General Description

The WSF15N10A uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

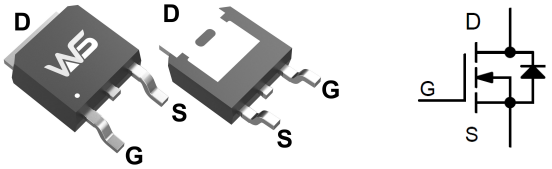
Product Summery

BVDSS	RDSON	ID
100V	90mΩ	15A

Features

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

TO-252 Pin Configuration



Application

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	15	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	7	A
I_{DM}	Pulsed Drain Current[2]	40	A
P_D@T_C=25℃	Maximum Power Dissipation	40	W
	Derating factor	0.27	W/℃
EAS	Single Pulse Avalanche Energy[3]	20	mJ
T_J T_{STG}	Operating Junction Temperature Range	-55 to 170	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1]	---	50	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	3.8	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	100	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.098	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=5A	---	90	110	mΩ
		V_{GS}=4.5V , I_D=2A	---	110	150	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	1.5	2.5	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=80V , V_{GS}=0V , T_J=25℃	---	---	1	nA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	uA
gfs	Forward Transconductance	V_{DS}=5V , I_D=5A	3.5	---	---	S
Q_g	Total Gate Charge (10V)	V_{DS}=50V , V_{GS}=10V , I_D=5A	---	21.5	---	nC
Q_{gs}	Gate-Source Charge		---	3.2	---	
Q_{gd}	Gate-Drain Charge		---	6.0	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=30V , V_{GS}=10V , R_G=6Ω I_D=1A , R_L=30Ω	---	11	24	ns
T_r	Rise Time		---	7.4	15	
$T_{d(off)}$	Turn-Off Delay Time		---	35	45	
T_f	Fall Time		---	9.1	12	
C_{iss}	Input Capacitance	V_{DS}=30V , V_{GS}=0V , f=1MHz	---	730	980	pF
C_{oss}	Output Capacitance		---	37	55	
C_{rss}	Reverse Transfer Capacitance		---	27	35	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	10	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=10A , T_J=25℃	---	---	1.2	V
t_{rr}	Reverse Recovery Time	IF=10A , dI/dt=100A/μs , T_J=25℃	17	21	61	nS
Q_{rr}	Reverse Recovery Charge		61	97	113	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：Tj=25℃,V_{DD}=50V,V_G=10V,L=0.5mH,Rg=25

Typical Characteristics

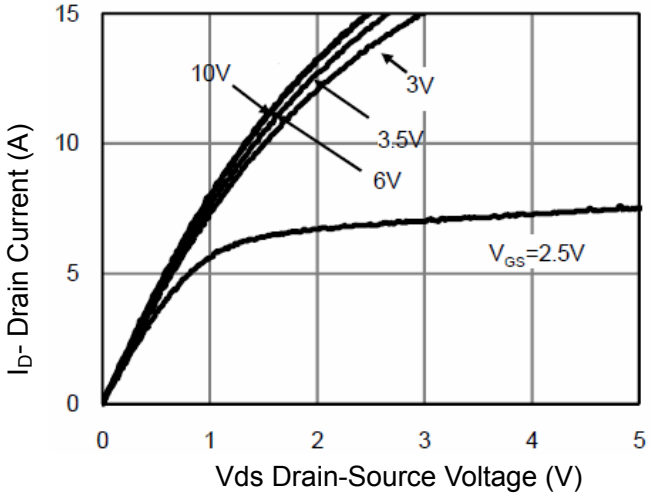


Figure 1 Output Characteristics

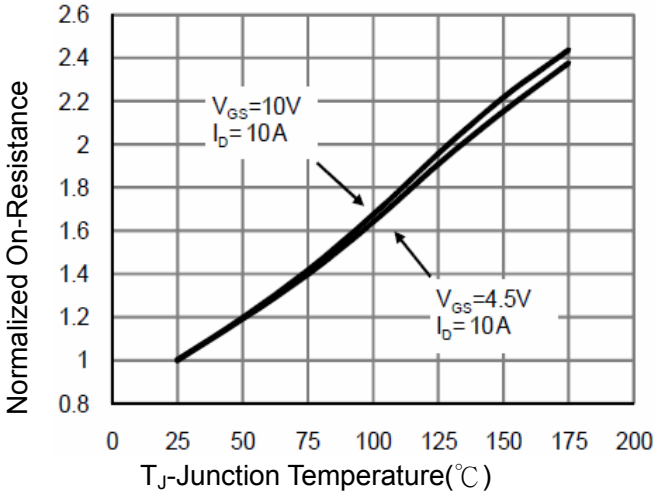


Figure 4 Rdson-JunctionTemperature

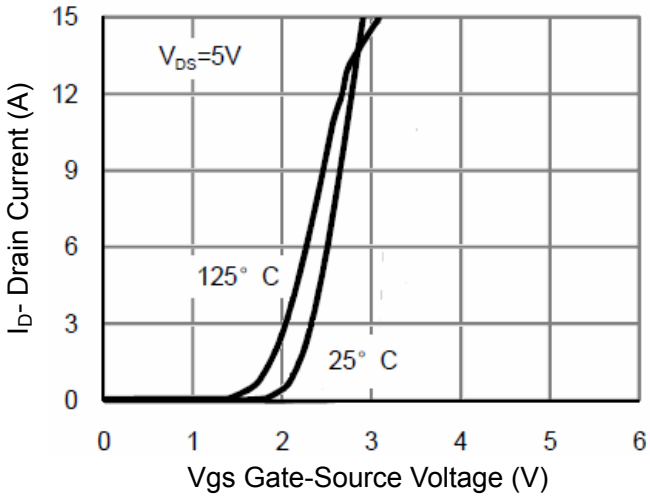


Figure 2 Transfer Characteristics

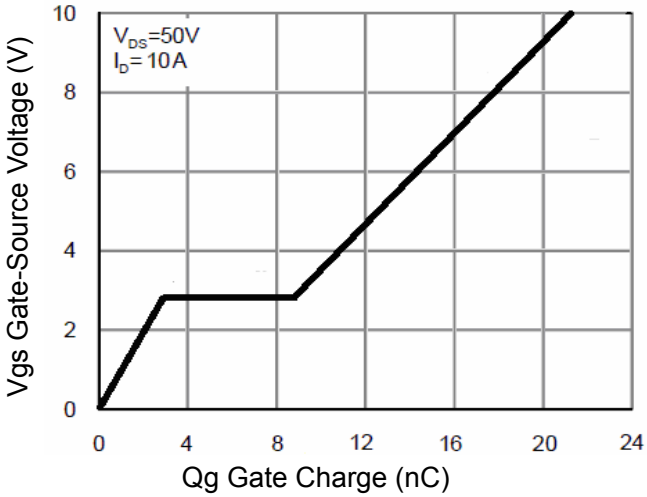


Figure 5 Gate Charge

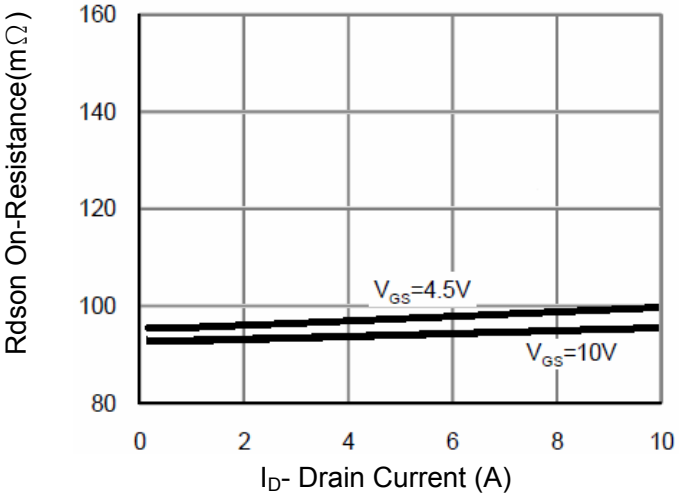


Figure 3 Rdson- Drain Current

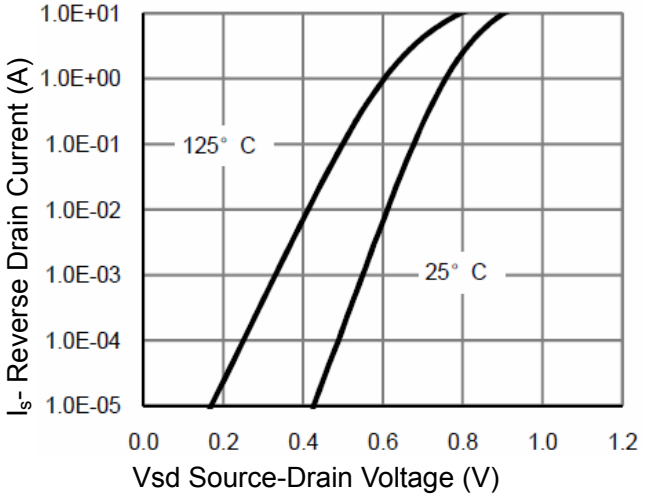


Figure 6 Source- Drain Diode Forward

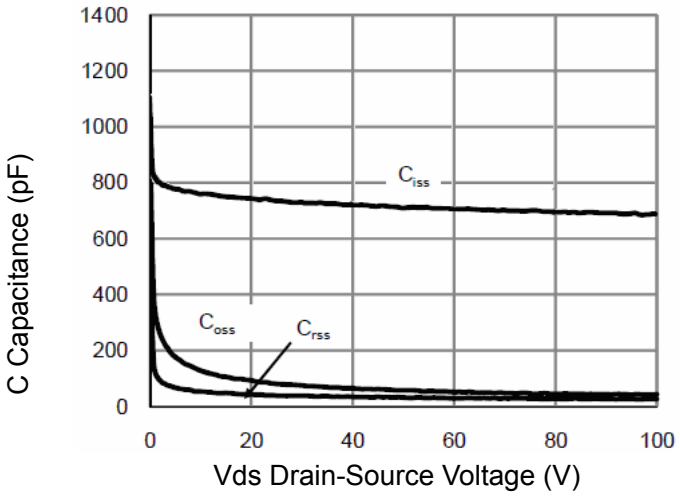


Figure 7 Capacitance vs Vds

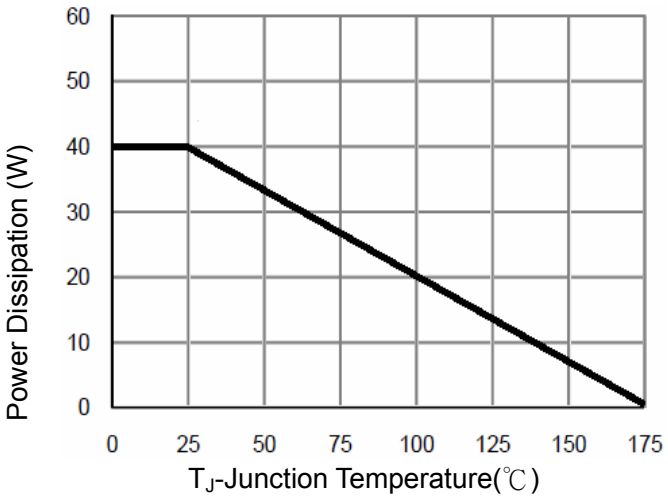


Figure 9 Power De-rating

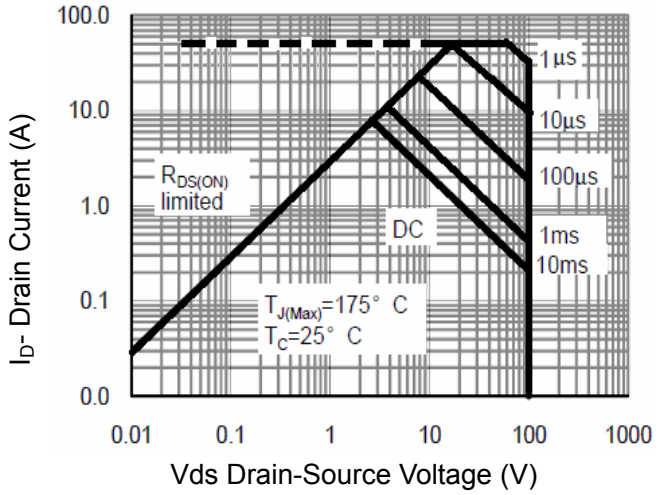


Figure 8 Safe Operation Area

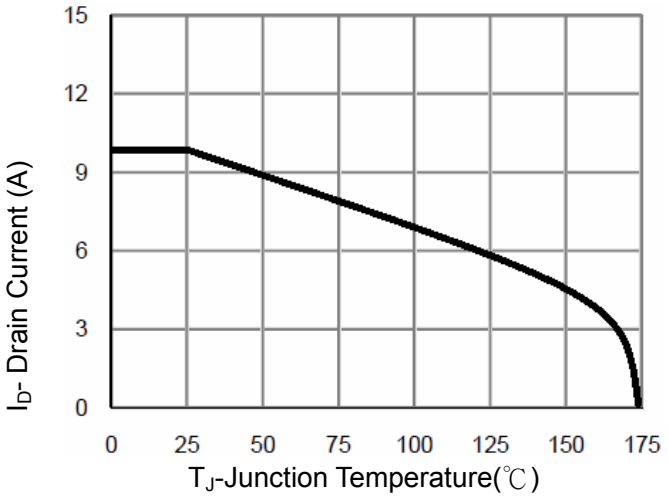


Figure 10 Current De-rating

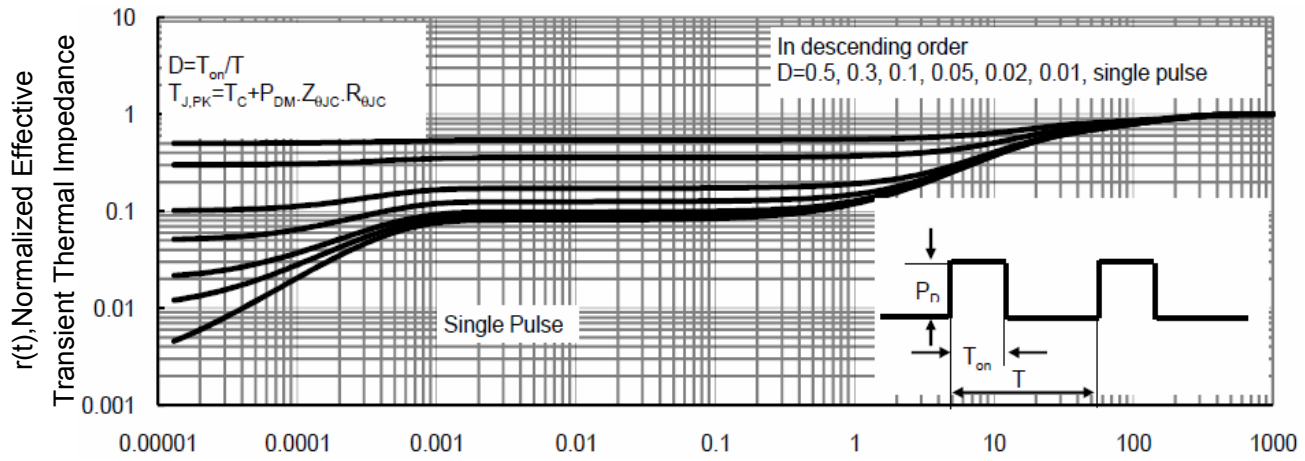


Figure 11 Normalized Maximum Transient Thermal Impedance

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