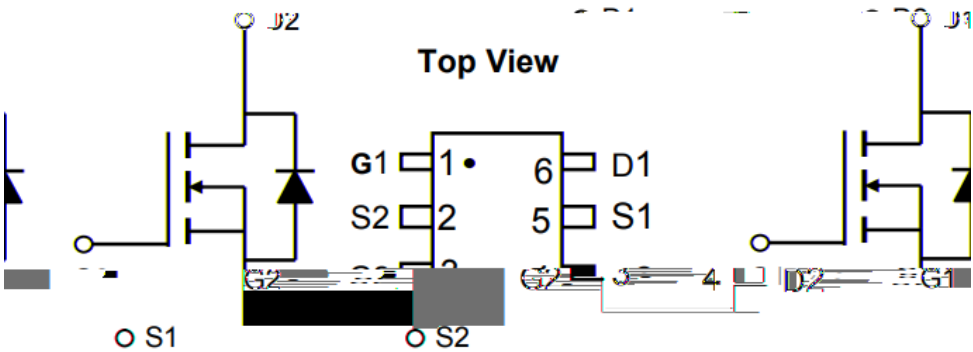
/ Features

Super high dense cell design for low $R_{DS(ON)}$,Rugged and reliable, HF product.

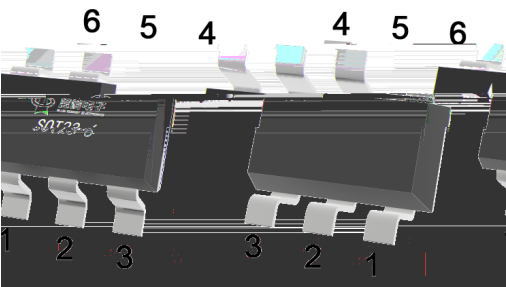
/ Applications

Power Management in Notebook computer, Portable Equipment and Battery powered systems.

/ Equivalent Circuit



/ Pinning



PIN1 G1 PIN 2 S2 PIN 3 G2
PIN 4 D2 PIN 5 S1 PIN 6 D1

/ Marking

Marking	H310
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/ Absolute Maximum Ratings(Ta=25)

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current – Continuous		I_D	3.0	A
Pulsed Drain Current		I_{DM}	15	A
Power Dissipation		P_D	0.9	W
Storage Temperature Range		T_{stg}	-55 150	
Maximum Junction-to-Ambient	$t \leq 10s$	$R_{\theta JA}$	60	/W
Maximum Junction-to-Ambient	Steady-State		96	
Maximum Junction-to-Lead	Steady-State	$R_{\theta JL}$	40	

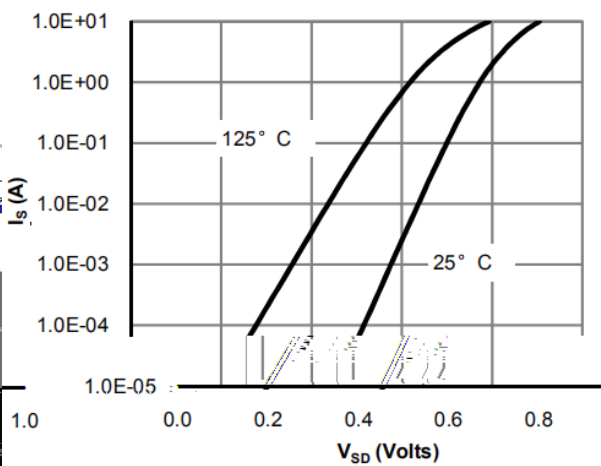
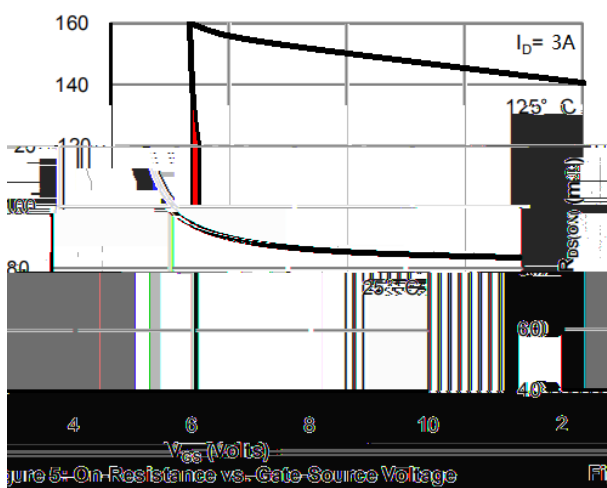
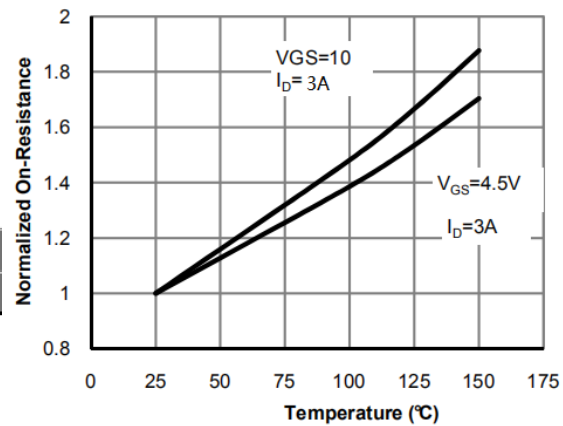
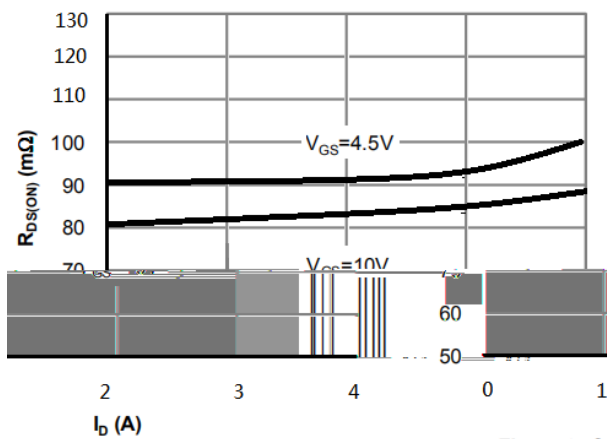
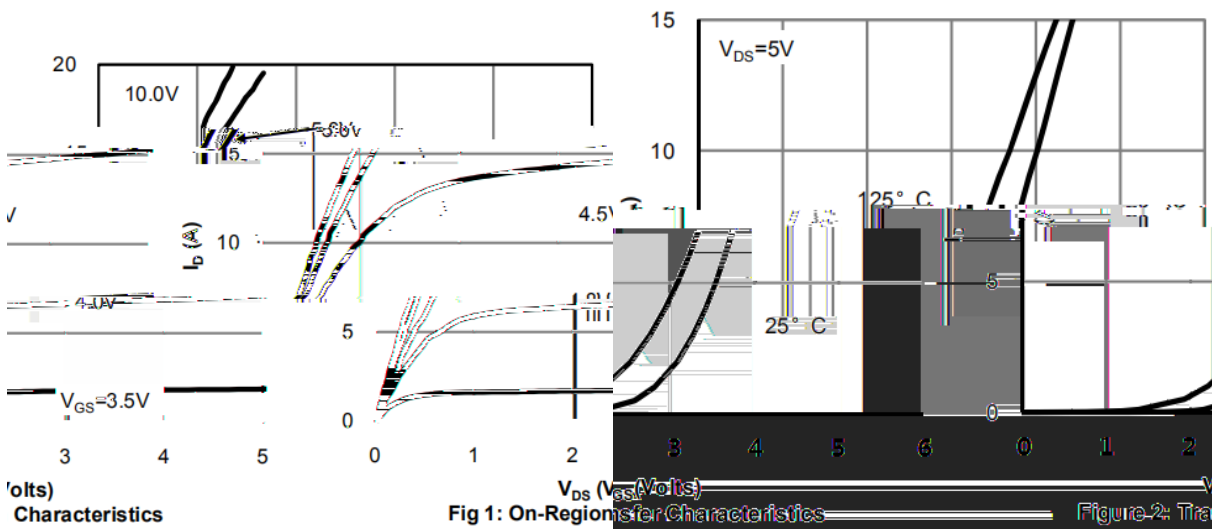
/ Electrical Characteristics(Ta=25)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
Drain–Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0$	$I_D=10\mu A$	60	68		V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS}=0$	$V_{DS}=60V$			1.0	μA
Gate–Body Leakage.	I_{GSS}	$V_{GS}=\pm 20V$	$V_{DS}=0V$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$	$I_D=50\mu A$	1.0	1.8	3.0	V
Static Drain–Source On–Resistance	$R_{DS(on)1}$	$V_{GS}=10V$	$I_D=3A$		84	90	m Ω
	$R_{DS(on)2}$	$V_{GS}=4.5V$	$I_D=3A$		94	110	m Ω
Drain–Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V$	$I_D=1A$		0.75	1.2	V

/ Electrical Characteristics(Ta=25)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Capacitance	Ciss	VGS=0V, VDS=25V f=1MHz		415		pF
Output Capacitance	Coss			37		
Reverse Transfer Capacitance	Crss			25		
Gate resistance	Rg	VGS=0V, VDS=0V f=1MHz		3.4		Ω
Total Gate Charge	Qg(10V)	VGS=10V, VDS=30V ID=4.2A		10	12	nC
Total Gate Charge	Qg(4.5V)			5	6	
Gate Source Charge	Qgs			2		
Gate Drain Charge	Qgd			3		
Turn-On Delay Time	t _{d(on)}	VGS=10V, VDS=30V RL=7 Ω , RGEN=3 Ω			7	ns
Turn-On Rise Time	t _r				4	
Turn-Off Delay Time	t _{d(off)}				20	
Turn-Off Fall Time	t _f				3	

/ Electrical Characteristic Curve



/ Electrical Characteristic Curve

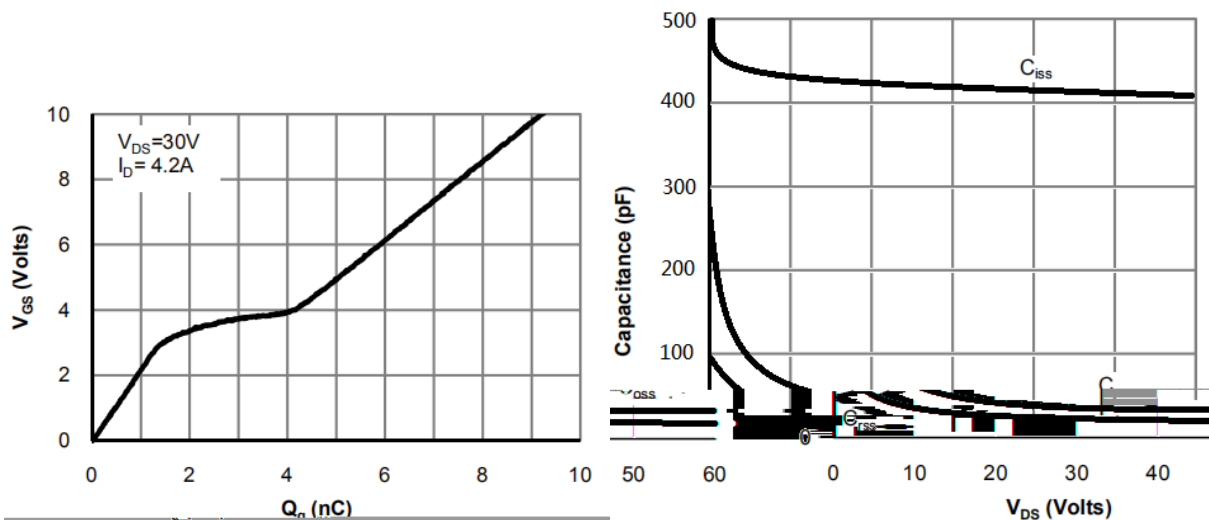
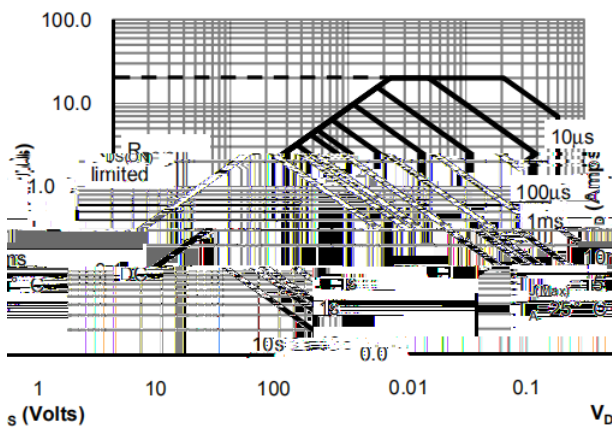


Figure 7: Gate-Charge Characteristics

Since Characteristics

Figure 8: Capacitance Characteristics



Maximum Safe Operating Area

Figure 9: Maximum Safe Operating Area

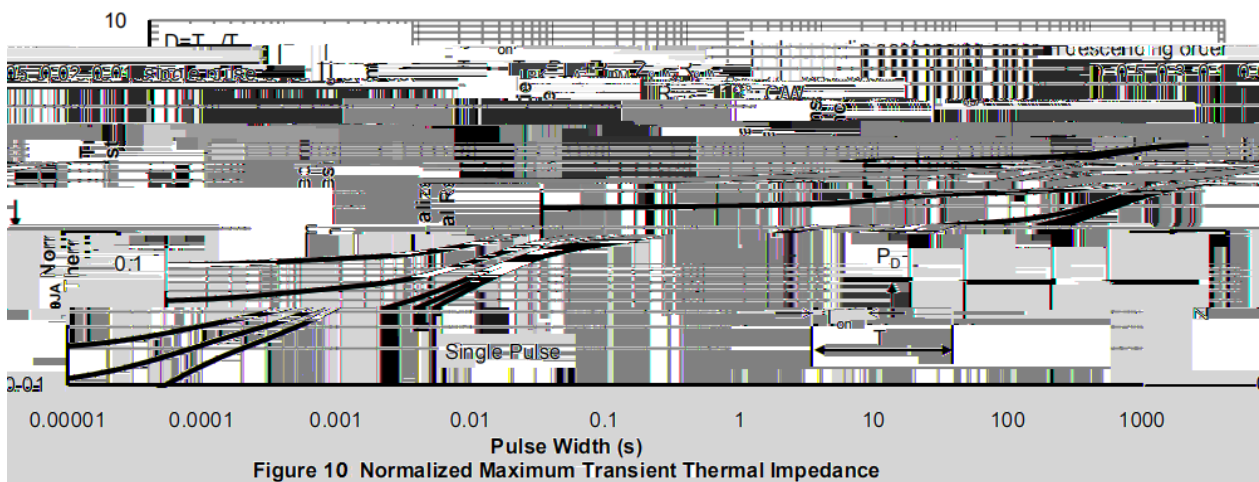
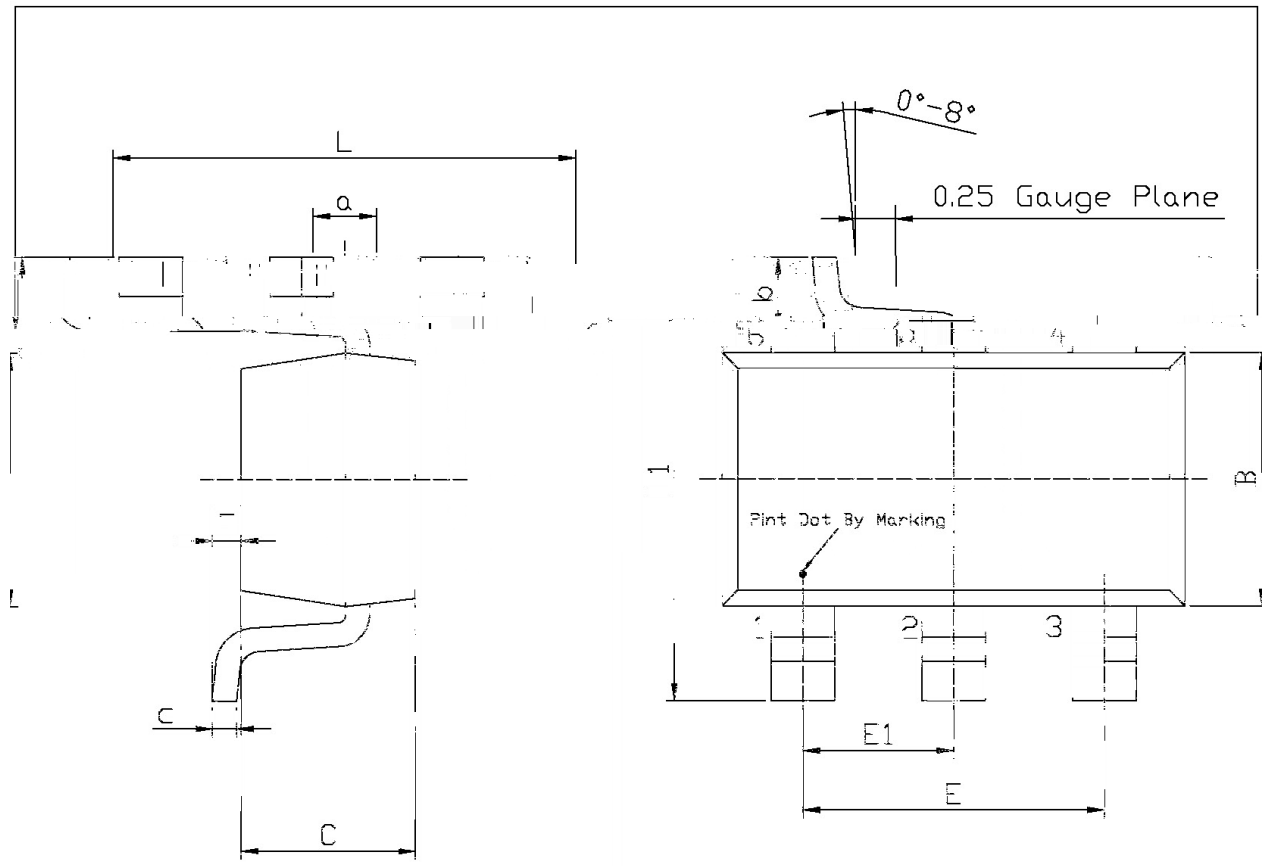


Figure 10 Normalized Maximum Transient Thermal Impedance

/ Package Dimensions



Unit: mm

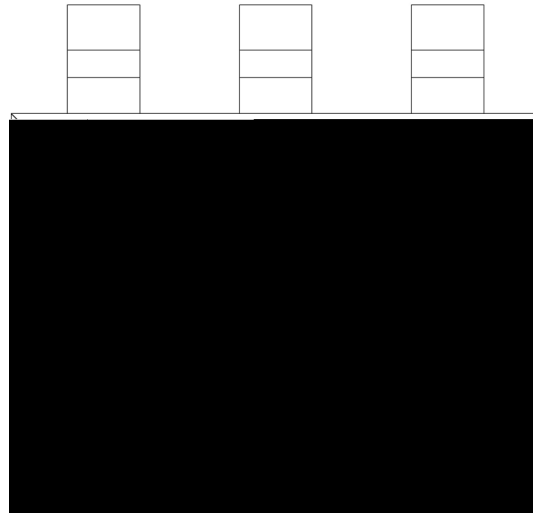
Symbol	Dimensions In Millimeters	
	Min	Max
E1	0.85	1.05
a	0.35	0.50
c	0.10	0.20
b	0.35	0.55
F	0	0.15

Symbol	Dimensions In Millimeters	
	Min	Max
L	2.82	3.32
B	1.50	1.70
C	0.90	1.30
L1	2.60	3.00
E	1.80	2.00

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SOT23

/ Marking Instructions



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310

Note:

H Company Code

310 Product Type Code

**** Lot No. Code, code change with Lot No

() / Temperature Profile for IR Reflow Soldering(Pb-Free)

Note:

- 1 150 ~ 180℃ 60 ~ 90sec;
 2 245 ± 5℃ 5 ± 0.5sec;
 3 2 ~ 10℃/sec.

- 1.Preheating:150~180℃, Time:60~90sec.
 2.Peak Temp.:245 ± 5℃, Duration:5 ± 0.5sec.
 3. Cooling Speed: 2~10℃/sec.

/ Resistance to Soldering Heat Test Conditions

260 ± 5℃ 10 ± 1 sec. Temp.:260±5 Time:10±1 sec

/ Packaging SPEC.

/ REEL