

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
85V	2.5mΩ@10V	200A



**合肥矽普半导体**

Siliup Semiconductor Technology Co., Ltd

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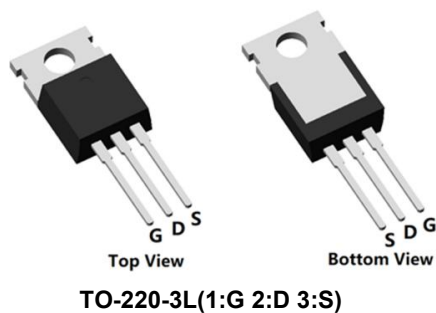
## Feature

- Fast Switching
- Low Gate Charge and Rdson
- Advanced Split Gate Trench Technology
- 100% Single Pulse avalanche energy Test

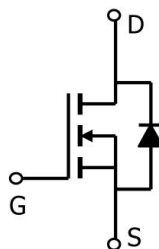
## Applications

- Power switching application
- DC-DC Converter
- Power Management

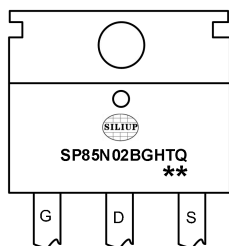
## Package



## Circuit diagram



## Marking



**SP85N02BGHTQ** : Product code  
\*\* : Week code

## Order Information

Device	Package	Unit/Tube
SP85N02BGHTQ	TO-220-3L	50

**Absolute maximum ratings (Ta=25°C unless otherwise noted)**

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		$V_{DS}$	85	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	V
Continuous Drain Current (Tc=25°C)	Silicon limit	$I_D$	310	A
Continuous Drain Current (Tc=25°C)	Package limit	$I_D$	200	A
Continuous Drain Current (Tc=100°C)		$I_D$	130	A
Pulsed Drain Current		$I_{DM}$	800	A
Single Pulse Avalanche Energy <sup>1</sup>		$E_{AS}$	1650	mJ
Power Dissipation (Tc=25°C)		$P_D$	240	W
Thermal Resistance Junction-to-Case		$R_{\theta JC}$	0.52	°C/W
Storage Temperature Range		$T_{STG}$	-55 to 150	°C
Operating Junction Temperature Range		$T_J$	-55 to 150	°C

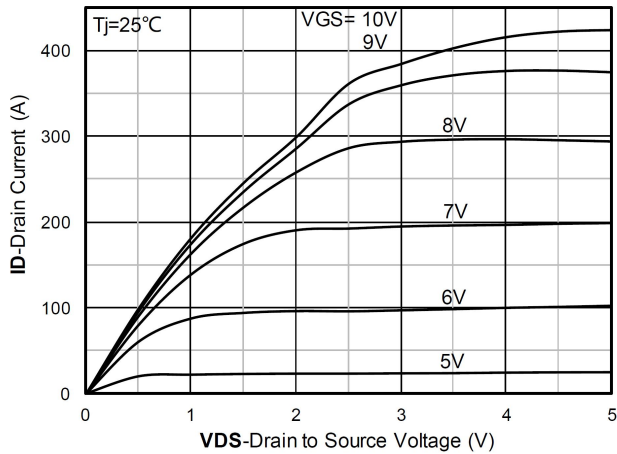
**Electrical characteristics (Ta=25°C, unless otherwise noted)**

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	VGS=0V , ID=250uA	85	-	-	V
Drain Cut-Off Current	I <sub>DSS</sub>	VDS=68V , VGS=0V , TJ=25℃	-	-	1	μA
Gate Leakage Current	I <sub>GSS</sub>	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	VGS=VDS , ID =250uA	2.0	3.0	4.0	V
Drain-Source ON Resistance	R <sub>DS(ON)</sub>	VGS=10V , ID=20A	-	2.5	3.2	mΩ
Dynamic Characteristics						
Input Capacitance	C <sub>iss</sub>	VDS=40V , VGS=0V , f=1MHz	-	9100	-	pF
Output Capacitance	C <sub>oss</sub>		-	4700	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	190	-	
Total Gate Charge	Q <sub>g</sub>	VDS=40V , VGS=10V , ID=125A	-	156	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	51	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	45	-	
Switching Characteristics						
Turn-On Delay Time	t <sub>d(on)</sub>	VDD=40V, VGS=10V , RG=1.6Ω, ID=125A	-	25	-	nS
Rise Time	t <sub>r</sub>		-	18	-	
Turn-Off Delay Time	t <sub>d(off)</sub>		-	50	-	
Fall Time	t <sub>f</sub>		-	15	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> = 1A, VGS = 0V	-	-	1.2	V
Maximum Body-Diode Continuous Current	I <sub>S</sub>		-	-	200	A
Reverse Recovery Time	T <sub>rr</sub>	I <sub>S</sub> =50A, di/dt=100A/us, TJ=25℃	-	106	-	nS
Reverse Recovery Charge	Q <sub>rr</sub>		-	256	-	nC

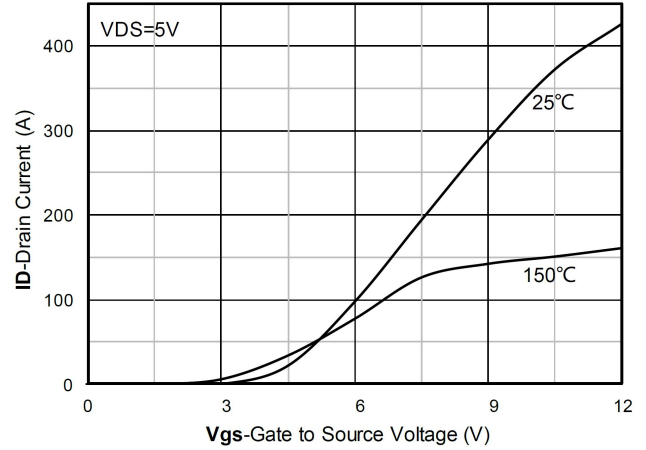
**Note:**

- The EAS test condition is  $V_{DD}=50V, V_{GS}=10V, L=0.5mH, R_G=25\Omega$

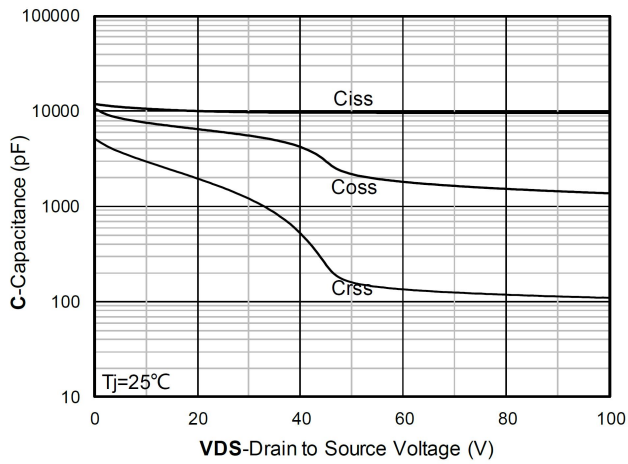
## Typical Characteristics



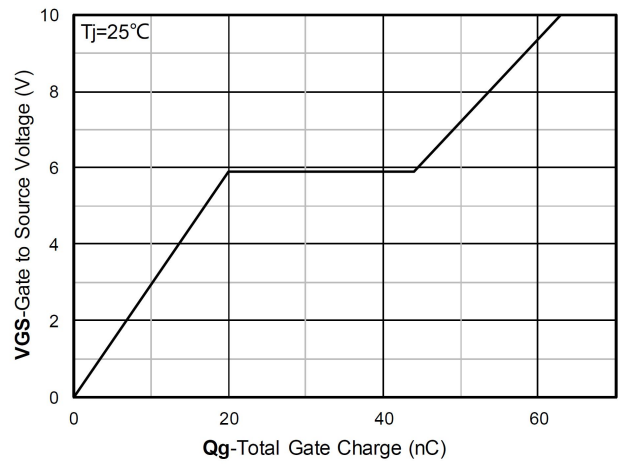
Output Characteristics



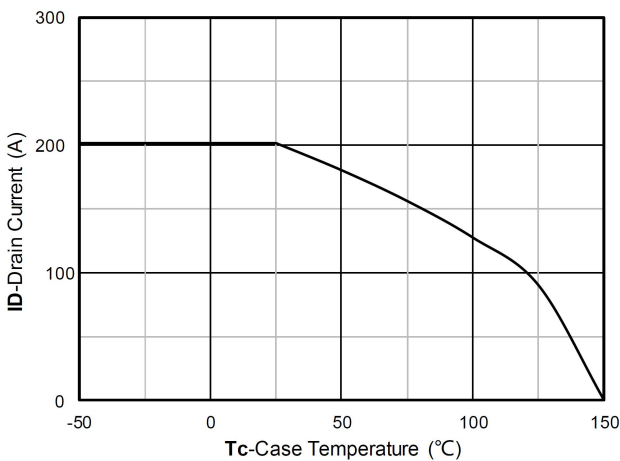
Transfer Characteristics



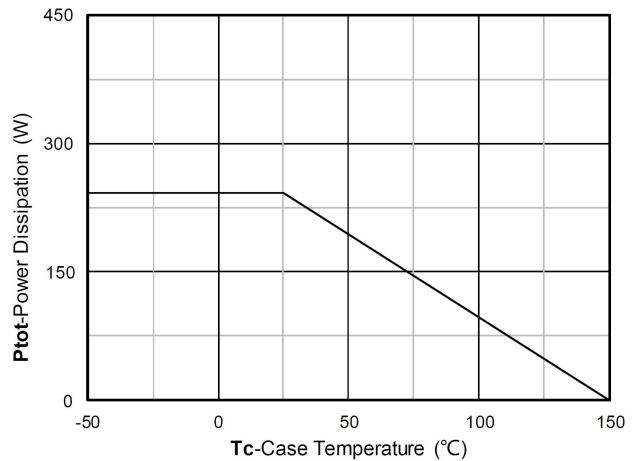
Capacitance Characteristics



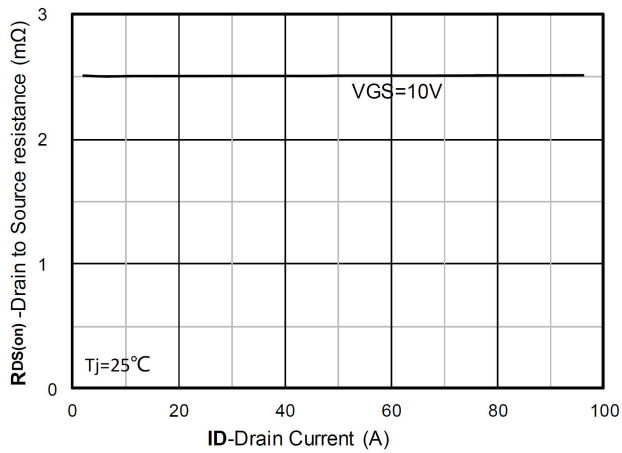
Gate Charge



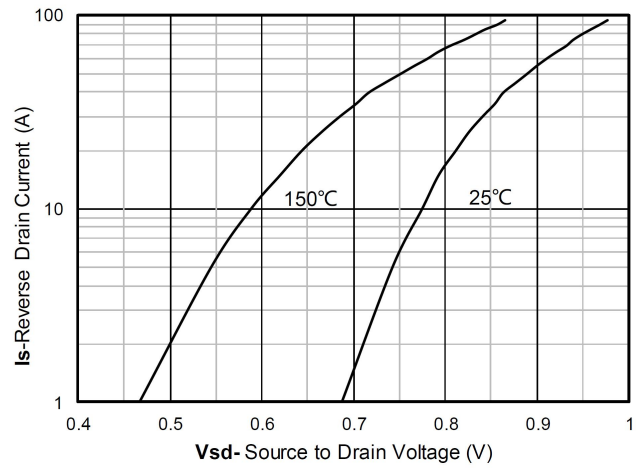
Current dissipation



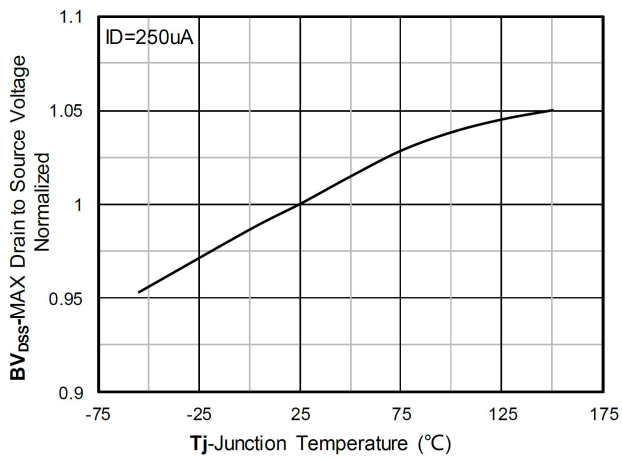
Power dissipation



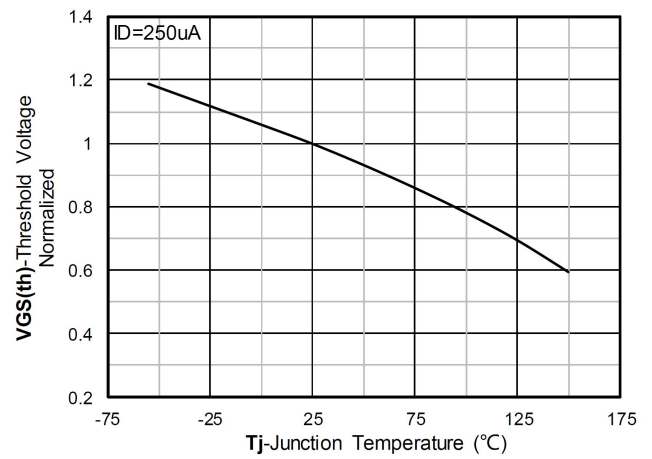
RDS(on) VS Drain Current



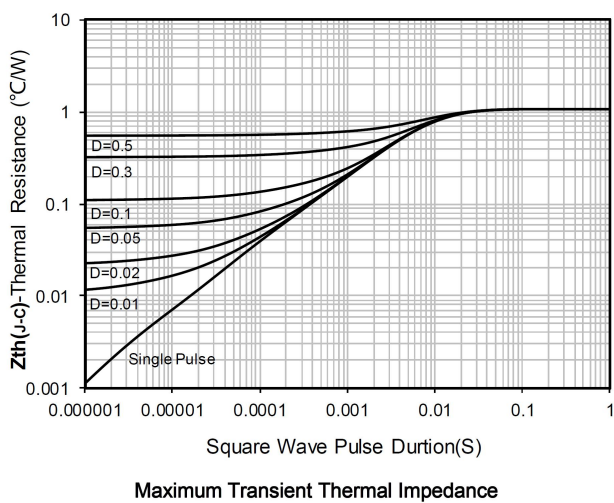
Forward characteristics of reverse diode



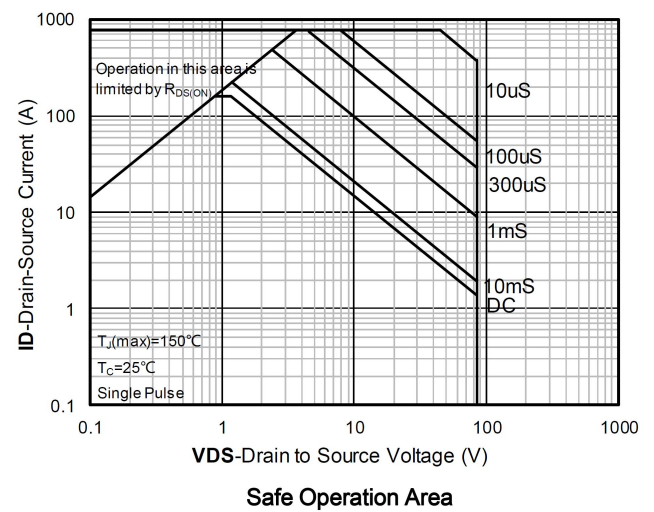
Normalized breakdown voltage



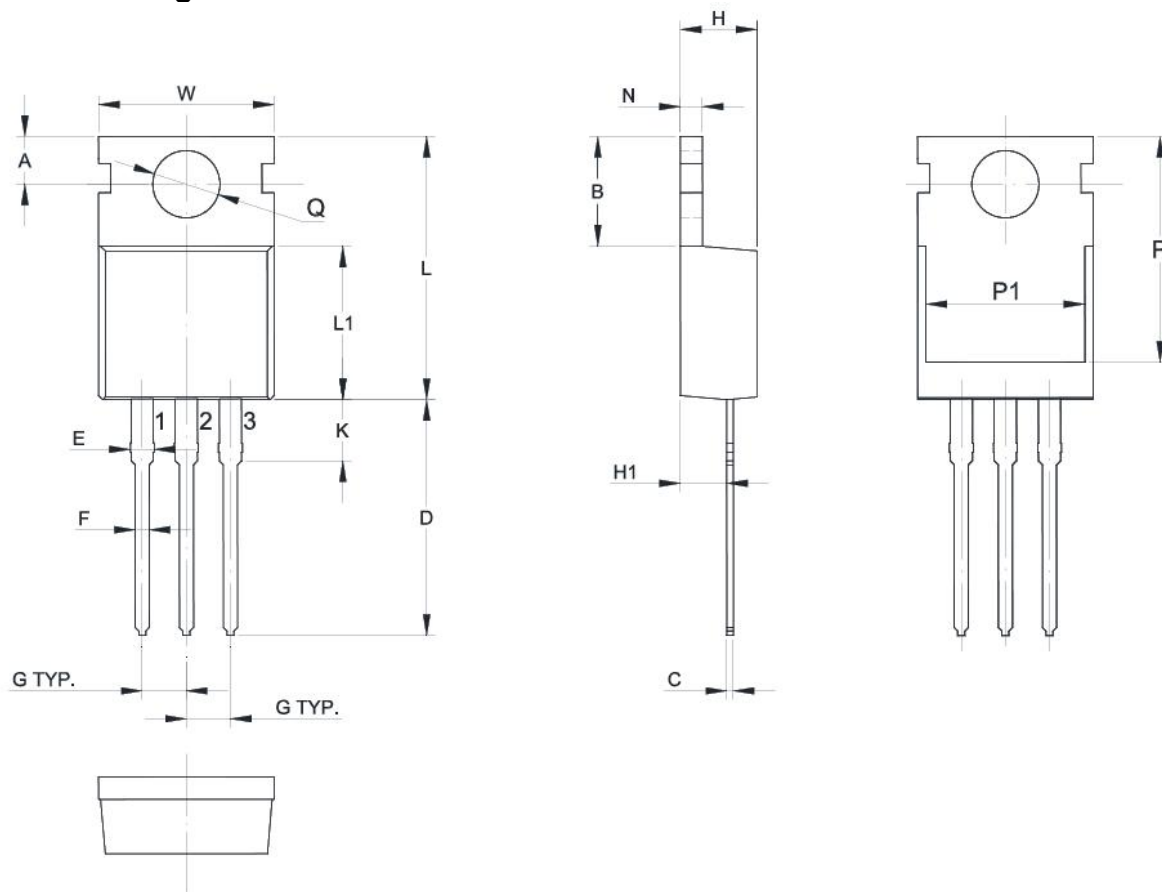
Normalized Threshold voltage



Maximum Transient Thermal Impedance



Safe Operation Area

**TO-220-3L Package Information**


Symbol	Dimensions In Millimeters	
	Min.	Max.
A	2.700	2.900
B	6.400	6.800
C	0.300	0.700
D	11	15
E	1.1	1.5
F	0.7	0.9
G	2.54TYP	
W	9.8	10.2
H	4.3	4.7
H1	2.2	2.5
K	2.7	3.1
L	14.8	16.8
L1	9.0	9.4
N	1.2	1.4
P	12.7	13.3
P1	7.6	8.2
Q	3.5	3.7