

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 $R_{DS(ON)}$

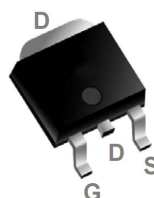
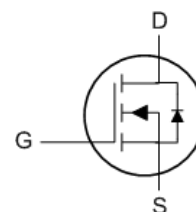
Product Summary

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 ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	100	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BVDSS Temperature Coefficient	Reference to 25°C , $I_D=1mA$	---	0.098	---	V/ $^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V$, $I_D=5A$	---	50	75	$m\Omega$
		$V_{GS}=4.5V$, $I_D=2A$	---	60	90	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	1.2	2.0	2.7	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=80V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=80V$, $V_{GS}=0V$, $T_J=55^\circ\text{C}$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1MHz$	---	28.8	---	Ω
Q_g	Total Gate Charge (10V)	$V_{GS}=10V$,	---	6.5	---	nC
Q_{gs}	Gate-Source Charge	$V_{DS}=50V$,	---	1.4	---	
Q_{gd}	Gate-Drain Charge	$I_D=5A$	---	1.4	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{GS}=10V$,	---	14	---	ns
T_r	Rise Time	$V_{DS}=50V$,	---	3.2	---	
$T_{d(off)}$	Turn-Off Delay Time	$R_G=2\Omega$,	---	36	---	
T_f	Fall Time	$I_D=5A$	---	14	---	
C_{iss}	Input Capacitance	$V_{GS}=0V$,	---	410	---	pF
C_{oss}	Output Capacitance	$V_{DS}=25V$,	---	80	---	
C_{rss}	Reverse Transfer Capacitance	$f=100\text{ KHz}$	---	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⁾	$V_{GS}=0V$, $I_S=5A$, $T_J=25^\circ\text{C}$	---	---	1.3	V
t_{rr}	Reverse Recovery Time	$I_F=5A$,	---	36	---	nS
Q_{rr}	Reverse Recovery Charge	$di/dt=100A/\mu s$, $T_J=25^\circ\text{C}$	---	37	---	nC

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

Typical Characteristics

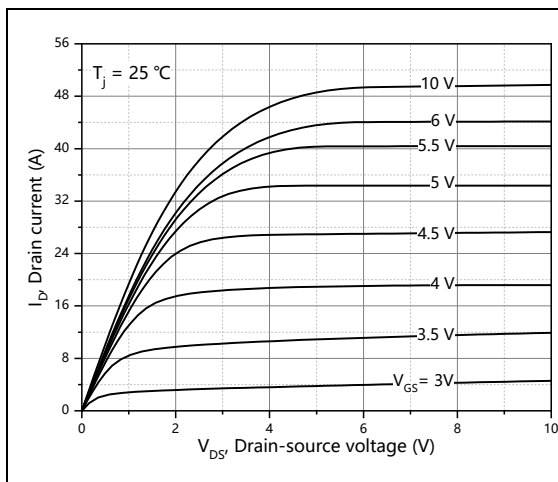


Figure 1, Typ. output characteristics

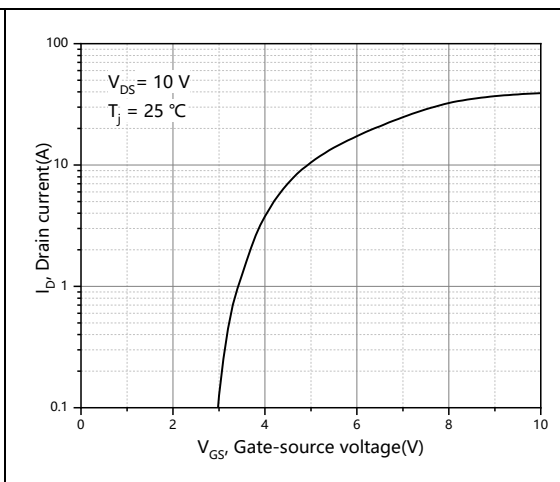


Figure 2, Typ. transfer characteristics

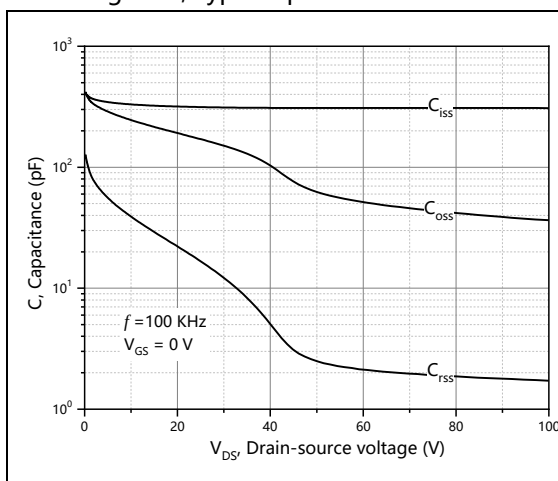


Figure 3, Typ. capacitances

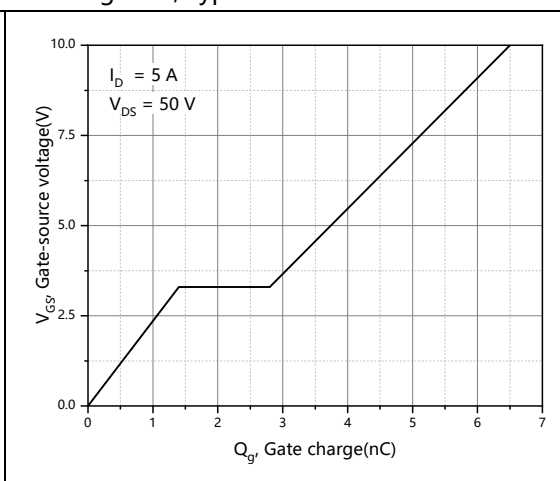


Figure 4, Typ. gate charge

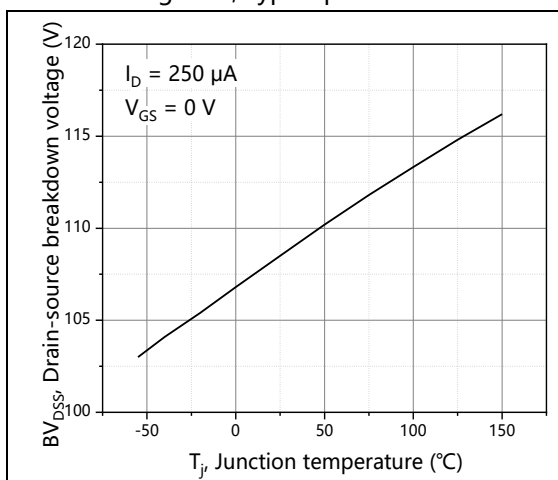


Figure 5, Drain-source breakdown voltage

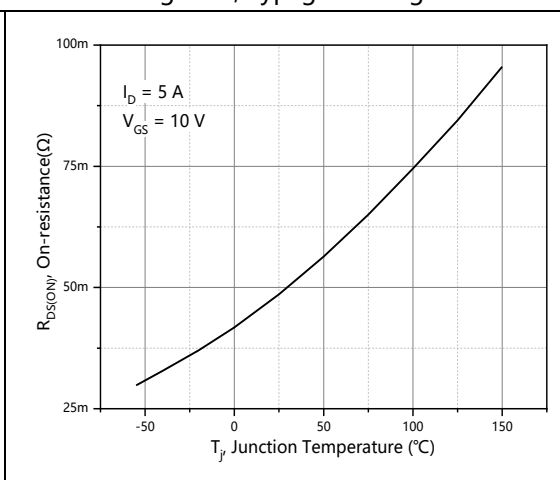


Figure 6, Drain-source on-state resistance

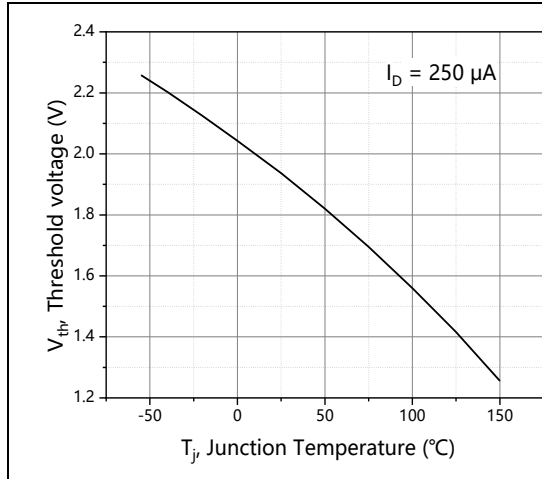


Figure 7, Threshold voltage

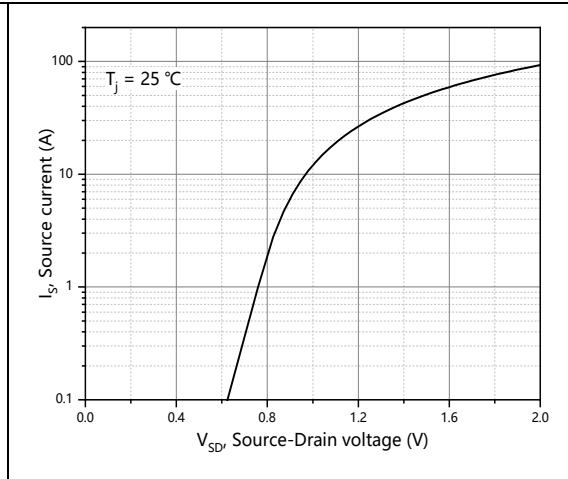


Figure 8, Forward characteristic of body diode

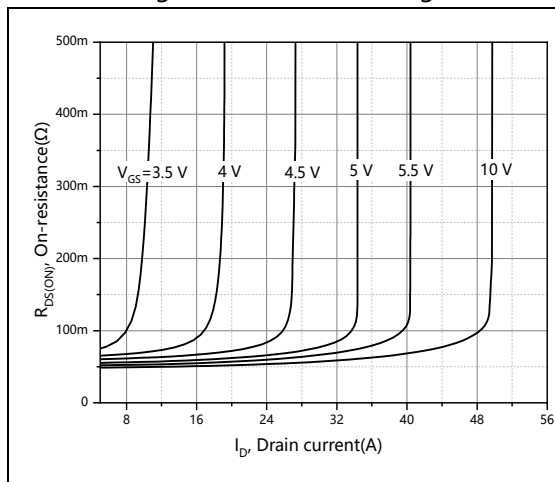


Figure 9, Drain-source on-state resistance

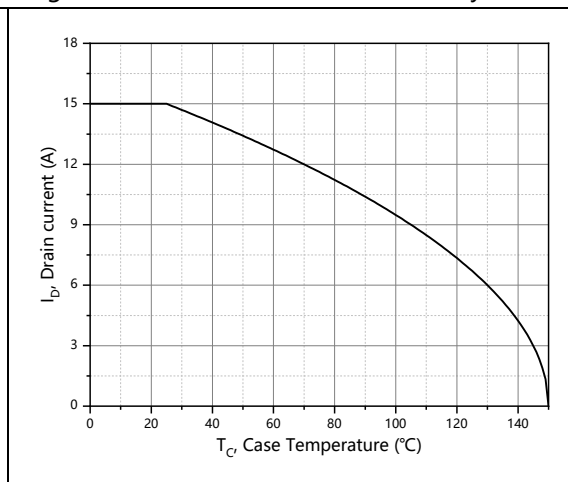


Figure 10, Drain current

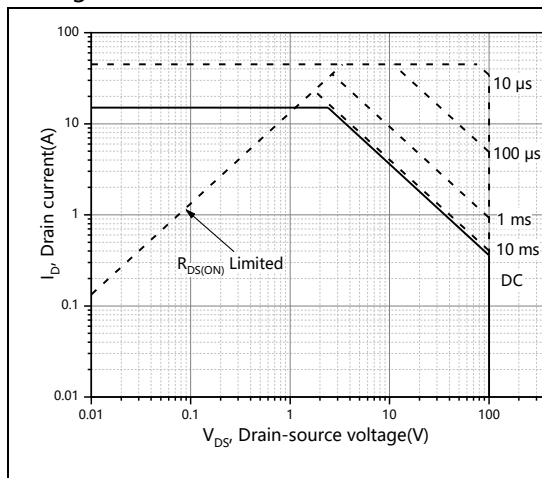


Figure 11, Safe operation area $T_C = 25^\circ\text{C}$

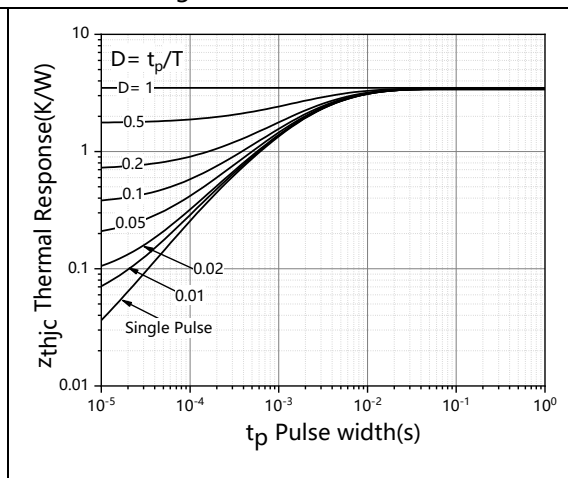
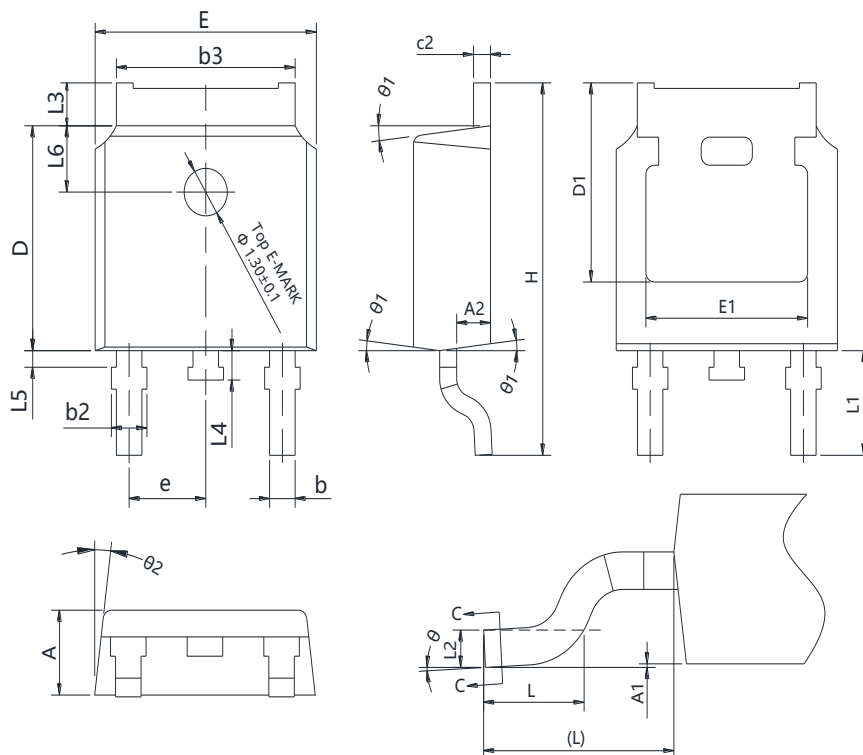


Figure 12, Max. transient thermal impedance



SYMBOL	mm		
	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0	-	0.10
A2	0.9	1.01	0.10
b	0.72	-	0.85
b1	0.71	0.76	0.81
b2	0.72	-	0.90
b3	5.13	5.33	5.46
c	0.47	-	0.60
c1	0.46	0.51	0.56
c2	0.47	-	0.60
D	6.00	6.10	6.20
D1	5.25	-	-
E	6.50	6.60	6.70
E1	4.70	-	-
e	2.186	2.286	2.386
H	9.80	10.10	10.40
L	1.40	1.50	1.70
L1	2.90 REF		
L2	0.508 BSC		
L3	0.90	-	1.25
L4	0.60	0.80	1.00
L5	0.15	-	0.75
L6	1.80 REF		
θ	0°	-	8°
θ_1	5°	7°	9°
θ_2	5°	7°	9°

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