N-Channel Enhancement Mode MOSFET

Description：

This N-Channel MOSFET uses advanced SGT technology and design to provide excellent $R_{DS(on)}$ with low gate charge. It can be used in a wide variety of applications.
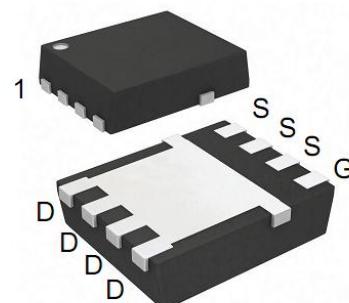
Features：

1) V_{DS}=150V,I_D=80A,$R_{DS(ON)}$≤10mΩ @V_{GS}=10V

2) Low gate charge.

3) Green device available.

4) Advanced high cell denity trench technology for ultra low $R_{DS(ON)}$.

5) Excellent package for good heat dissipation.
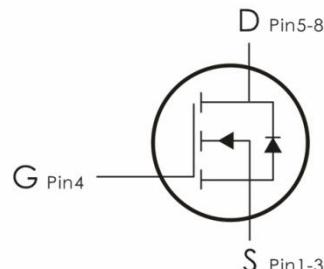
Absolute Maximum Ratings： (T$_C$=25℃ unless otherwise noted)

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	150	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Current[1]	80	A
I_{DM}	Pulsed Drain Current[2]	240	A
E_{AS}	Single Pulse Avalanche Energy[5]	80	mJ
P_D	Power Dissipation[3]	160	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	℃

Thermal Characteristics：

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Thermal Resistance,Junction to Case	0.78	℃/W
$R_{\theta JA}$	Thermal Resistance Junction to mbient[4]	62	℃/W

Package Marking and Ordering Information：

Part NO.	Marking	Package
BSC093N15NS5	93N15	DFN5*6-8

Electrical Characteristics： (T$_C$=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV$_{DSS}$	Drain-Sourtce Breakdown Voltage	V$_{GS}$=0V,I$_D$=250μA	150	---	---	V
I$_{DSS}$	Zero Gate Voltage Drain Current	V$_{GS}$=0V, V$_{DS}$=135V	---	---	1	μA
I$_{GSS}$	Gate-Source Leakage Current	V$_{GS}$=±20V, V$_{DS}$=0A	---	---	±100	nA
On Characteristics						
V$_{GS(th)}$	GATE-Source Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$=250μA	3	---	4.5	V
R$_{DS(ON)}$	Drain-Source On Resistance	V$_{GS}$=10V,I$_D$=20A	---	9	10	mΩ
Dynamic Characteristics						
C$_{iss}$	Input Capacitance		---	5131	---	
C$_{oss}$	Output Capacitance	V$_{DS}$=25V, V$_{GS}$=0V, f=1MH$_Z$	---	1673	---	pF
C$_{rss}$	Reverse Transfer Capacitance		---	174	---	
Switching Characteristics						
t$_{d(on)}$	Turn-On Delay Time		---	21	---	ns
t$_r$	Rise Time	V$_{DS}$=75V,I$_D$=44A,	---	21	---	ns
t$_{d(off)}$	Turn-Off Delay Time	R$_G$=2Ω,V$_{GS}$=10V	---	37	---	ns
t$_f$	Fall Time		---	8.7	---	ns
Q$_g$	Total Gate Charge		---	69	---	nC
Q$_{gs}$	Gate-Source Charge	V$_{GS}$=10V, V$_{DS}$=75V,	---	26	---	nC
Q$_{gd}$	Gate-Drain "Miller" Charge	I$_D$=44A	---	17	---	nC
Drain-Source Diode Characteristics						
Symbol	Parameter	Conditions	Min	Typ	Max	Units
V$_{SD}$	Source-Drain Diode Forward Voltage	V$_{GS}$=0V,I$_S$=20A	---	---	1.3	V
I$_S$	Continuous Drain Current	VD=VG=0V	---	---	80	A
I$_{SM}$	Pulsed Drain Curren	VD=VG=0V	---	---	240	A
Qrr	Reverse Recovery Charge	I$_{DS}$ = 40 A, V$_{GS}$ = 0 V	---	285	---	nC
Trr	Reverse Recovery Time	dI$_{SD}$/dt = 100 A/μs	---	76	---	ns

Notes:

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 $R_{\theta JA}$ 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 °C.

5. V_{DD}=50 V,V_{GS}=10 V, L=0.3 mH, starting T_j=25 °C.

Typical Characteristics： (T_C=25℃ unless otherwise noted)
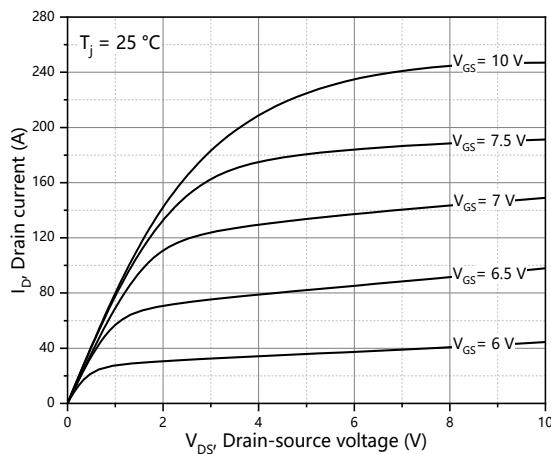
Figure 1. Typ. output characteristics
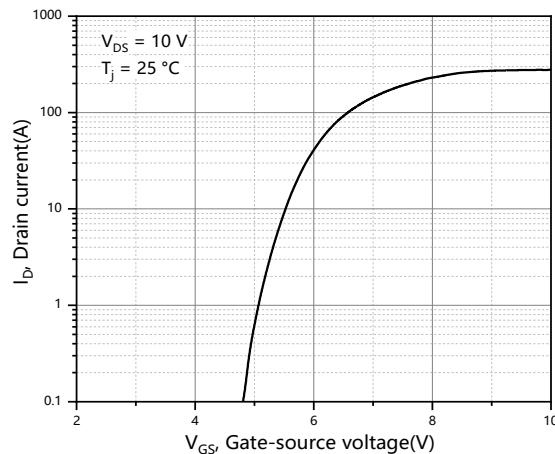
Figure 2. Typ. transfer characteristics
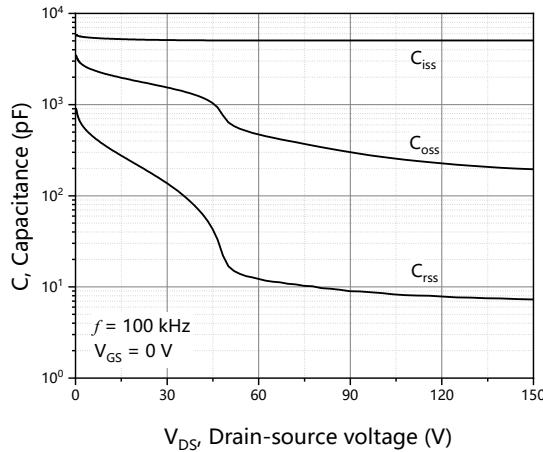
Figure 3. Typ. capacitances
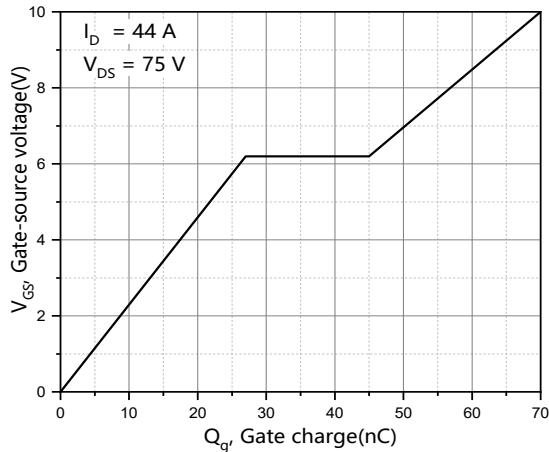
Figure 4. Typ. gate charge
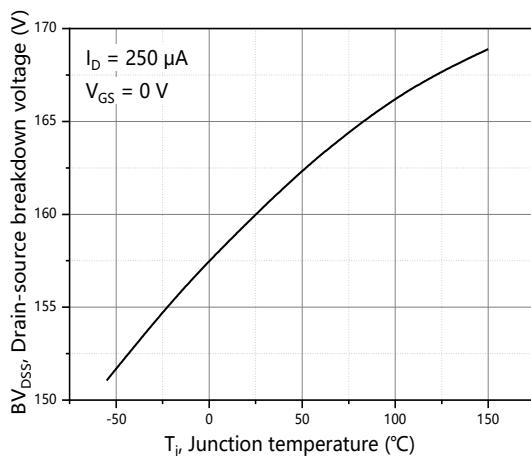
Figure 5. Drain-source breakdown voltage
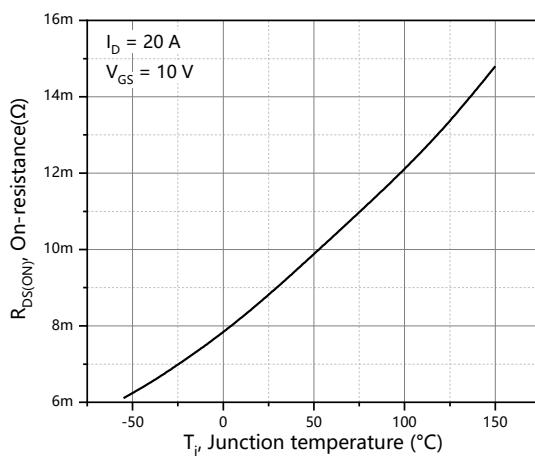

Figure 6. Drain-source on-state resistance
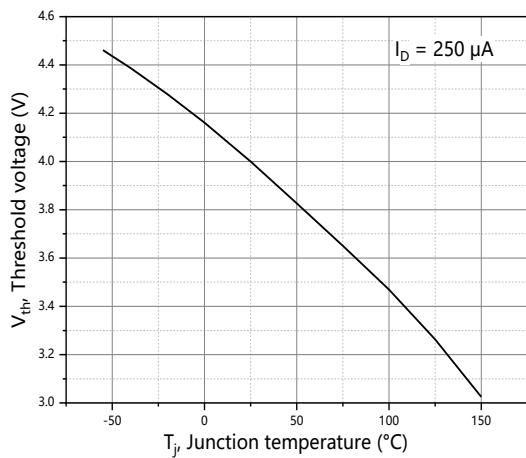
**Figure 7. Threshold voltage**
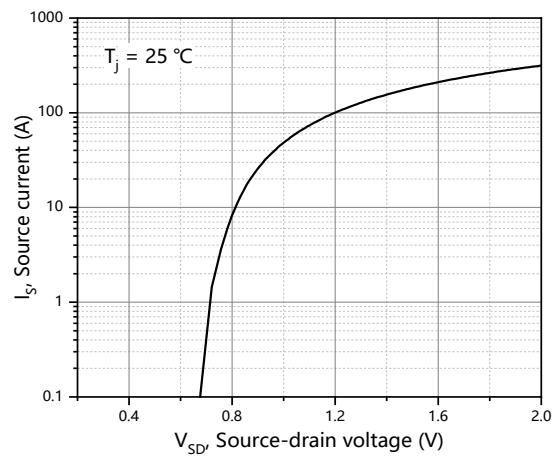

Figure 8. Forward characteristic of body diode
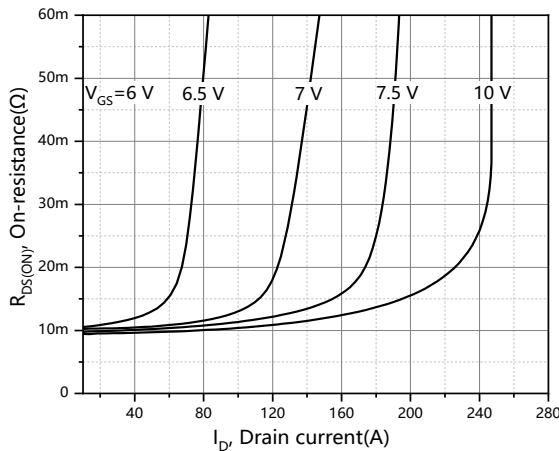

**Figure 9. Drain-source on-state resistance**
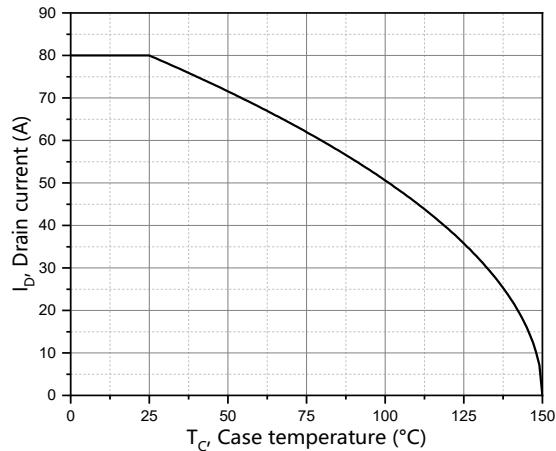
**Figure 10. Drain current**
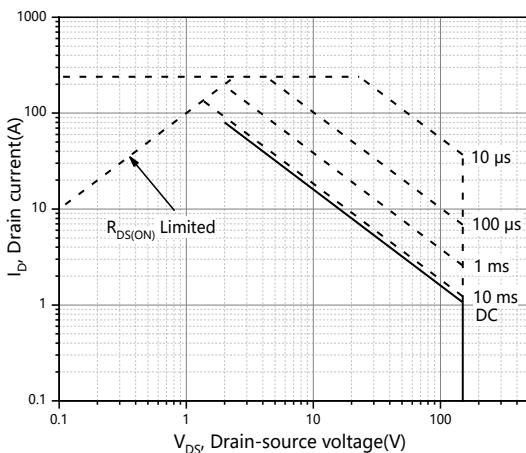
Figure 11. Safe operation area T$_C$=25℃
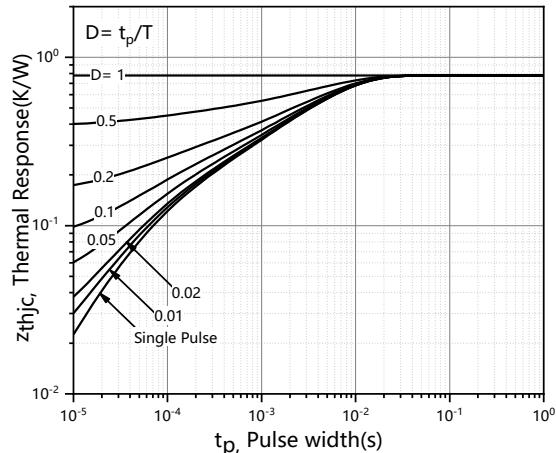
Figure 12. Max. transient thermal impedance