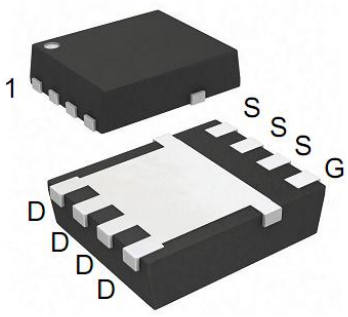
N-Channel Enhancement Mode MOSFET

Description：

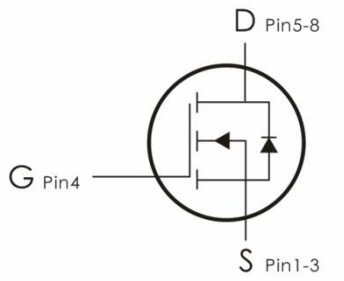
This N-Channel MOSFET uses advanced SGT technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.



Features：

1) V_{DS}=100V,I_D=55A,$R_{DS(ON)}$<10.8mΩ @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	100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Current[1)]	55	A
$I_{D, pulse}$	Pulsed Drain Current[2)]	165	
I_S	Continuous diode forward current[1)]	55	A
$I_{S, Pulse}$	Diode pulsed current[2)]	165	A
E_{AS}	Single Pulse Avalanche Energy[5)]	20	mJ
P_D	Power Dissipation[3)]	75	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	1.67	℃/W

$R_{\Theta JA}$	Thermal Resistance Junction to mbient[4)]	62	℃/W

Package Marking and Ordering Information：

Part NO.	Marking	Package
BSC109N10NS3G	109N10	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	100	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=100V	---	---	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	1	---	2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance	V_{GS}=10V,I_D=30A	---	9.9	10.8	mΩ
		V_{GS}=4.5V,I_D=12A	---	12.5	15	
R_G	Gate resistance	f=1 MHz, Open drain	---	2.8	---	Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=25V, V_{GS}=0V, f=1MHz	---	2300	---	pF
C_{oss}	Output Capacitance		---	1550	---	
C_{rss}	Reverse Transfer Capacitance		---	120	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=50V,I_D=25A, R_G=2Ω,V_{GS}=10V	---	19	---	ns
t_r	Rise Time		---	5.4	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	39.2	---	ns
t_f	Fall Time		---	7.4	---	ns
Q_g	Total Gate Charge	V_{GS}=10V, V_{DS}=50V, I_D=25A	---	27	---	nC
Q_{gs}	Gate-Source Charge		---	4.4	---	nC
Q_{gd}	Gate-Drain “Miller” Charge		---	6.5	---	nC

$V_{plateau}$	Gate plateau voltage		---	3.2	---	V
Drain-Source Diode Characteristics						
Symbol	**Parameter**	**Conditions**	**Min**	**Typ**	**Max**	**Units**
V_{SD}	Source-Drain Diode Forward Voltage	V_{GS}=0V,I_S=30A	---	---	1.3	V
I_{rrm}	Peak reverse recovery current	V_R=50V,I_S=25A, di/dt=100A/us	---	3	---	A
Qrr	Reverse Recovery Charge		---	130	---	nC
Trr	Reverse Recovery Time		---	70.8	---	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)

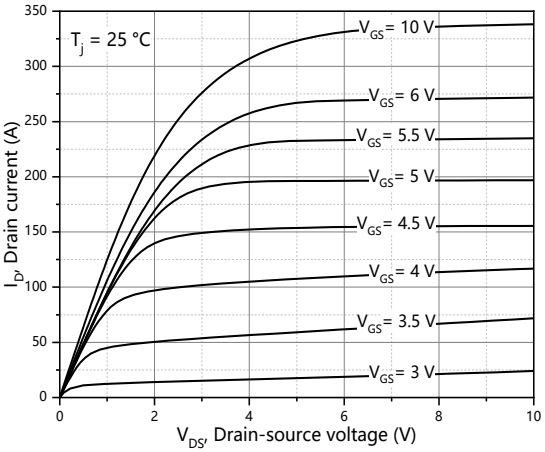


Figure 1. Typ. output characteristics

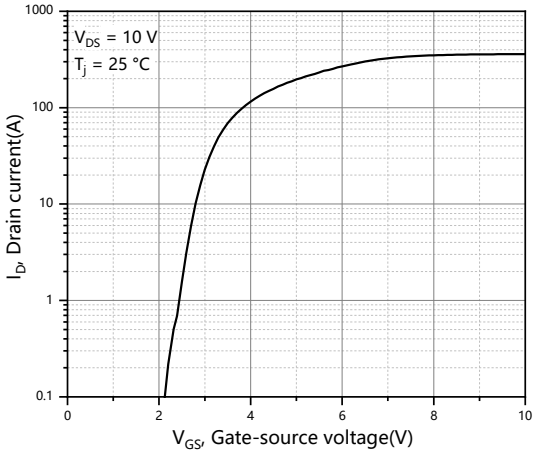
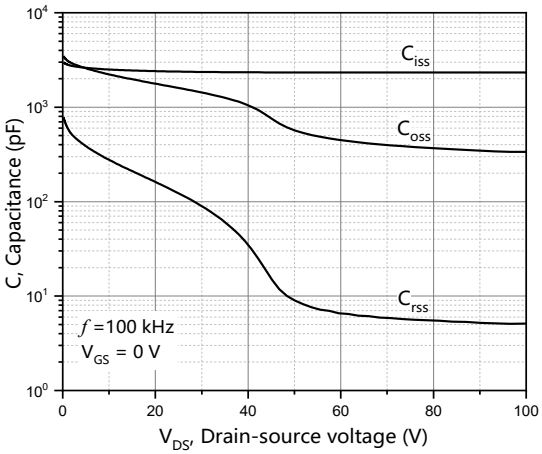
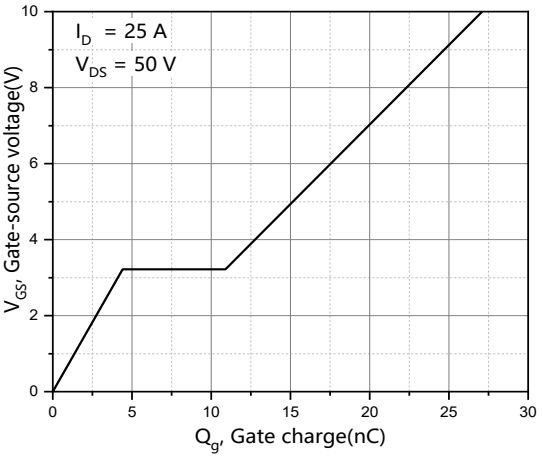


Figure 2. Typ. transfer characteristics





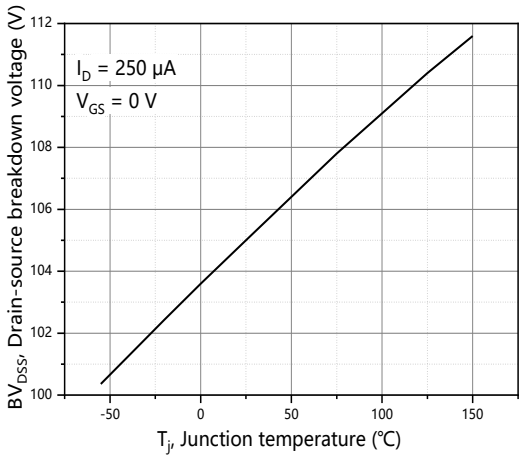


Figure 5. Drain-source breakdown voltage

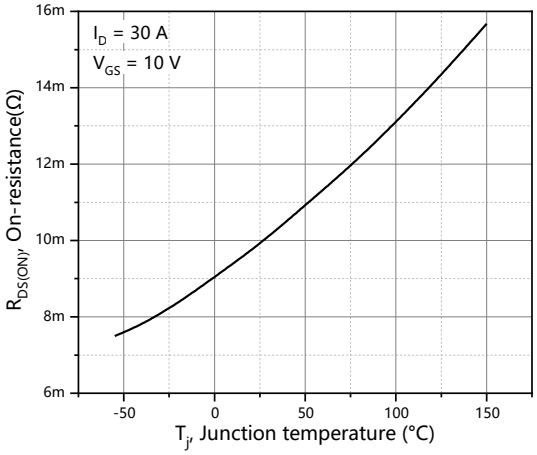


Figure 6. Drain-source on-state resistance

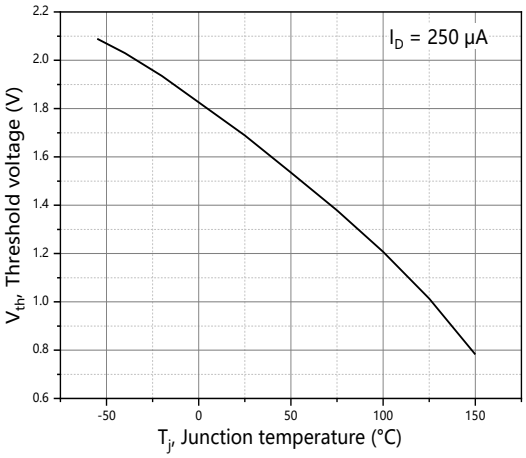


Figure 7. Threshold voltage

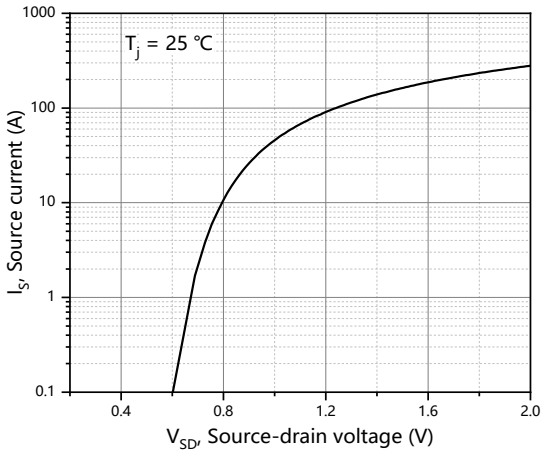


Figure 8. Forward characteristic of body diode

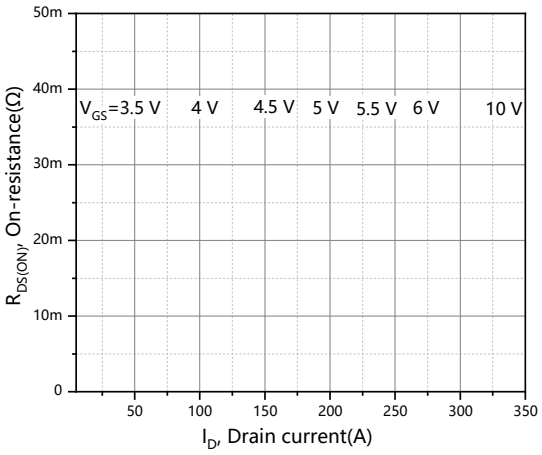


Figure 9. Drain-source on-state resistance

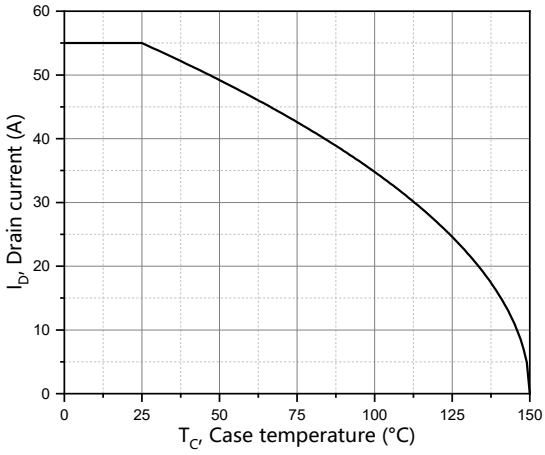


Figure 10. Drain current

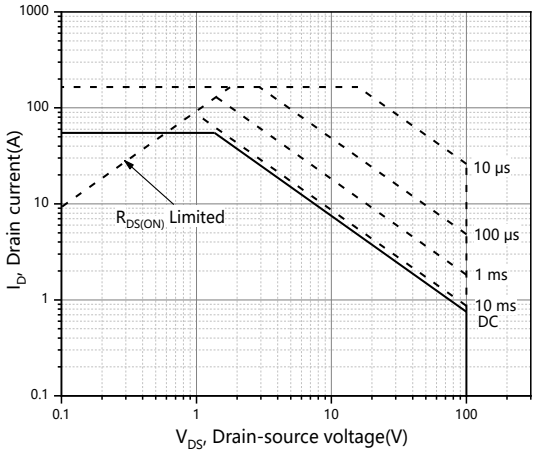


Figure 11. Safe operation area T_C=25 ℃

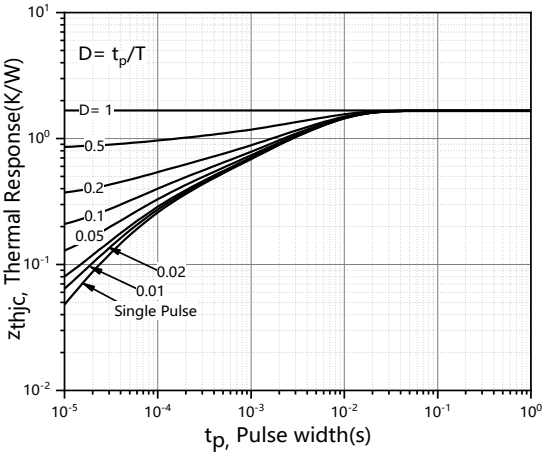


Figure 12. Max. transient thermal impedance