

General Description

The WSF15N10G uses advanced SGT MOS technology to provide low $R_{DS(ON)}$, low gate charge, fast switching and excellent avalanche characteristics. This device is specially designed to get better ruggedness and suitable to use in Synchronous rectification applications

Features

- advanced SGT MOS technology
- Low gate charge
- Low $R_{DS(ON)}$

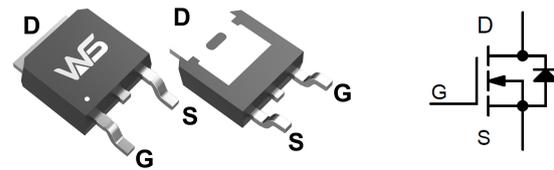
Product Summary

BVDSS	$R_{DS(ON)}$	I_D
100V	75m Ω	15A

Applications

- Fast Switching
- DC-DC Power System
- Load Switch

TO-252 Pin Configuration



Absolute Maximum Ratings at $T_j=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current ¹⁾	15	A
$I_{D, pulse}$	Pulsed Drain Current ²⁾	45	A
E_{AS}	Single Pulse Avalanche Energy ⁴⁾	5.5	mJ
P_D	Total Power Dissipation ³⁾	36	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient ⁵⁾	---	62	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case	---	3.5	$^\circ\text{C/W}$

Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	100	---	---	V
ΔBV _{DSS} /ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.098	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =5A	---	50	75	mΩ
		V _{GS} =4.5V, I _D =2A	---	60	90	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	---	2.5	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =80V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =80V, V _{GS} =0V, T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	28.8	---	Ω
Q _g	Total Gate Charge (10V)	V _{GS} =10V, V _{DS} =50V, I _D =5A	---	6.5	---	nC
Q _{gs}	Gate-Source Charge		---	1.4	---	
Q _{gd}	Gate-Drain Charge		---	1.4	---	
T _{d(on)}	Turn-On Delay Time	V _{GS} =10V, V _{DS} =50V, R _G =2Ω, I _D =5A	---	14	---	ns
T _r	Rise Time	---	3.2	---		
T _{d(off)}	Turn-Off Delay Time	---	36	---		
T _f	Fall Time	---	14	---		
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V, f=100KHz	---	310	---	pF
C _{oss}	Output Capacitance	---	---	80	---	
C _{rss}	Reverse Transfer Capacitance	---	---	50	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous diode current ¹⁾	V _G =V _D =0V, Force Current	---	---	15	A
I _{SP}	Pulsed diode current ²⁾		---	---	45	A
V _{SD}	Diode Forward Voltage ²⁾	V _{GS} =0V, I _S =5A, T _J =25°C	---	---	1.3	V
t _{rr}	Reverse Recovery Time	I _F =5A, dI/dt=100A/μs, T _J =25°C	---	36	---	nS
Q _{rr}	Reverse Recovery Charge		---	37	---	nC

- 1) Calculated continuous current based on maximum allowable junction temperature.
- 2) Repetitive rating; pulse width limited by max. junction temperature.
- 3) Pd is based on max. junction temperature, using junction-case thermal resistance.
- 4) V_{DD}=50V, R_G=25Ω, L=0.3mH, starting T_J=25°C.
- 5) The value of R_{θJA} is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_a=25°C.

Typical Characteristics

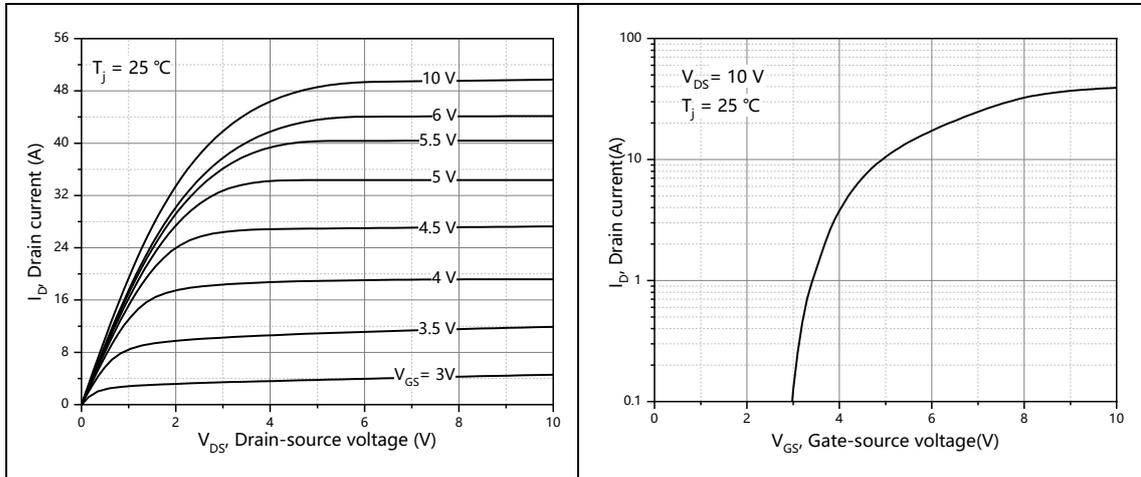


Figure 1, Typ. output characteristics

Figure 2, Typ. transfer characteristics

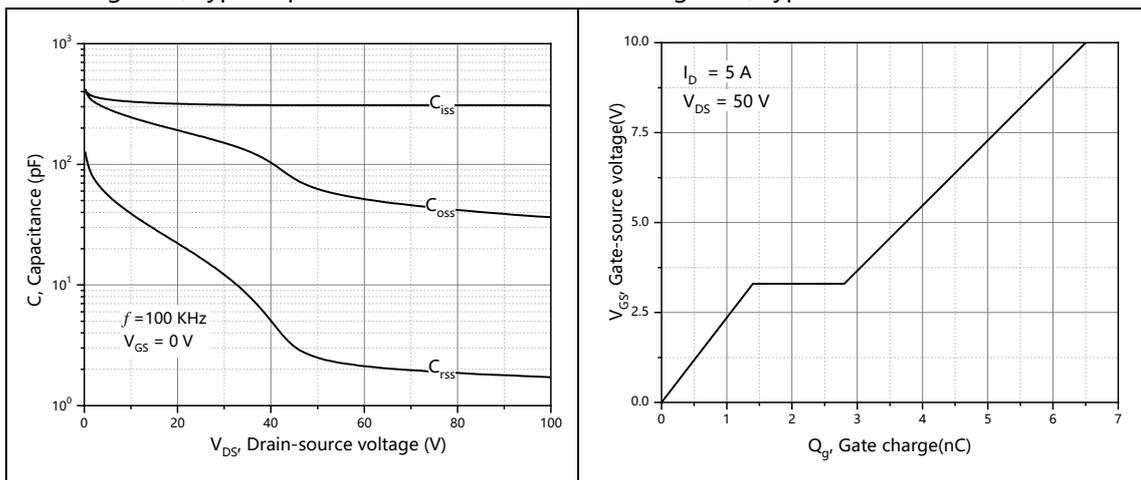


Figure 3, Typ. capacitances

Figure 4, Typ. gate charge

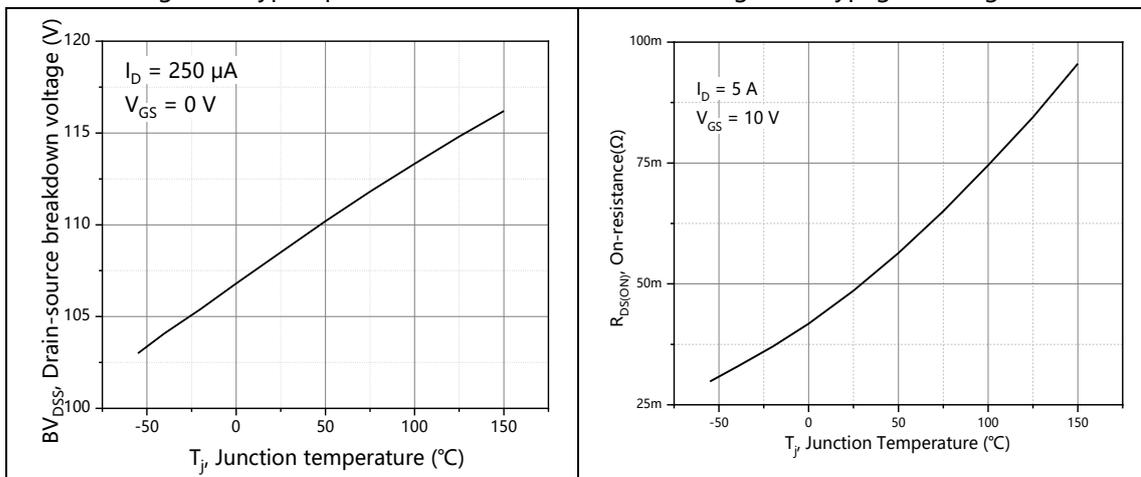


Figure 5, Drain-source breakdown voltage

Figure 6, Drain-source on-state resistance

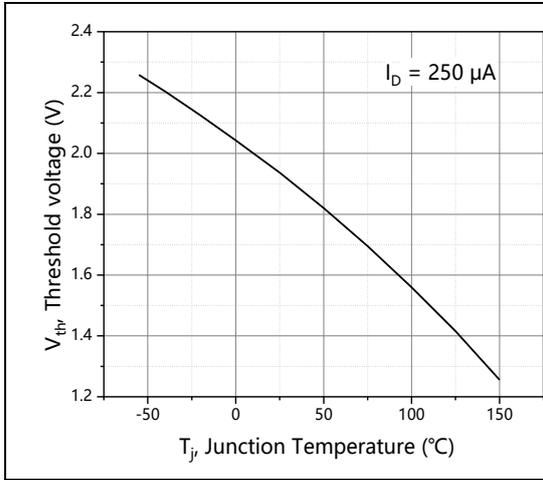


Figure 7, Threshold voltage

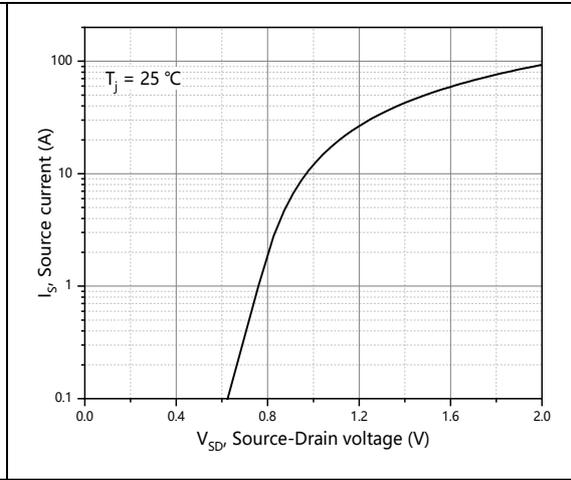


Figure 8, Forward characteristic of body diode

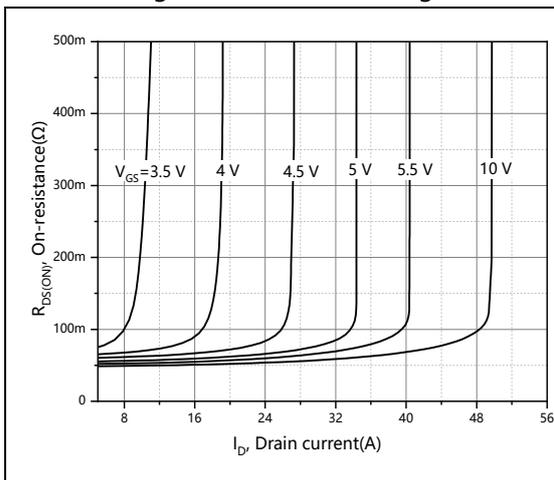


Figure 9, Drain-source on-state resistance

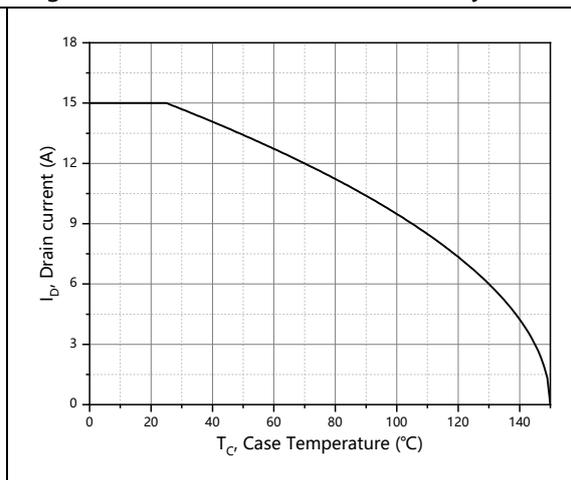


Figure 10, Drain current

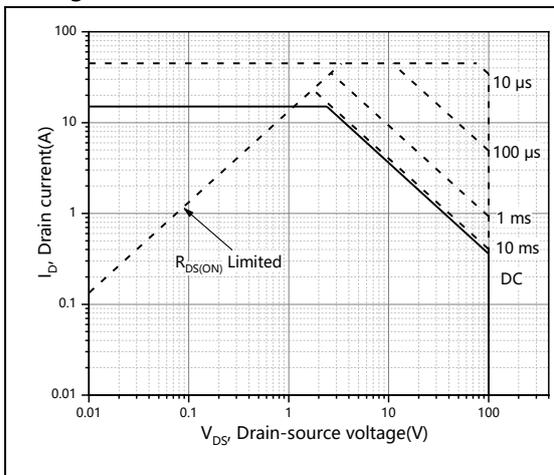


Figure 11, Safe operation area $T_C=25\text{ }^\circ\text{C}$

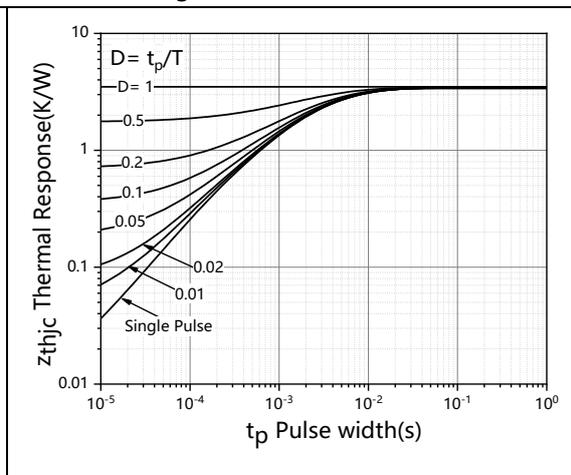


Figure 12, Max. transient thermal impedance



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