

### General Description

The WSR130N06PT 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

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E<sub>AS</sub>
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

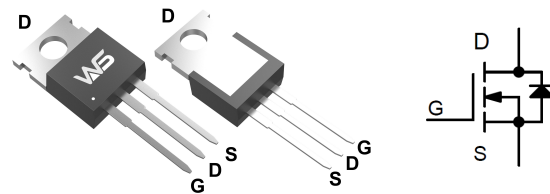
### Product Summary

BVDSS	RDSON	ID
60V	3.0mΩ	130A

### Application

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

### TO-220AB Pin Configuration



### Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	60	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub> @T <sub>C</sub> =25°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup>	130	A
I <sub>DM</sub>	Pulsed Drain Current <sup>2</sup>	390	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	80	mJ
P <sub>D</sub> @T <sub>C</sub> =25°C	Total Power Dissipation <sup>4</sup>	140	W
T <sub>J</sub> T <sub>STG</sub>	Operating Junction Temperature Range	-55 to 175	°C

### Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction-Ambient <sup>1</sup>		62	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction-Case <sup>1</sup>		0.89	°C/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	60			V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =20A		3.0	3.5	mΩ
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A		3.5	4.5	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250μA	1.0		2.5	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =48V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C			1	μA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V			±100	nA
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =25A		36		nC
Q <sub>gs</sub>	Gate-Source Charge			9.9		
Q <sub>gd</sub>	Gate-Drain Charge			6.6		
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =25A, R=2Ω.		16		ns
T <sub>r</sub>	Rise Time			10		
T <sub>d(off)</sub>	Turn-Off Delay Time			45		
T <sub>f</sub>	Fall Time			12		
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz		5377		pF
C <sub>oss</sub>	Output Capacitance			1666		
C <sub>rss</sub>	Reverse Transfer Capacitance			77.7		

**Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current <sup>1,6</sup>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current			130	A
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C			1.3	V
t <sub>rr</sub>	Reverse Recovery Time	IF=25A, dI/dt=100A/μs, T <sub>J</sub> =25°C		68.3		ns
Q <sub>rr</sub>	Reverse Recovery Charge				73.0	

- 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

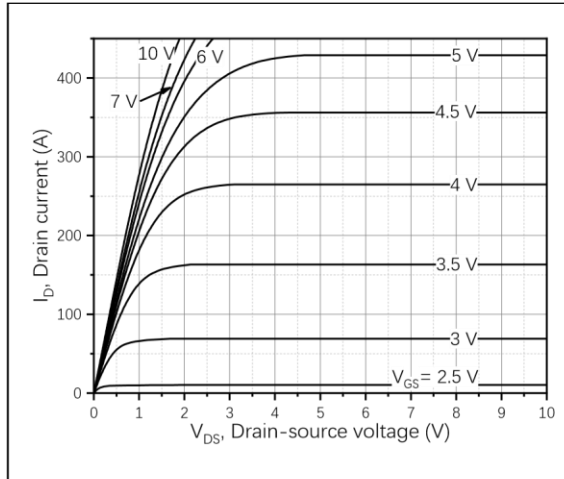


Figure 1, Typ. output characteristics

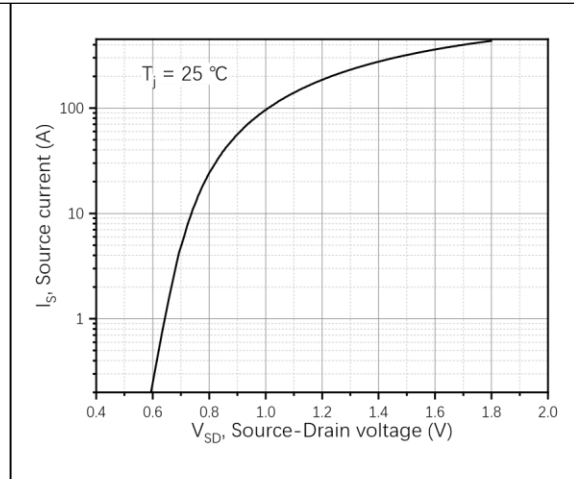


Figure 2, Typ. transfer characteristics

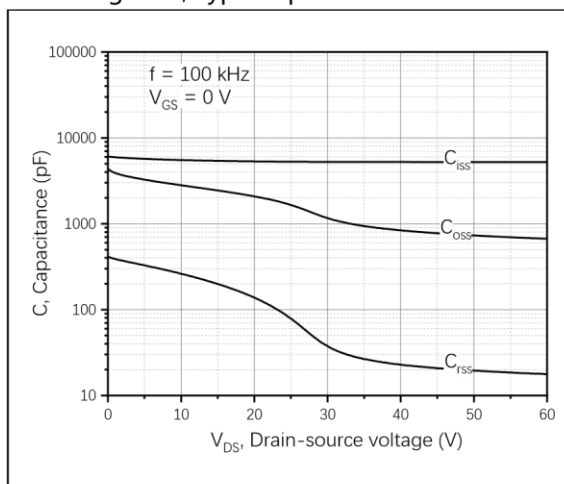


Figure 3, Typ. capacitances

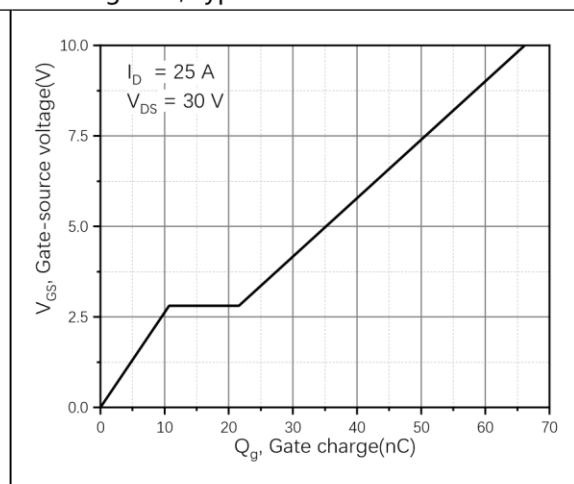


Figure 4, Typ. gate charge

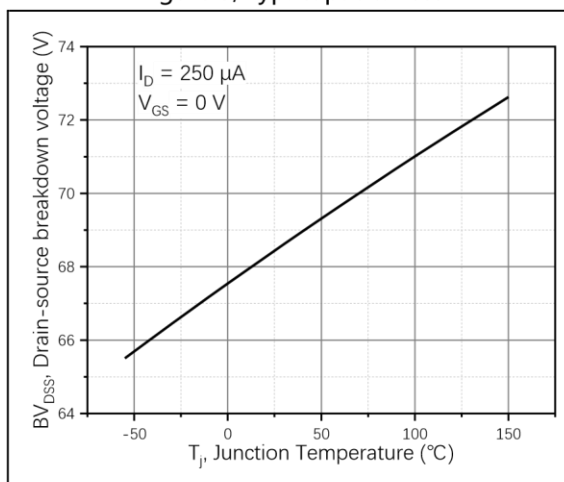


Figure 5, Drain-source breakdown voltage

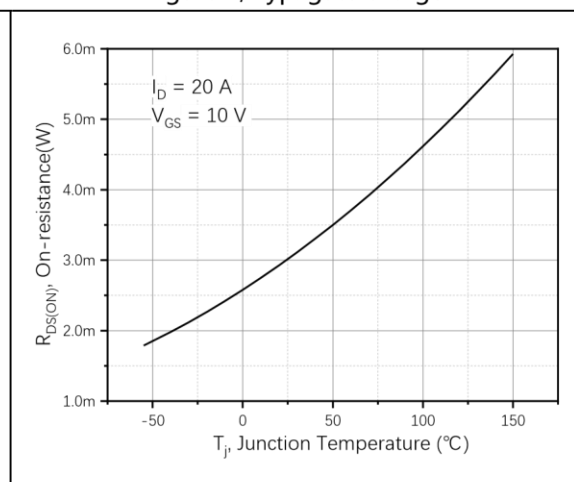


Figure 6, Drain-source on-state resistance

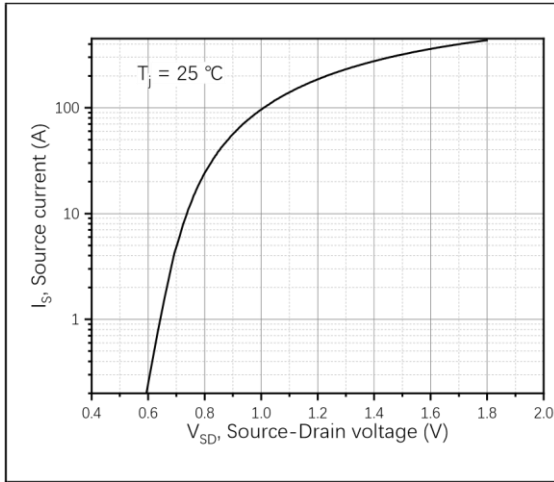


Figure 7, Forward characteristic of body diode

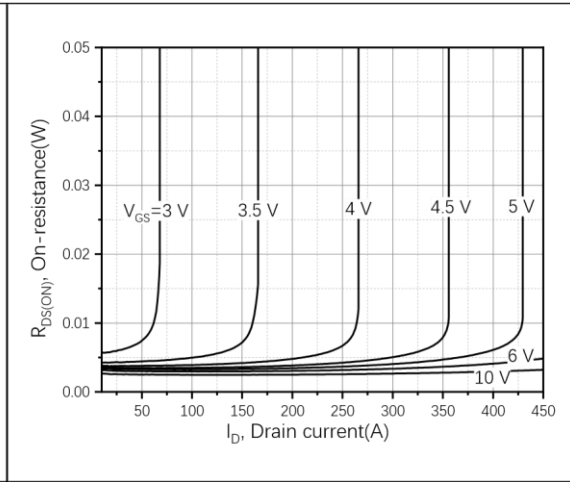


Figure 8, Drain-source on-state resistance

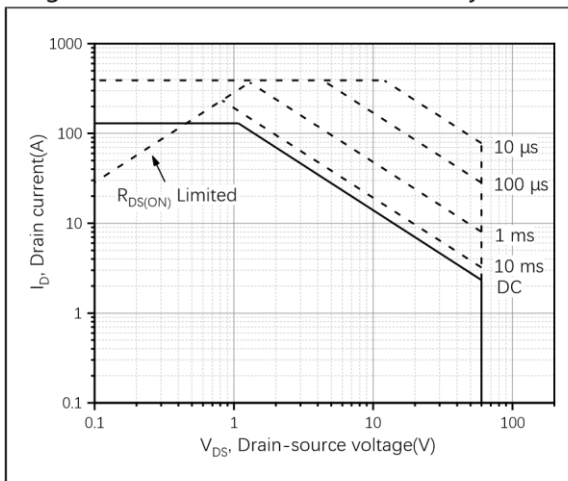


Figure 9, Safe operation area  $T_c=25\text{ }^\circ\text{C}$



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