Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
120V	3.2mΩ@10V	220A

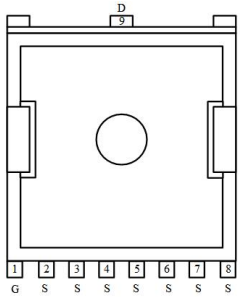
Feature

- Fast Switching
- Low Gate Charge and Rdson
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

Applications

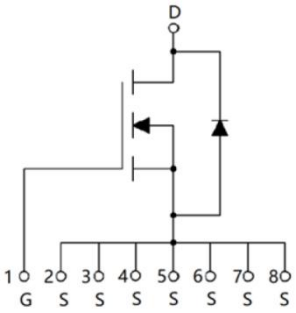
- High Speed Power switching
- DC-DC Converter
- Power Management

Package

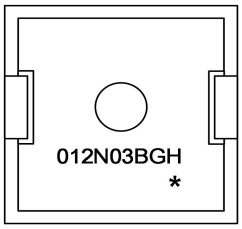


TOLL

Circuit diagram



Marking



012N03BGH : Product code
*** : Month code**

Order Information

Device	Package	Unit/Tape
SP012N03BGHTO	TOLL	2000

Absolute maximum ratings (Ta=25℃ unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	120	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current1 (Tc=25℃)	I_D	220	A
Continuous Drain Current1 (Tc=100℃)	I_D	147	A
Pulsed Drain Current	I_{DM}	880	A
Single Pulse Avalanche Energy[1]	E_{AS}	900	mJ
Power Dissipation (Tc=25℃)	P_D	296	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	0.42	℃/W
Storage Temperature Range	T_{STG}	-55 to 150	℃
Operating Junction Temperature Range	T_J	-55 to 150	℃

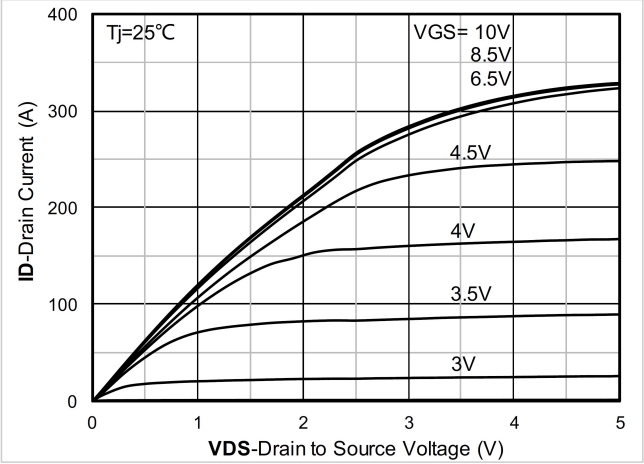
Electrical characteristics (Ta=25℃, unless otherwise noted)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	ID = 250μA, VGS = 0V	120	130	-	V
Drain Cut-Off Current	I_{DSS}	VDS = 96V, VGS = 0V	-	-	1	μA
Gate Leakage Current	I_{GSS}	VGS = ±20V, VDS = 0V	-	-	±0.1	
Gate Threshold Voltage	$V_{GS(th)}$	VDS = VGS, ID = 250μA	2.6	3.1	3.6	V
Drain-Source ON Resistance	$R_{DS(ON)}$	VGS = 10V, ID = 50A	-	3.2	4	mΩ
Dynamic Characteristics						
Input Capacitance	C_{iss}	VDS = 60V, VGS = 0V, f = 1.0MHz	-	5640	-	pF
Output Capacitance	C_{oss}		-	835	-	
Reverse Transfer Capacitance	C_{rss}		-	13	-	
Total Gate Charge	Q_g	VDS=60V , VGS=10V , ID=75A	-	152	-	nC
Gate-Source Charge	Q_{gs}		-	43	-	
Gate-Drain Charge	Q_{gd}		-	46	-	
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	VGS = 10V, VDS = 50V, ID = 75A RG = 1.6Ω	-	25	-	nS
Rise Time	t_r		-	15	-	
Turn-Off Delay Time	$t_{d(off)}$		-	52	-	
Fall Time	t_f		-	18	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V_{SD}	I_S = 1A, V_{GS} = 0V	-	-	1.2	V
Maximum Body-Diode Continuous Current	I_S		-	-	220	A
Reverse Recovery Time	T_{rr}	I_S=100A, di/dt=100A/us, TJ=25℃	-	92	-	nS
Reverse Recovery Charge	Q_{rr}		-	183	-	nC

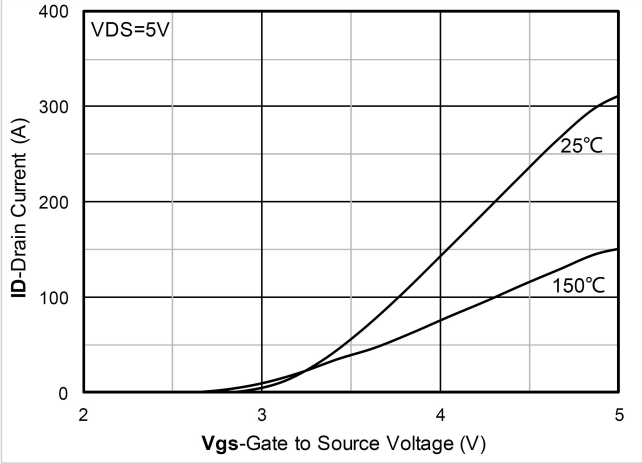
Note :

1. The test condition is VDD=50V,VGS=10V,L=0.5mH,RG=25Ω

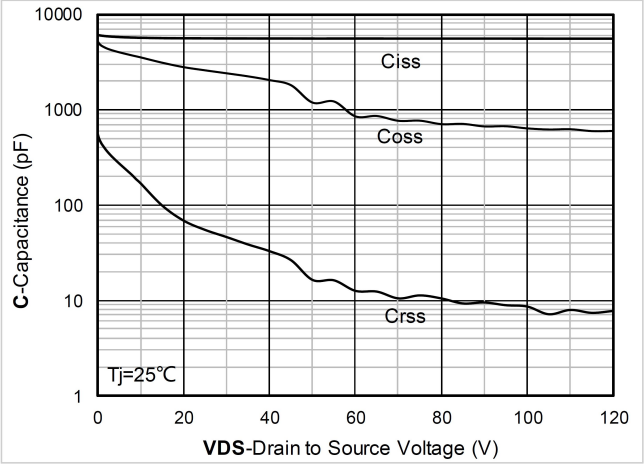
Typical Characteristics



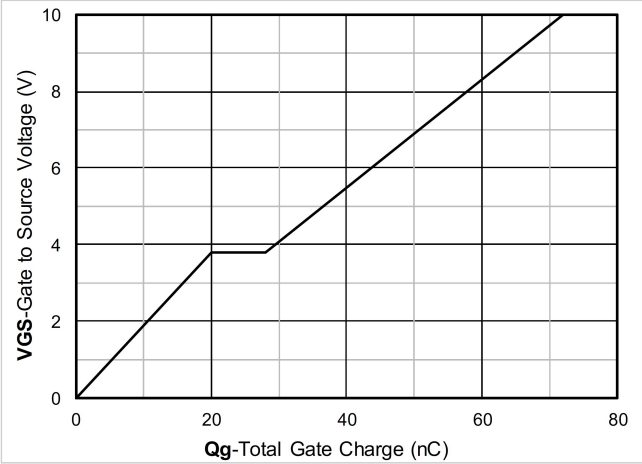
Output Characteristics



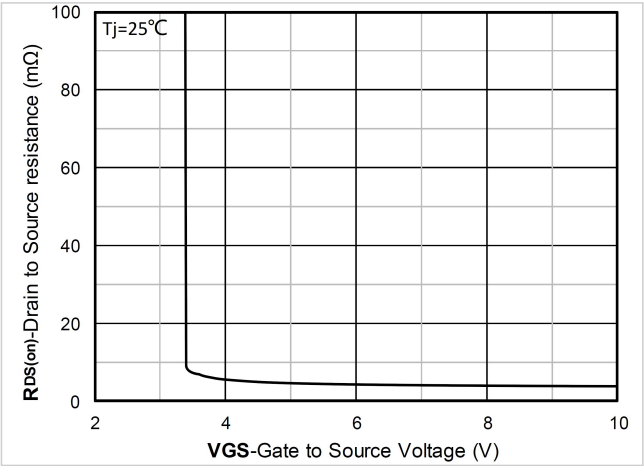
Transfer Characteristics



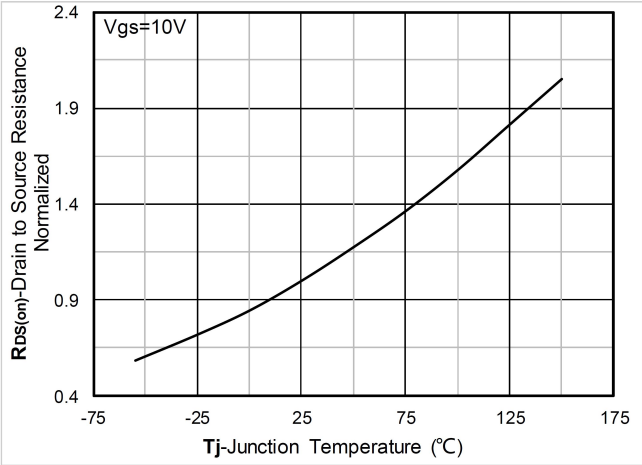
Capacitance Characteristics



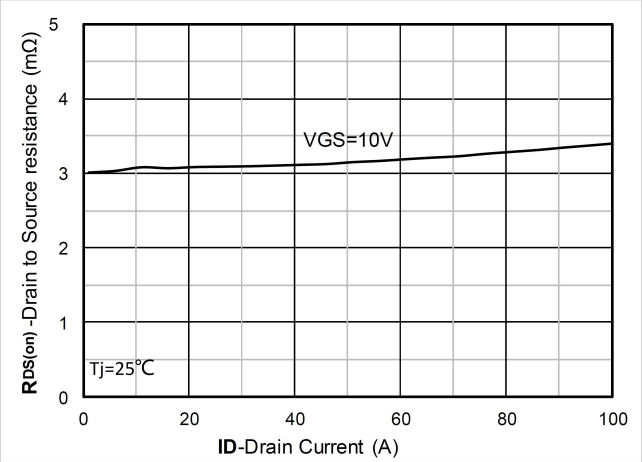
Gate Charge



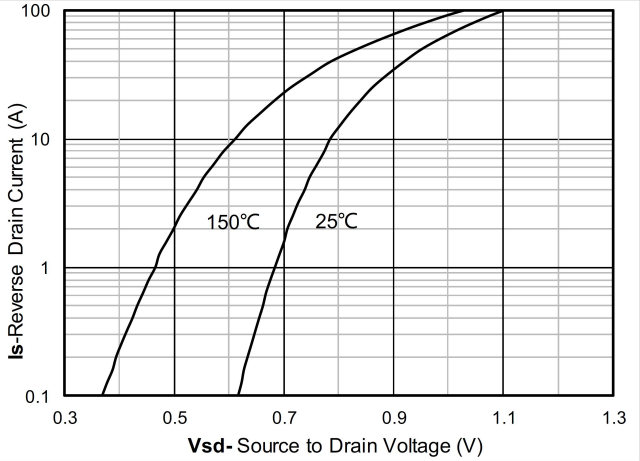
On-Resistance vs Gate to Source Voltage



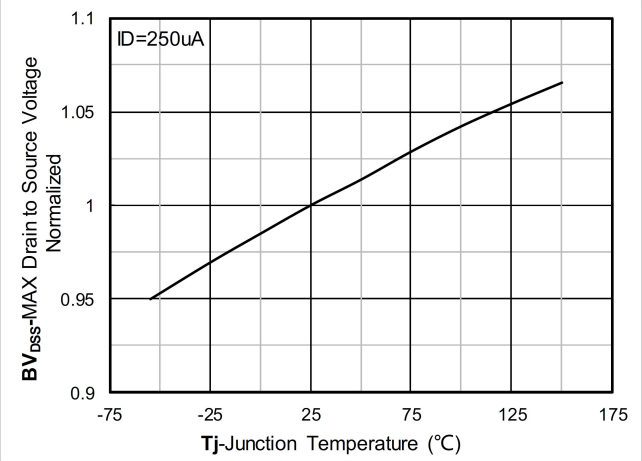
Normalized On-Resistance



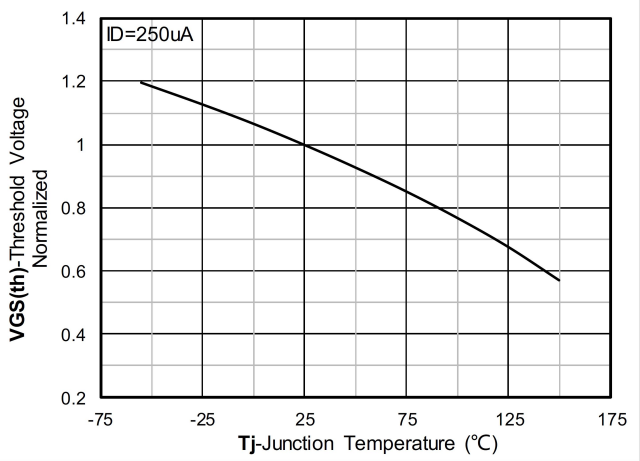
RDS(on) VS Drain Current



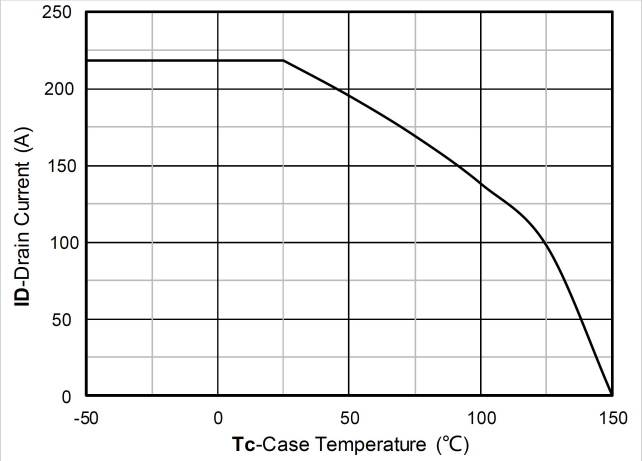
Forward characteristics of reverse diode



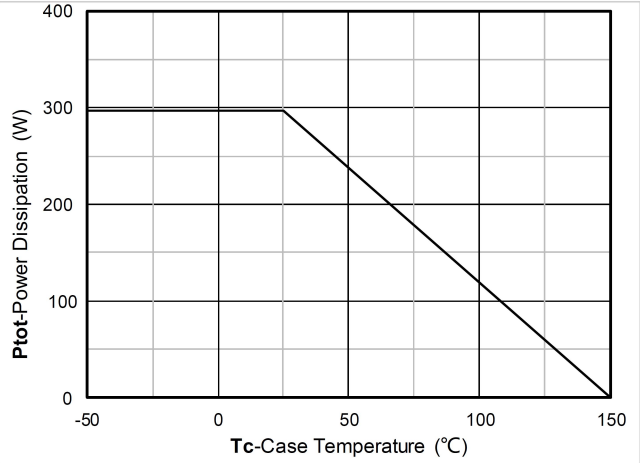
Normalized breakdown voltage



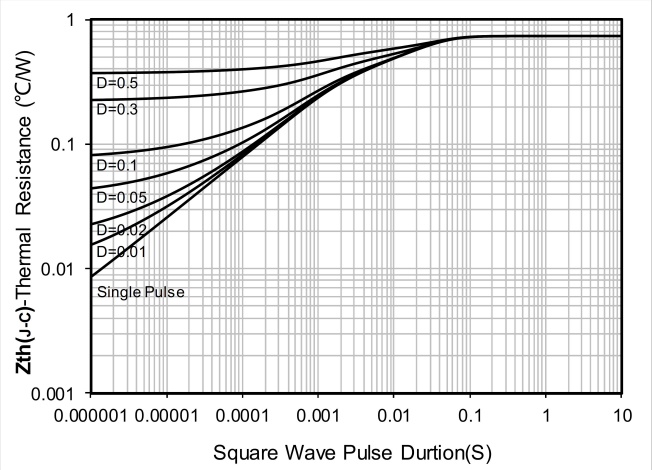
Normalized Threshold voltage



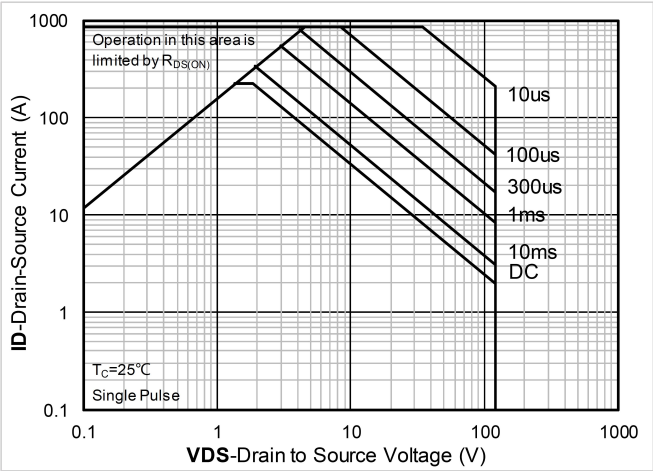
Current dissipation



Power dissipation

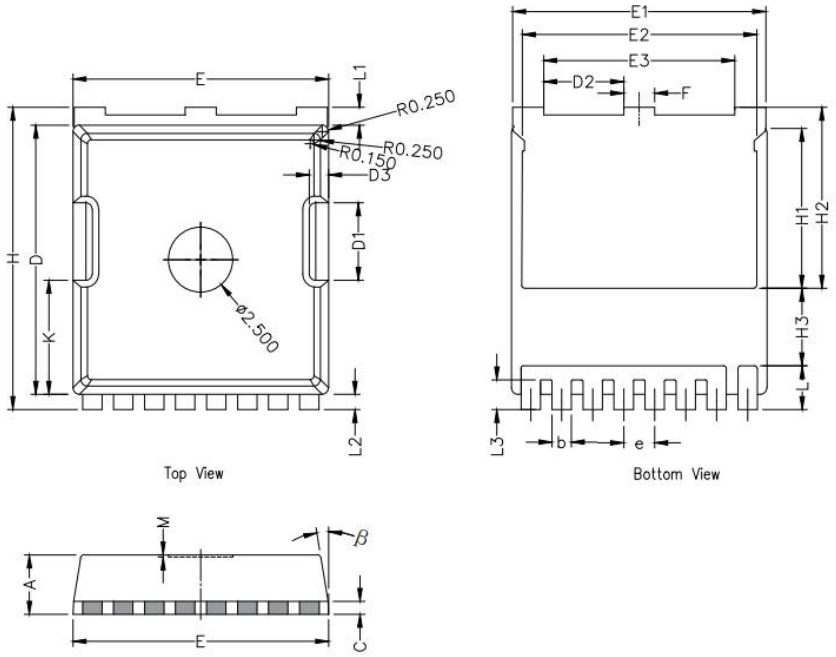


Maximum Transient Thermal Impedance



Safe Operation Area

TOLL Package Outline Dimensions



Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	2.20	2.30	2.40
b	0.65	0.75	0.85
C		0.508 REF	
D	10.25	10.40	10.55
D1	2.85	3.00	3.15
E	9.75	9.90	10.05
E1	9.65	9.80	9.95
E2	8.95	9.10	9.25
E3	7.25	7.40	7.55
e		1.20 BSC	
F	1.05	1.20	1.35
H	11.55	11.70	11.85
H1	6.03	6.18	6.33
H2	6.85	7.00	7.15
H3		3.00 BSC	
L	1.55	1.70	1.85
L1	0.55	0.7	0.85
L2	0.45	0.6	0.75
M		0.08 REF.	
β	8°	10°	12°
K	4.25	4.40	4.55