

### General Description

The WSF70N10D use advanced SGT MOSFET technology to provide low RDS(ON), low gate charge, fast switching and excellent avalanche characteristics.

This device is specially designed to get better ruggedness and suitable to use in.

### Features

Low RDS(on) & FOM Extremely low switching loss  
Excellent stability and uniformity or Invertors

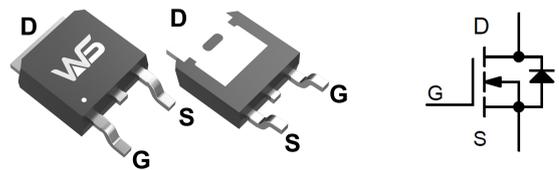
### Product Summary

BVDSS	RDSON	ID
100V	9mΩ	60A

### Applications

Consumer electronic power supply Motor control  
Synchronous-rectification Isolated DC  
Synchronous-rectification applications

### TO-252 Pin Configuration



### Absolute Maximum Ratings at T<sub>j</sub>=25°C unless otherwise noted

Symbol	Parameter	Value	Unit
V <sub>DS</sub>	Drain source voltage	100	V
V <sub>GS</sub>	Gate source voltage	±20	V
I <sub>D</sub>	Continuous drain current <sup>1)</sup>	TC=25 °C 60	A
I <sub>D, pulse</sub>	Pulsed drain current <sup>2)</sup>	TC=25 °C 180	A
P <sub>D</sub>	Power dissipation <sup>3)</sup>	TC=25 °C 56.8	W
E <sub>AS</sub>	Single pulsed avalanche energy <sup>4)</sup>	183.8	mJ
T <sub>stg</sub> , T <sub>j</sub>	Operation and storage temperature	-55 to 150	°C
R <sub>th(J-c)</sub>	Thermal resistance, junction-case	2.5	°C/W
R <sub>th(J-A)</sub>	Thermal resistance, junction-ambient <sup>4)</sup>	70	°C/W

**Electrical Characteristics** at  $T_j=25\text{ }^\circ\text{C}$  unless otherwise specified

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-source breakdown voltage	$V_{GS}=0\text{ V}$ , $I_D=250\text{ }\mu\text{A}$	100	-	-	V
$V_{GS(th)}$	Gate threshold voltage	$V_{DS}=V_{GS}$ , $I_D=250\text{ }\mu\text{A}$	1.5	-	2.5	V
$R_{DS(ON)}$	Drain-source on-state resistance	$V_{GS}=10\text{ V}$ , $I_D=20\text{ A}$	-	9	10.0	m $\Omega$
$R_{DS(ON)}$	Drain-source on-state resistance	$V_{GS}=4.5\text{ V}$ , $I_D=12\text{ A}$	-	12	14.0	m $\Omega$
$I_{GSS}$	Gate-source leakage current	$V_{GS}=20\text{ V}$	-	-	100	nA
		$V_{GS}=-20\text{ V}$	-	-	-100	
$I_{DSS}$	Drain-source leakage current	$V_{DS}=100\text{ V}$ , $V_{GS}=0\text{ V}$	-	-	1	$\mu\text{A}$
$R_G$	Gate resistance	$f=1\text{ MHz}$ , Open drain	-	5.5	-	$\Omega$
$C_{iss}$	Input capacitance	$V_{GS}=0\text{ V}$ , $V_{DS}=50\text{ V}$ , $f=100\text{ kHz}$ $V_{GS}=10\text{ V}$ ,	-	1999	-	pF
$C_{oss}$	Output capacitance		-	322	-	pF
$C_{rss}$	Reverse transfer capacitance		-	7.1	-	pF
$t_{d(on)}$	Turn-on delay time		-	22.1	-	ns
$t_r$	Rise time		$V_{DS}=50\text{ V}$ ,	-	5.2	-
$t_{d(off)}$	Turn-off delay time	$R_G=2\text{ }\Omega$ ,	-	44	-	ns
$t_f$	Fall time	$I_D=25\text{ A}$ $I_D=25\text{ A}$ , $V_{DS}=50\text{ V}$ , $V_{GS}=10\text{ V}$ $V_{GS}<V_{th}$	-	8.4	-	ns
$Q_g$	Total gate charge		-	28.9	-	nC
$Q_{gs}$	Gate-source charge		-	6	-	nC
$Q_{gd}$	Gate-drain charge		-	6.8	-	nC
$V_{plateau}$	Gate plateau voltage		-	3.7	-	V
$I_S$	Diode forward current	$I_S=20\text{ A}$ , $V_{GS}=0\text{ V}$	-	-	60	A
$I_{SP}$	Pulsed source current		-	-	180	A
$V_{SD}$	Diode forward voltage		-	-	1.3	V
$t_{rr}$	Reverse recovery time	$I_S=25\text{ A}$ , $di/dt=100\text{ A}/\mu\text{s}$	-	102.9	-	ns
$Q_{rr}$	Reverse recovery charge		-	379	-	nC
$I_{rrm}$	Peak reverse recovery current		-	6.4	-	A

**Note**

- 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)  $V_{DD}=50\text{ V}$ ,  $R_G=25\text{ }\Omega$ ,  $L=0.3\text{ mH}$ , starting  $T_j=25\text{ }^\circ\text{C}$ .
- 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  $T_a=25\text{ }^\circ\text{C}$ .

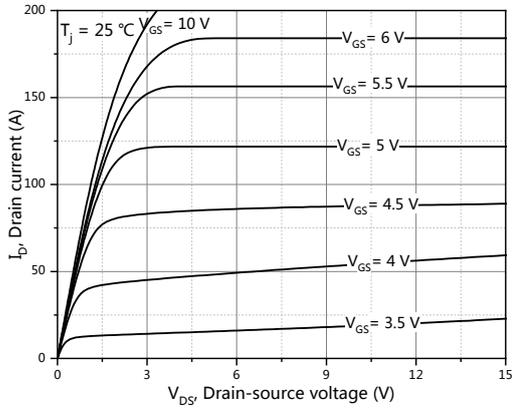


Figure 1, Typ. output characteristics

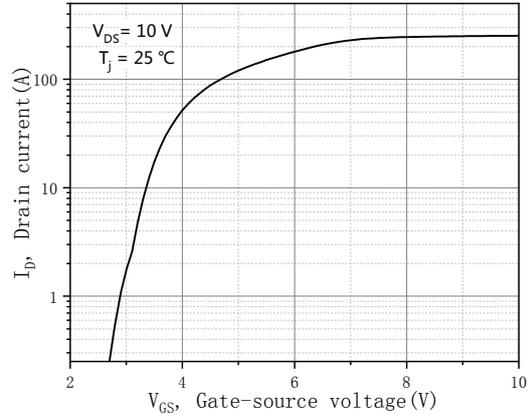


Figure 2, Typ. transfer characteristics

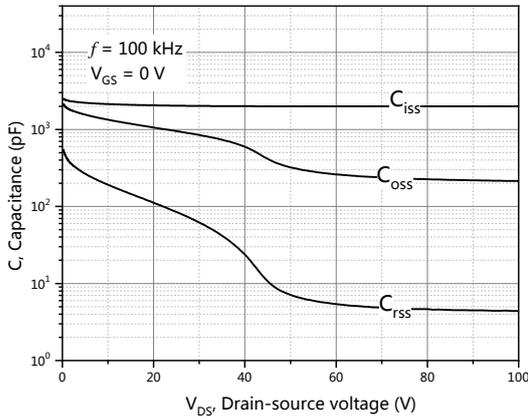


Figure 3, Typ. capacitances

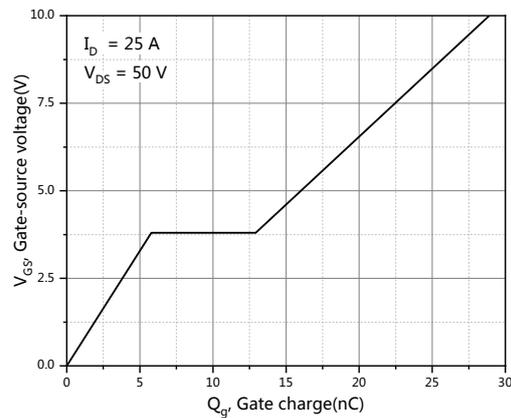


Figure 4, Typ. gate charge

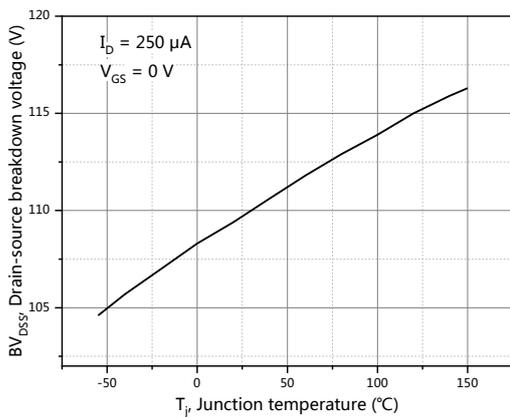


Figure 5, Drain-source breakdown voltage

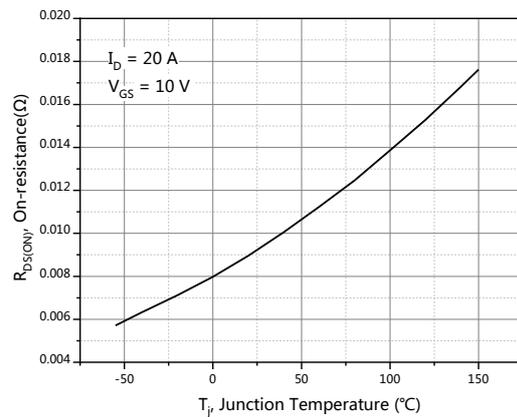


Figure 6, Drain-source on-state resistance

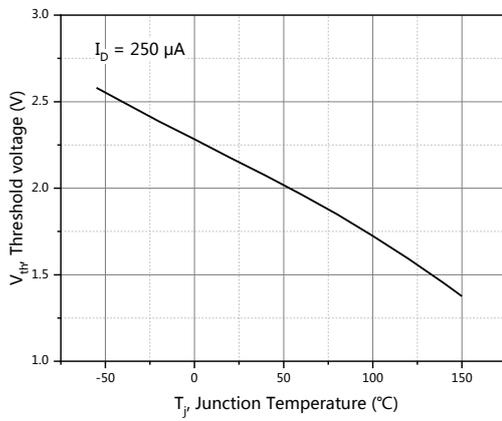


Figure 7, Threshold voltage

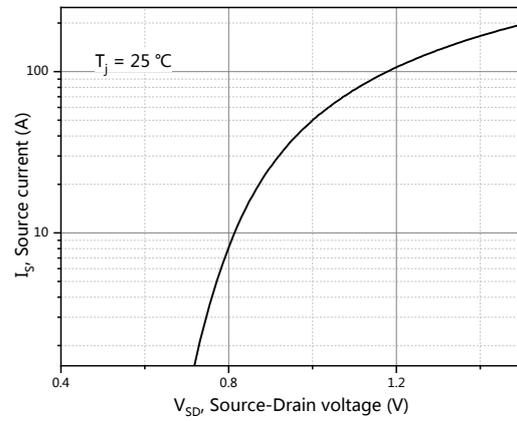


Figure 8, Forward characteristic of body diode

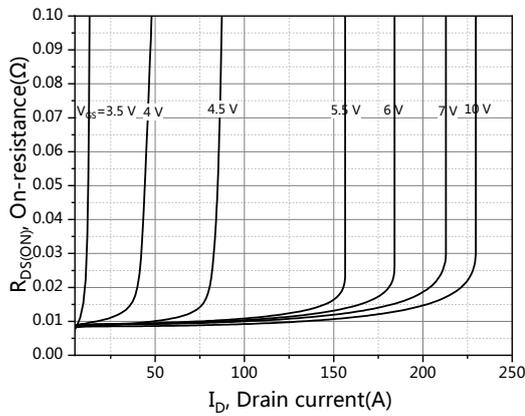


Figure 9, Drain-source on-state resistance

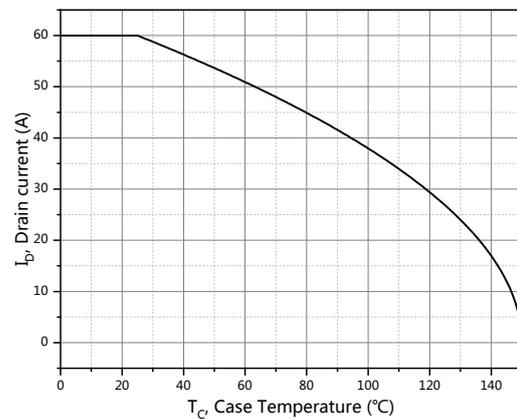


Figure 10, Drain current

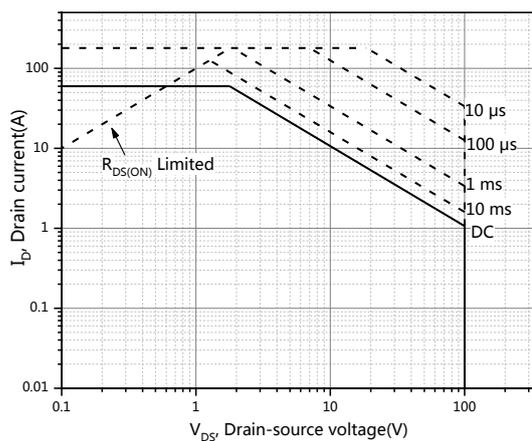


Figure 11, Safe operation area  $T_C=25\text{ }^\circ\text{C}$



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