

Description

The WSF2060 uses advanced trench technology and design to provide excellent RDS(ON) with low gate charge. It can be used in a wide variety of applications.

General Features

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high EAS
- Excellent package for good heat dissipation

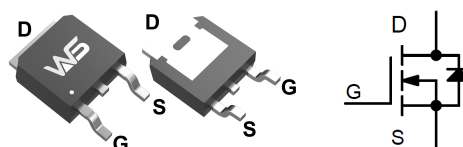
Product Summary

BVDSS	RDSON	ID
20V	3.5mΩ	60A

Application

- Power switching application
- Hard switched
- Uninterruptible power supply

TO-252 Pin Configuration



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

Symbol	Parameter	Limit	Unit	
VDS	Drain-Source Voltage	20	V	
VGS	Gate-Source Voltage	±12	V	
ID	Drain Current-Continuous	60	A	
ID*	Drain Current-Continuous	TC=100°C	52	A
IDM	Pulsed Drain Current	320	A	
PD	Maximum Power Dissipation	83	W	
	Derating factor	0.56	W/°C	
EAS	Single pulse avalanche energy (Note 5)	280	mJ	
TJ,TSTG	Operating Junction and Storage Temperature Range	-55 To 175	°C	

Thermal Characteristic

RθJC	Thermal Resistance, Junction-to-Case(Note 2)	1.8	°C/W
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Electrical Characteristics (T_c=25 °C unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Off Characteristics						
B _{VDS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	20	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =20V, V _{GS} =0V	-	-	1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±12V, V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	0.5	0.75	1.1	V
R _{DS(on)}	Drain-Source On-State Resistance	V _{GS} =4.5V, I _D =20A	-	3.5	5.5	mΩ
		V _{GS} =2.5V, I _D =20A	-	6	7.5	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =20A	20	-	-	S
Dynamic Characteristics (Note 4)						
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, F=1.0MHz	-	2016	-	PF
C _{oss}	Output Capacitance		-	391	-	PF
C _{rss}	Reverse Transfer Capacitance		-	130	-	PF
Switching Characteristics (Note 4)						
t _{d(on)}	Turn-on Delay Time	V _{DD} =10V, I _D =20A V _{GS} =10V, R _{GEN} =2.7Ω	-	6	-	nS
t _r	Turn-on Rise Time		-	4	-	nS
t _{d(off)}	Turn-Off Delay Time		-	31	-	nS
t _f	Turn-Off Fall Time		-	5	-	nS
Q _g	Total Gate Charge	V _{DS} =10V I _D =20A, V _{GS} =4.5V	-	15	-	nC
Q _{gs}	Gate-Source Charge		-	3	-	nC
Q _{gd}	Gate-Drain Charge		-	4	-	nC
Drain-Source Diode Characteristics						
V _{SD}	Diode Forward Voltage (Note 3)	V _{GS} =0V, I _S =20A	-	-	1.2	V
I _S	Diode Forward Current (Note 2)		-	-	60	A
t _{rr}	Reverse Recovery Time	T _J = 25 °C, I _F = 20A	-	18	-	nS
Q _{rr}	Reverse Recovery Charge	di/dt = 100A/μS (Note 3)	-	30	-	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition: T_J=25 °C, V_{DD}=10V, V_G=10V, L=0.5mH, R_g=25Ω

Typical Electrical and Thermal Characteristics (Curves)

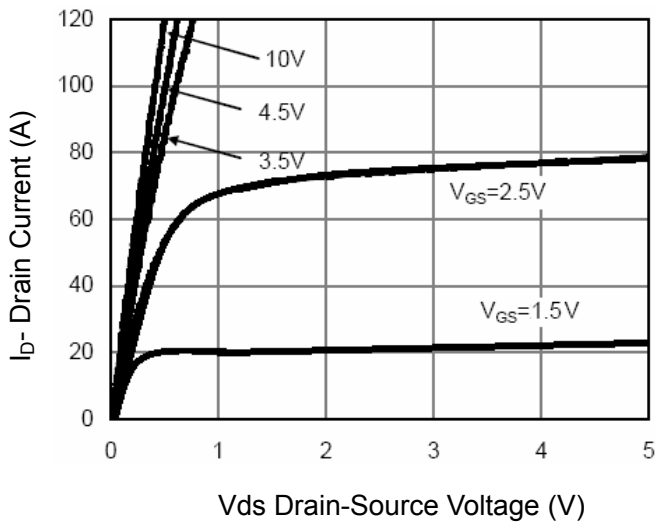


Figure 1 Output Characteristics

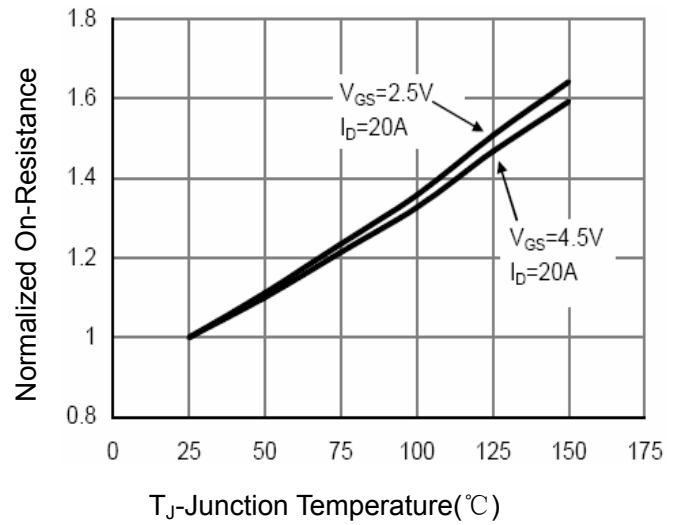


Figure 4 Rdson-Junction Temperature

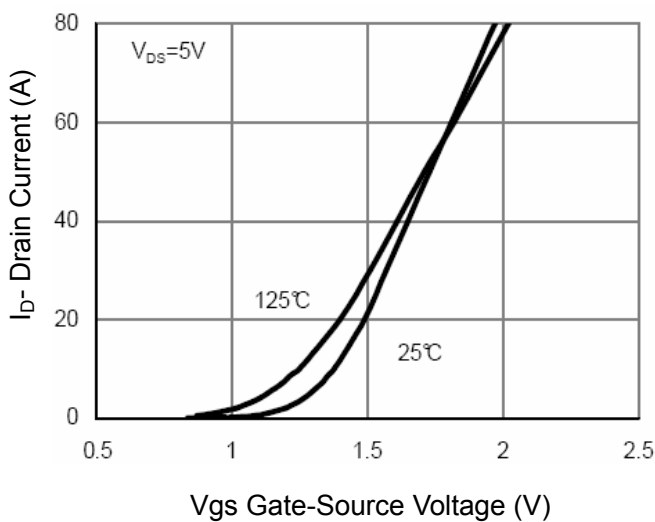


Figure 2 Transfer Characteristics

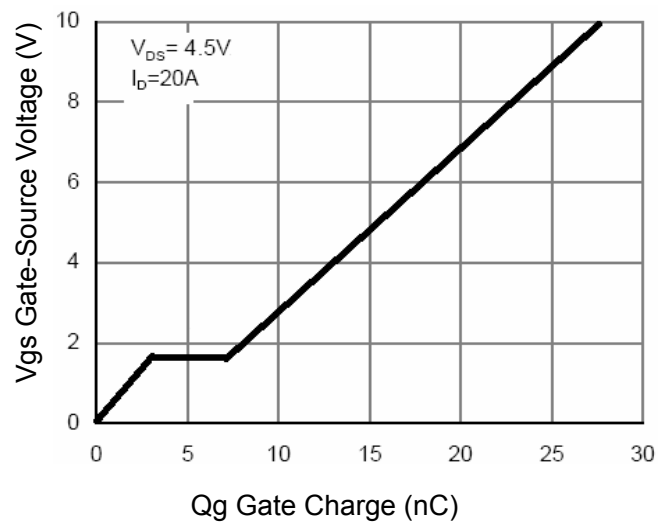


Figure 5 Gate Charge

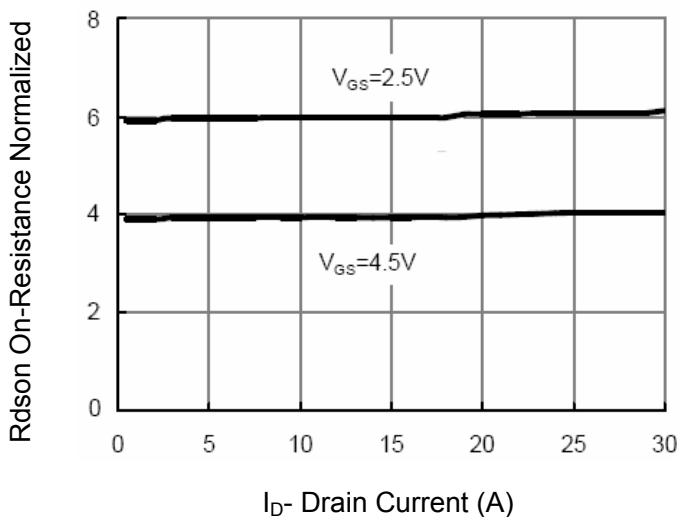


Figure 3 Rdson- Drain Current

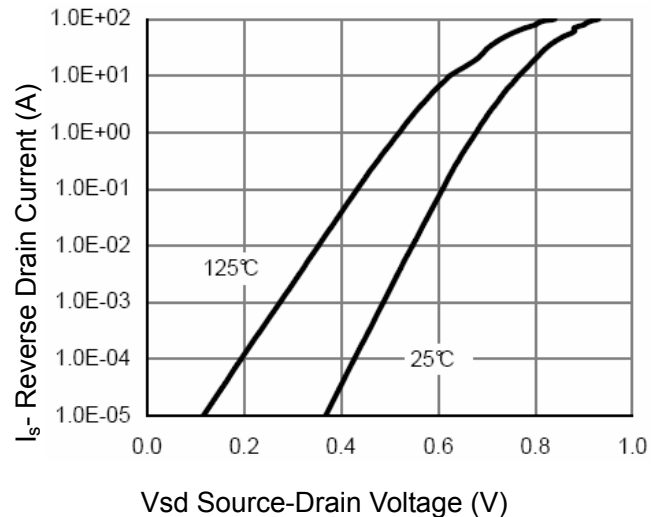


Figure 6 Source- Drain Diode Forward

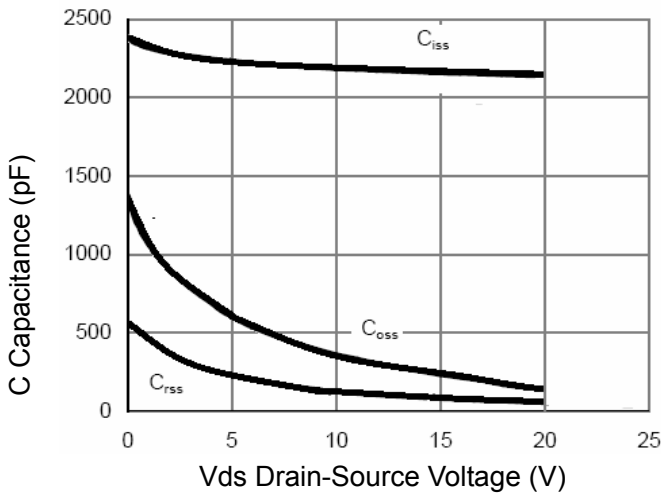


Figure 7 Capacitance vs Vds

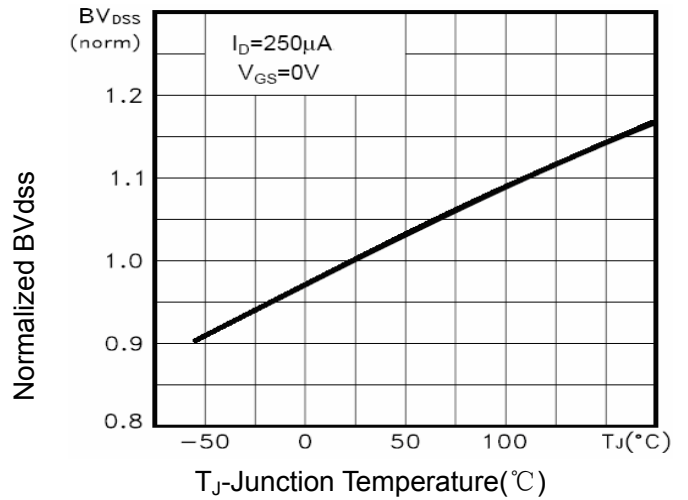


Figure 9 BV_{DSS} vs Junction Temperature

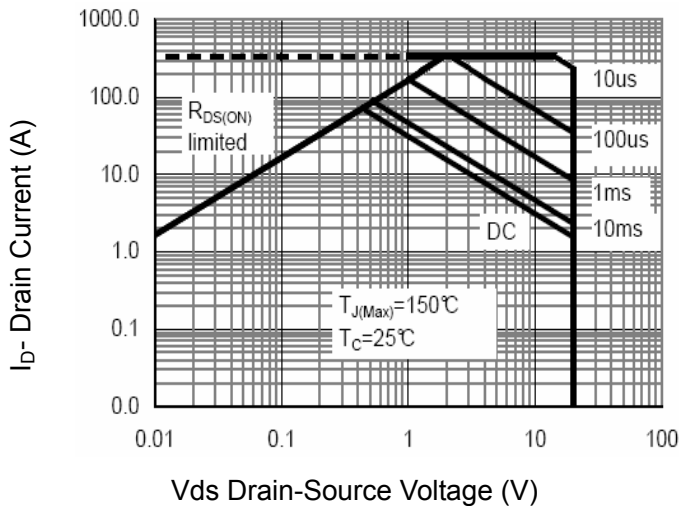


Figure 8 Safe Operation Area

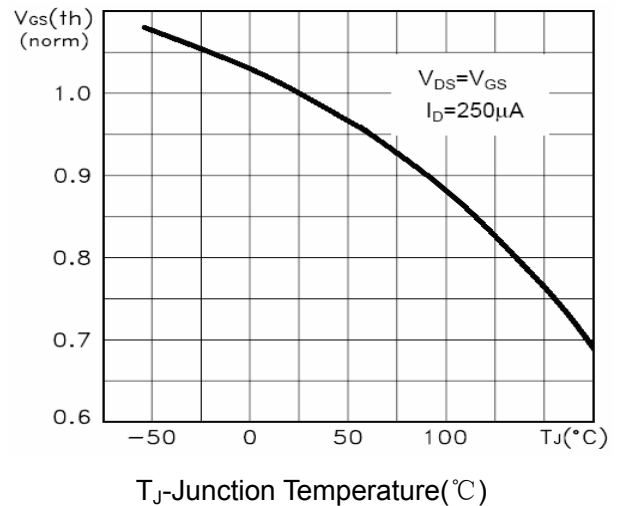


Figure 10 V_{GS(th)} vs Junction Temperature

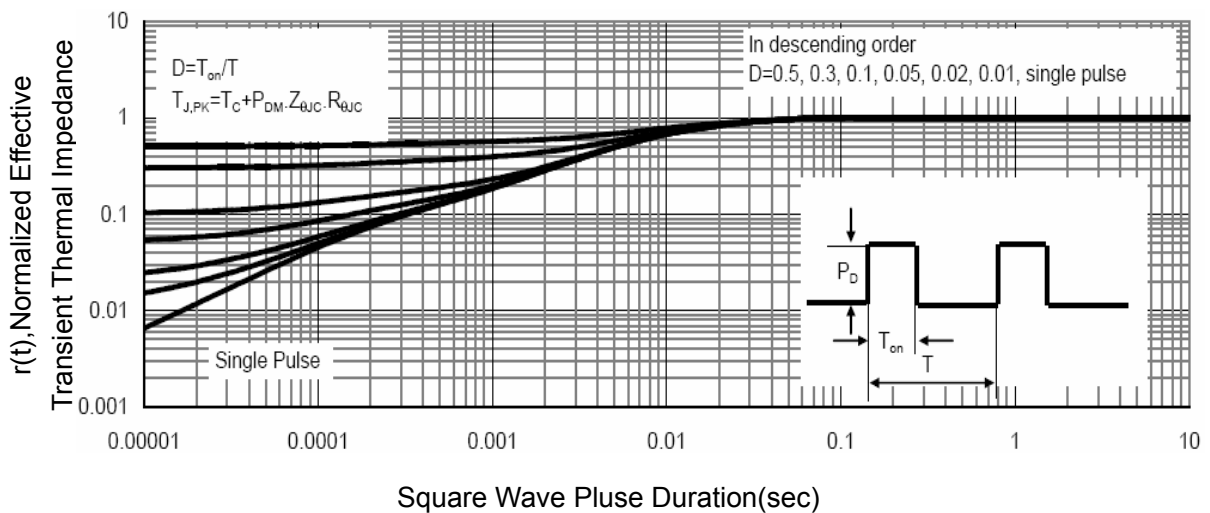


Figure 11 Normalized Maximum Transient Thermal Impedance



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