

### Description

The uses advanced SGT technology to provide excellent RDS(ON), low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

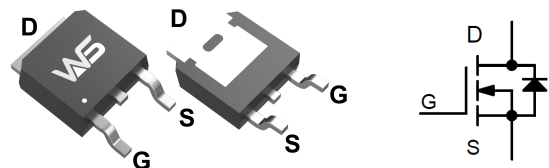
### Application

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

### Product Summary

BVDSS	RDSON	ID
100V	13.8mΩ	40A

### TO-252 Pin Configuration



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

Symbol	Parameter	Rating	Units
VDS	Drain source voltage	100	V
VGS	Gate source voltage	±20	V
ID	Continuous drain current <sup>1)</sup>	TC=25 °C 40	A
ID, pulse	Pulsed drain current <sup>2)</sup>	TC=25 °C 120	A
P <sub>D</sub>	Power dissipation <sup>3)</sup>	TC=25 °C 71	W
EAS	Single pulsed avalanche energy <sup>5)</sup>	57	mJ
T <sub>stg</sub> , T <sub>j</sub>	Operation and storage temperature	-55 to 150	°C
R <sub>θJC</sub>	Thermal resistance, junction-case	1.76	°C/W
R <sub>θJA</sub>	Thermal resistance, junction-ambient <sup>4)</sup>	62	°C/W

**Electrical Characteristics (T<sub>c</sub>=25°C unless otherwise noted)**

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
BVDSS	Drain-source breakdown voltage	V <sub>GS</sub> =0 V, I <sub>D</sub> =250 μA	100	107	-	V
VGS(th)	Gate threshold voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250 μA	1.2	1.5	2.5	V
RDS(ON)	Drain-source on-state resistance	V <sub>GS</sub> =10 V, I <sub>D</sub> =10 A	-	13.8	20.0	mΩ
RDS(ON)	Drain-source on-state resistance	V <sub>GS</sub> =4.5 V, I <sub>D</sub> =7 A	-	17.4	26.0	mΩ
IGSS	Gate-source leakage current	V <sub>GS</sub> =±20 V	-	-	±100	nA
IDSS	Drain-source leakage current	V <sub>DS</sub> =100 V, V <sub>GS</sub> =0 V	-	-	1	μA
Ciss	Input capacitance	V <sub>GS</sub> =0 V, V <sub>DS</sub> =50 V, f=100 kHz	-	1003.9	-	pF
Coss	Output capacitance		-	185.4	-	pF
Crss	Reverse transfer capacitance		-	9.8	-	pF
td(on)	Turn-on delay time	V <sub>GS</sub> =10 V, V <sub>DS</sub> =50 V, R <sub>G</sub> =10 Ω, I <sub>D</sub> =5 A	-	16.6	-	ns
t <sub>r</sub>	Rise time		-	3.8	-	ns
td(off)	Turn-off delay time		-	75.5	-	ns
t <sub>f</sub>	Fall time		-	46	-	ns
Q <sub>g</sub>	Total gate charge	I <sub>D</sub> =5 A, V <sub>DS</sub> =50V, V <sub>GS</sub> =10V	-	16.2	-	nc
Q <sub>gs</sub>	Gate-source charge		-	2.8	-	nc
Q <sub>gd</sub>	Gate-drain charge		-	4.1	-	nc
V <sub>plateau</sub>	Gate plateau voltage		-	3	-	V
I <sub>S</sub>	Diode forward current	V <sub>GS</sub> <V <sub>th</sub>	-	30	-	A
ISP	Pulsed source current		-	90	-	A
t <sub>rr</sub>	Reverse recovery time	I <sub>S</sub> =1A, di/dt=100 A/μs	49	-	-	ns
Q <sub>rr</sub>	Reverse recovery charge		61.8	-	-	nc
I <sub>rrm</sub>	Peak reverse recovery current		2.4	-	-	A

**Note :**

- 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、 The value of R<sub>θja</sub> is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T<sub>a</sub>=25 °C.
- 5、 V<sub>DD</sub>=50 V, R<sub>G</sub>=25 Ω, L=0.3 mH, starting T<sub>j</sub>=25 °C.

**Typical Characteristics**

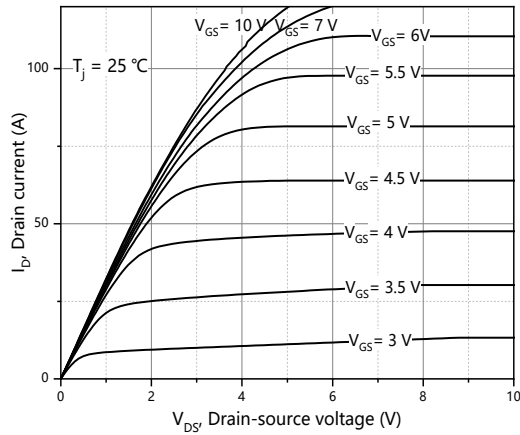


Figure 1, Typ. output characteristics

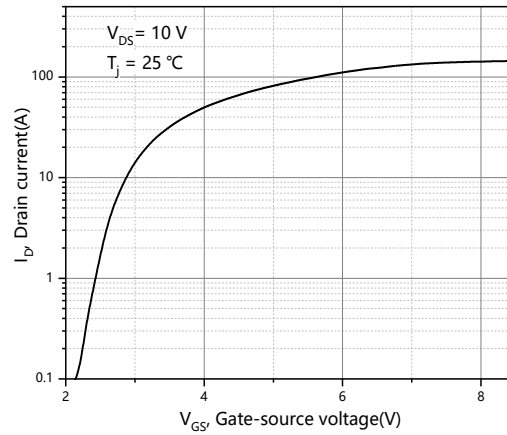


Figure 2, Typ. transfer characteristics

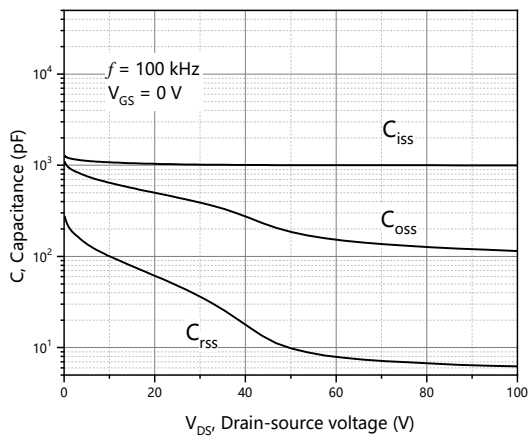


Figure 3, Typ. capacitances

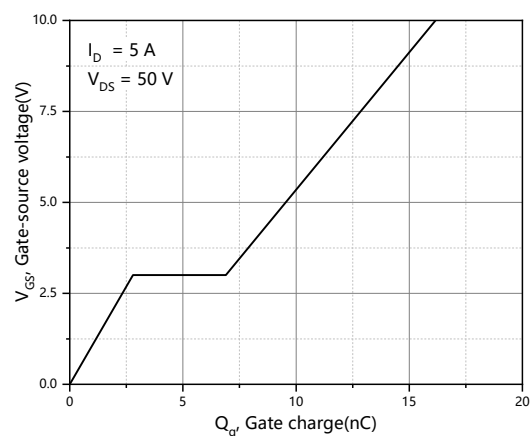


Figure 4, Typ. gate charge

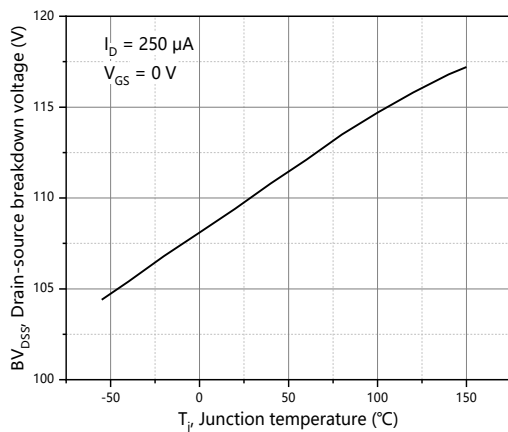


Figure 5, Drain-source breakdown voltage

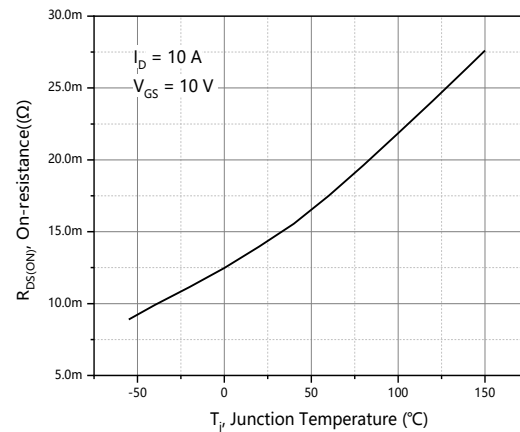


Figure 6, Drain-source on-state resistance

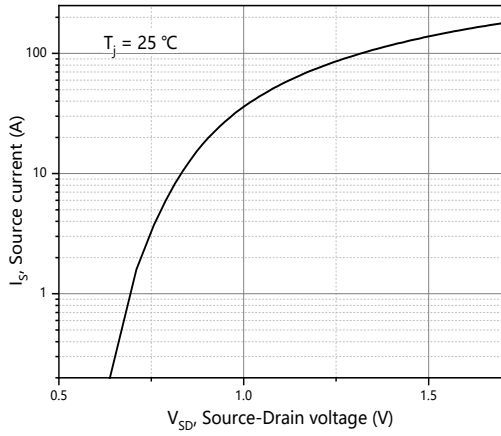


Figure 7, Forward characteristic of body diode

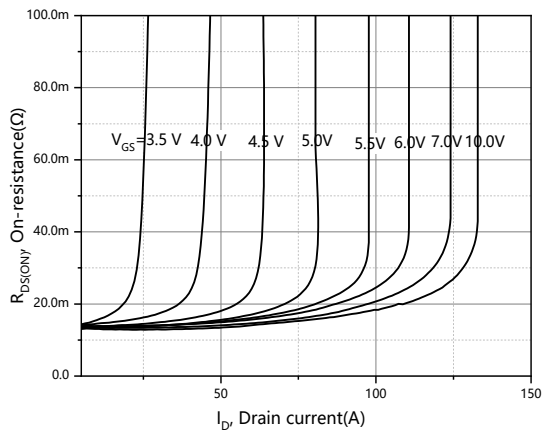


Figure 8, Drain-source on-state resistance

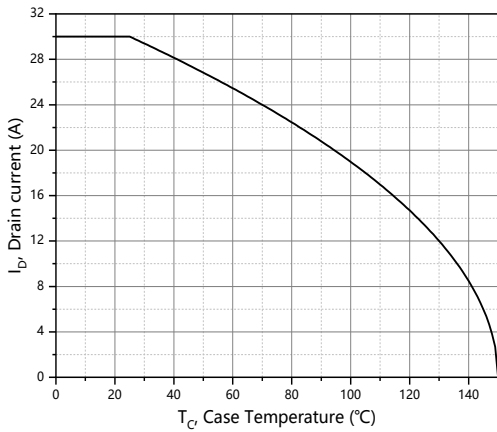


Figure 9, Drain current

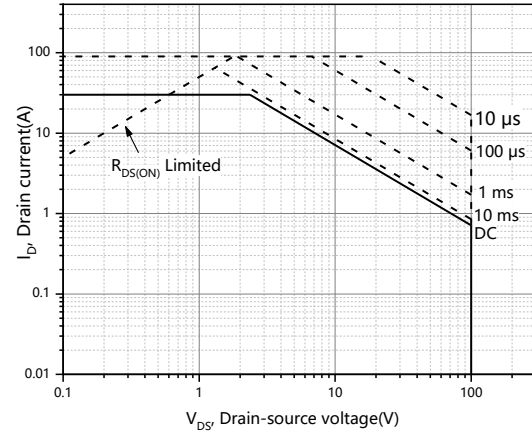


Figure 10, Safe operation area  $T_C=25\text{ }^\circ\text{C}$

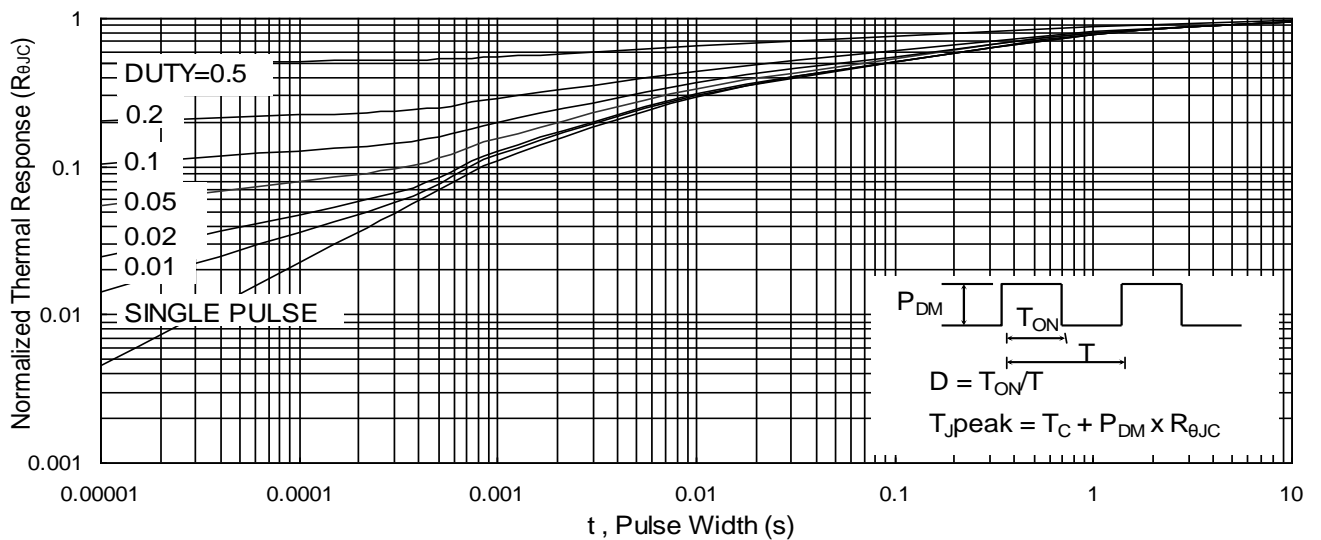


Fig11. Normalized Maximum Transient Thermal Impedance



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