Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
120V	3.7mΩ@10V	180A

合肥矽普半导体
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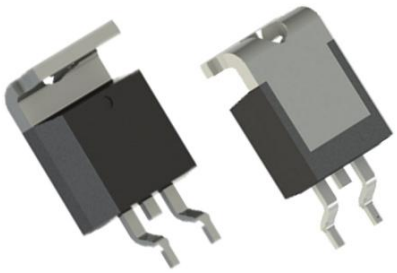
Feature

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

Applications

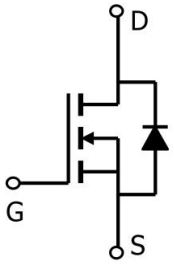
- High Speed Power switching
- DC-DC Converter
- Power Management

Package

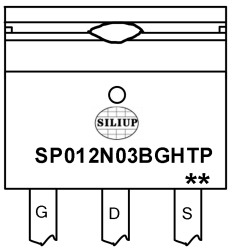


TO-220R

Circuit diagram



Marking



SP012N03BGHTP :Product code
** :Week code

Order Information

Device	Package	Unit/Tube
SP012N03BGHTP	TO-220R	50

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 Current (Tc=25℃)	I_D	180	A
Continuous Drain Current (Tc=100℃)	I_D	120	A
Pulsed Drain Current	I_{DM}	720	A
Single Pulse Avalanche Energy[1]	E_{AS}	900	mJ
Power Dissipation (Tc=25℃)	P_D	230	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	0.54	℃/W
Storage Temperature Range	T_{STG}	-55 to 150	℃
Operating Junction Temperature Range	T_J	-55 to 150	℃

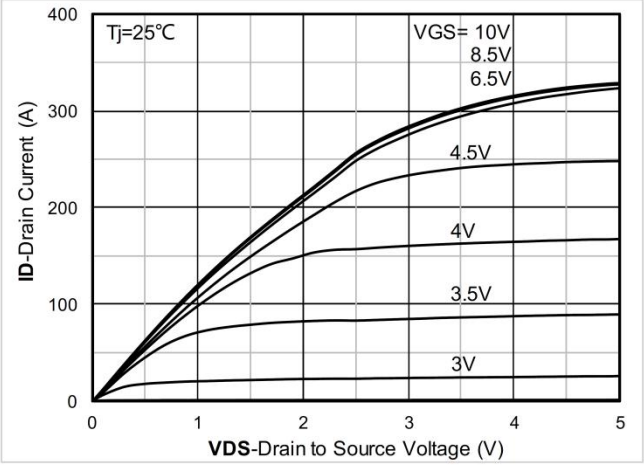
Electrical characteristics (Ta=25℃, unless otherwise noted)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	ID = 250μA, VGS = 0V	120	-	-	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	2.0	3.0	4.0	V
Drain-Source ON Resistance	$R_{DS(ON)}$	VGS = 10V, ID = 50A	-	3.7	4.6	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		-	-	180	A
Reverse Recovery Time	T_{rr}	I_S=100A, di/dt=100A/us, TJ=25℃	-	92	-	nS
Reverse Recovery Charge	Q_{rr}		-	183	-	nC

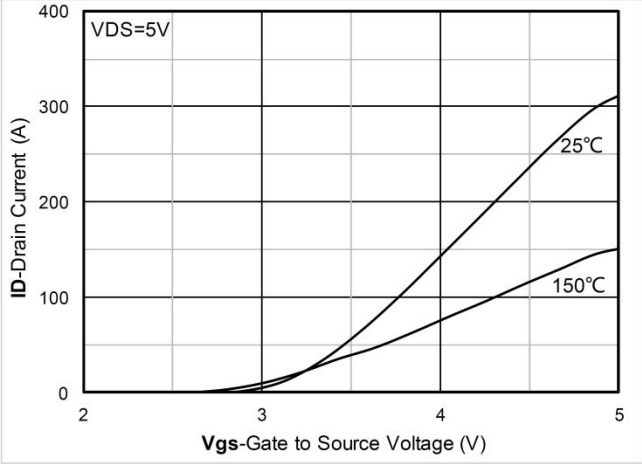
Note :

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

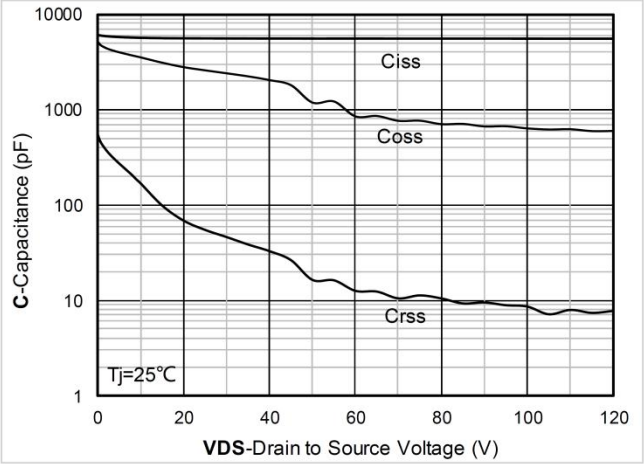
Typical Characteristics



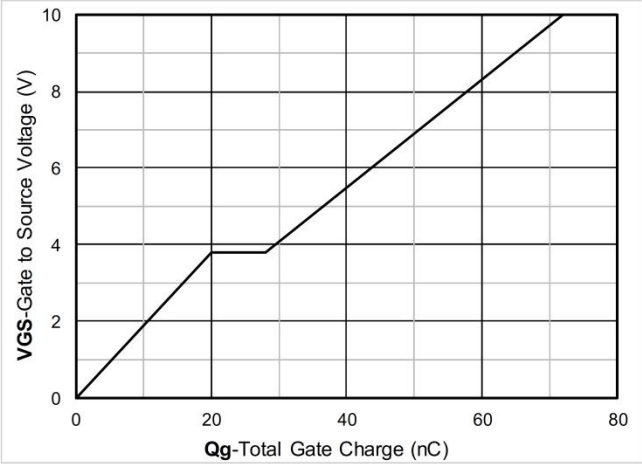
Output Characteristics



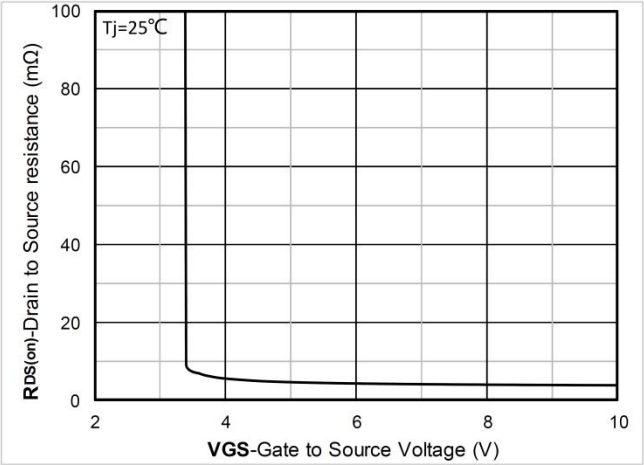
Transfer Characteristics



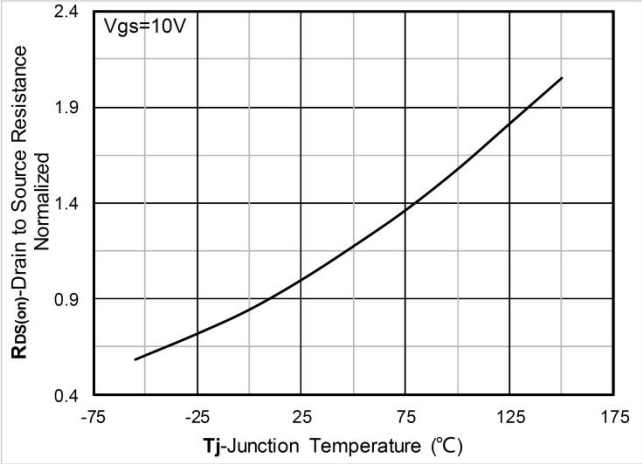
Capacitance Characteristics



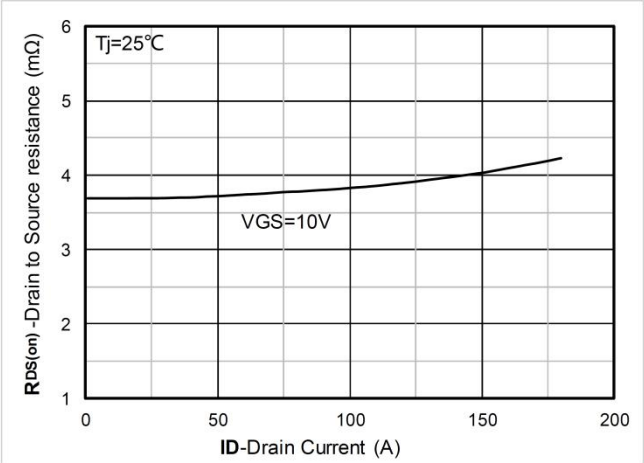
Gate Charge



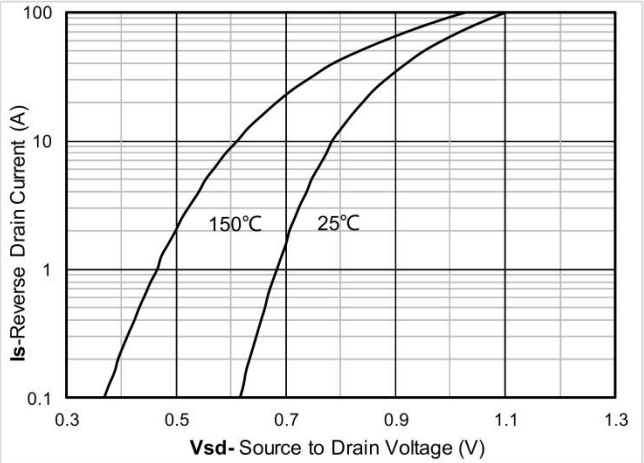
On-Resistance vs Gate to Source Voltage



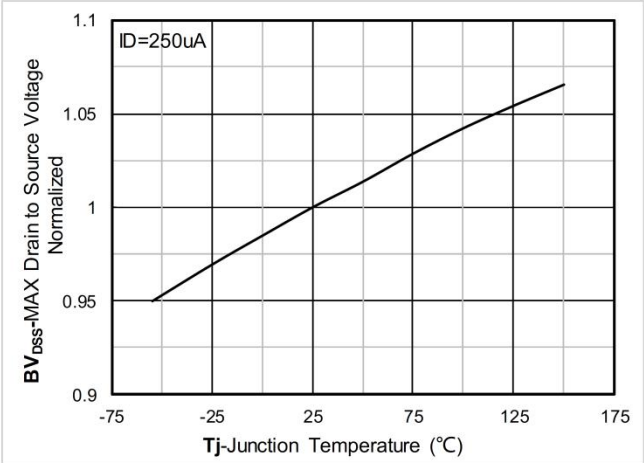
Normalized On-Resistance



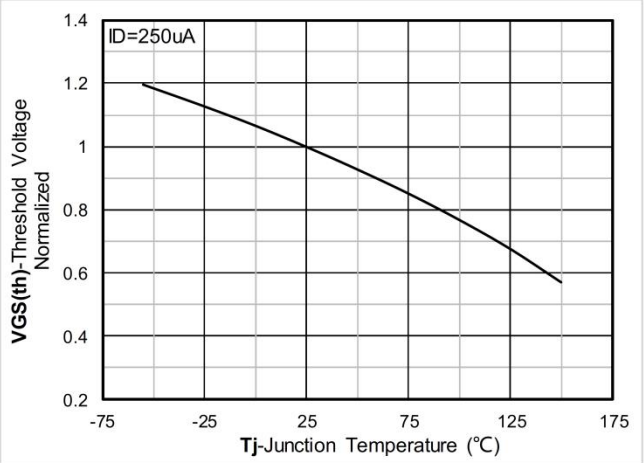
RDS(on) VS Drain Current



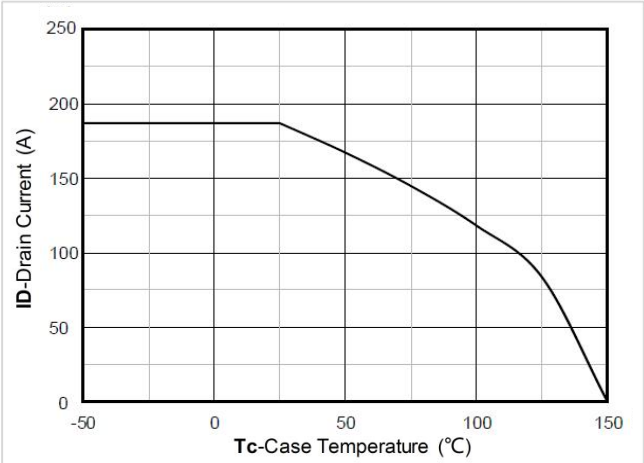
Forward characteristics of reverse diode



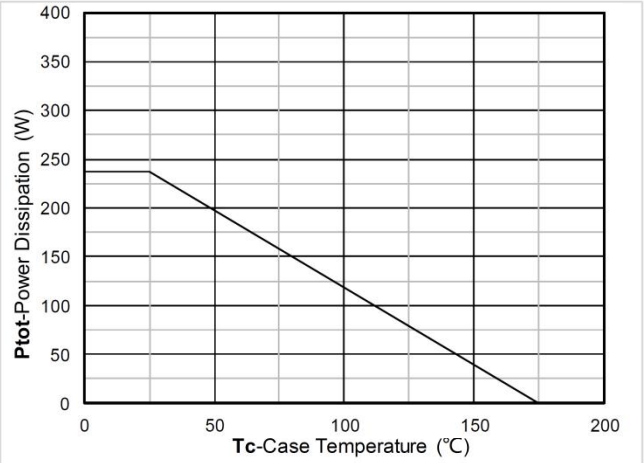
Normalized breakdown voltage



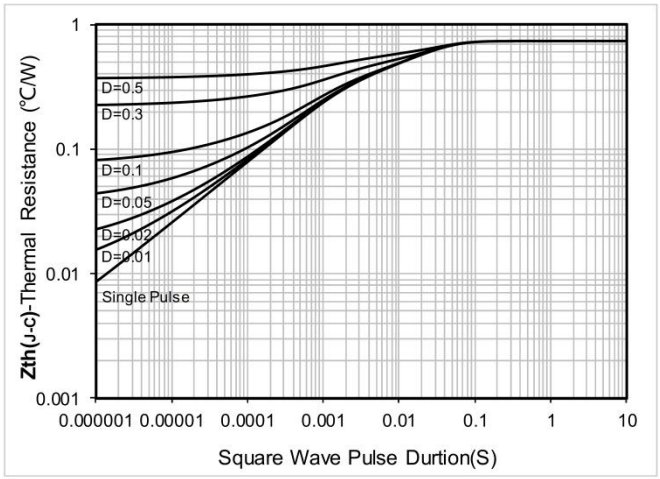
Normalized Threshold voltage



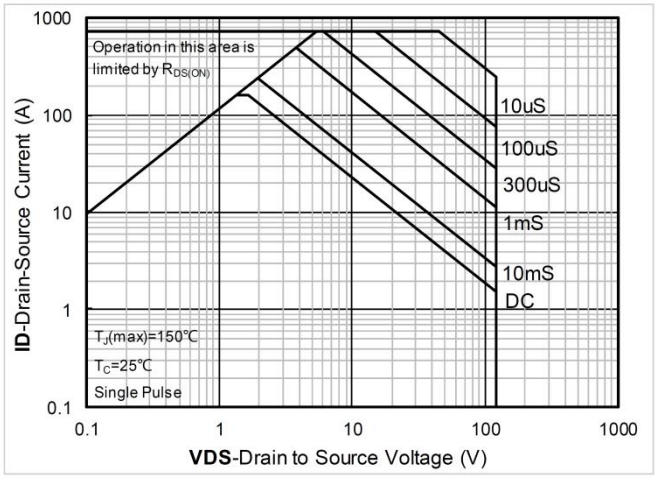
Current dissipation



Power dissipation

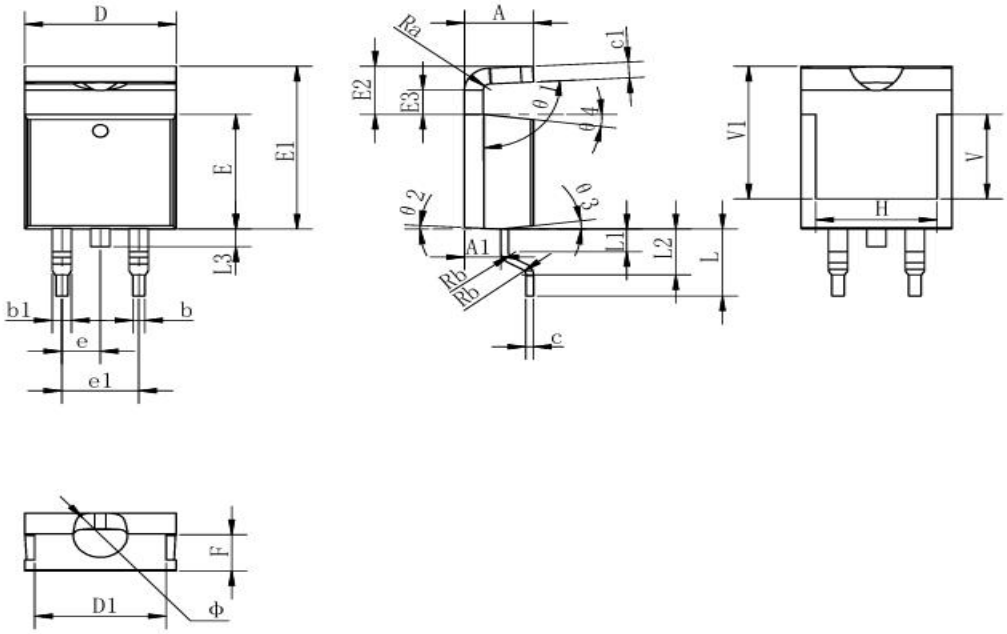


Maximum Transient Thermal Impedance



Safe Operation Area

TO-220R Package Information



Symbol	Dimensions In MIllimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4. 30	4. 80	0.169	0. 189
A1	2. 20	2. 70	0. 087	0.106
b	0. 70	0. 95	0. 028	0. 037
b1	1. 10	1. 50	0. 043	0. 059
c	0. 40	0. 65	0. 016	0. 026
c1	1. 20	1. 45	0. 047	0. 057
D	9. 70	10. 30	0. 382	0. 406
D1	8.70 Ref.		0. 343 Ref.	
E	8. 75	9. 65	0. 344	0. 380
E1	12. 85	13. 85	0. 492	0.516
E2	3. 95	4. 55	0. 156	0. 179
E3	1. 27	2. 07	0. 050	0. 080
e	2. 540 Typ.		0. 100 Typ.	
e1	4. 98	5. 18	0. 196	0. 204
F	2. 60	3. 00	0.102	0. 118
H	7. 00	8. 40	0.276	0.331
L	5. 10	5. 50	0. 201	0.217
L1	1. 35	1. 75	0. 053	0. 069
L2	2. 50	2. 90	0. 098	0.114
L3	1. 30	1. 50	0.051	0. 059
V	6.70 Ref.		0. 264 Ref.	
V1	10. 45	11. 45	0. 411	0. 451
φ	3. 45	3. 75	0. 136	0. 148
θ1	90°	93. 5°	90°	93. 5°
θ2	0°	6°	0°	6°
θ3	4°	10°	4°	10°
θ4	4°	10°	4°	10°
Ra	0. 40	0. 90	0.016	0.035
Rb	0. 30	0. 70	0. 012	0. 027