

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
60V	1.5mΩ@10V	200A
	2.0mΩ@4.5V	



合肥矽普半导体

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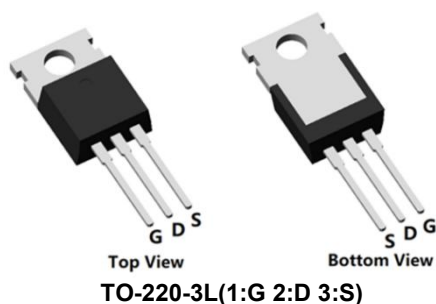
Feature

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

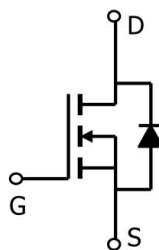
Applications

- Charger
- Battery management
- Power Switching application

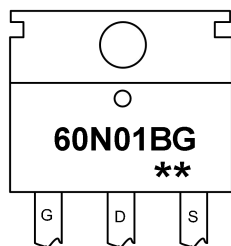
Package



Circuit diagram



Marking



60N01BG =Device Code
****** =Week Code

Order Information

Device	Package	Unite/Tube
SP60N01BGTQ	TO-220	50

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

Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current (Tc=25°C)	Silicon limit	I_D	250	A
Continuous Drain Current (Tc=25°C)	Package limit	I_D	200	A
Pulsed Drain Current		I_{DM}	800	A
Single Pulse Avalanche Energy ¹		E_{AS}	1849	mJ
Power Dissipation (Tc=25°C)		P_D	220	W
Thermal Resistance Junction-to-Case		$R_{\theta JC}$	0.57	°C/W
Storage Temperature Range		T_{STG}	-55 to 150	°C
Operating Junction Temperature Range		T_J	-55 to 150	°C

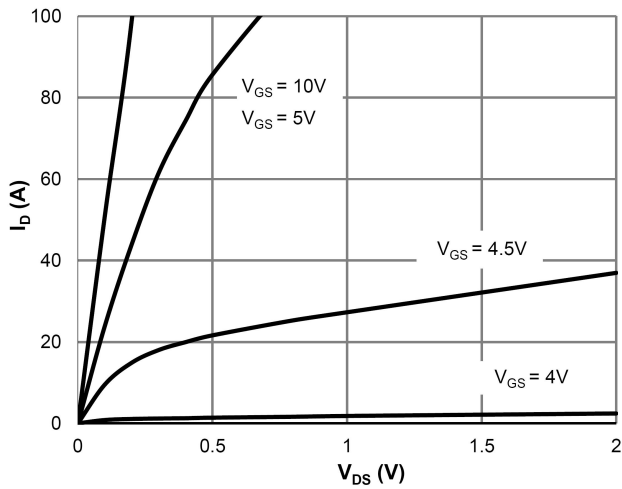
Electrical characteristics (Ta=25°C, unless otherwise noted)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	VGS=0V , ID=250uA	60	-	-	V
Drain Cut-Off Current	I _{DSS}	VDS=48V , VGS=0V	-	-	1	μA
Gate Leakage Current	I _{GSS}	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	VGS(th)	VGS=VDS , ID =250uA	1.0	1.8	2.5	V
Drain-Source ON Resistance	RDS(ON)	VGS=10V , ID=30A	-	1.5	2.1	mΩ
		VGS=4.5V , ID=20A	-	2.0	2.8	
Dynamic Characteristics						
Input Capacitance	Ciss	VDS=30V , VGS=0V , f=1MHz	-	8904	-	pF
Output Capacitance	Coss		-	2508	-	
Reverse Transfer Capacitance	Crss		-	51	-	
Total Gate Charge	Qg	VDS=30V , VGS=10V , ID=30A	-	148	-	nC
Gate-Source Charge	Qgs		-	28	-	
Gate-Drain Charge	Qgd		-	24	-	
Switching Characteristics						
Turn-On Delay Time	td(on)	VDD=30V,VGS=10V,RG=2Ω, ID=30A	-	48	-	nS
Rise Time	tr		-	32	-	
Turn-Off Delay Time	td(off)		-	221	-	
Fall Time	tf		-	136	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	VSD	Is = 1A, VGS = 0V	-	-	1.2	V
Maximum Body-Diode Continuous Current	Is		-	-	200	A
Reverse Recovery Time	Trr	Is=20A, di/dt=100A/us, TJ=25℃	-	86	-	nS
Reverse Recovery Charge	Qrr		-	116	-	nC

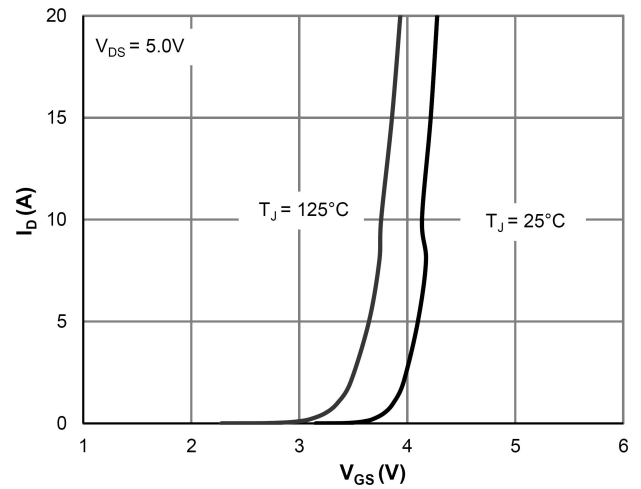
Note:

- The EAS test condition is $V_{DD}=30V, V_{GS}=10V, L=0.5mH, R_G=25\Omega$

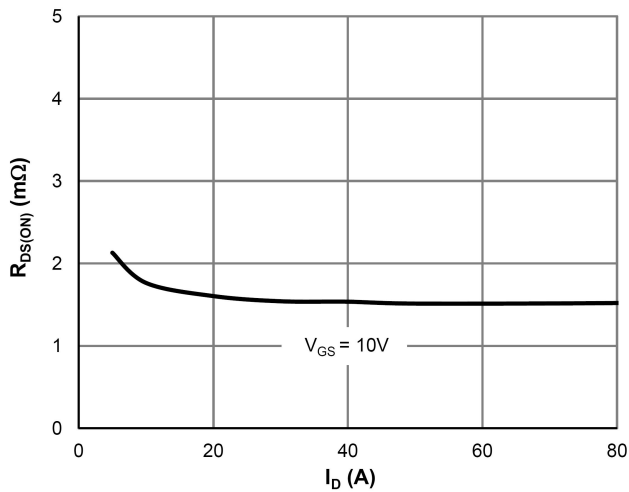
Typical Characteristics



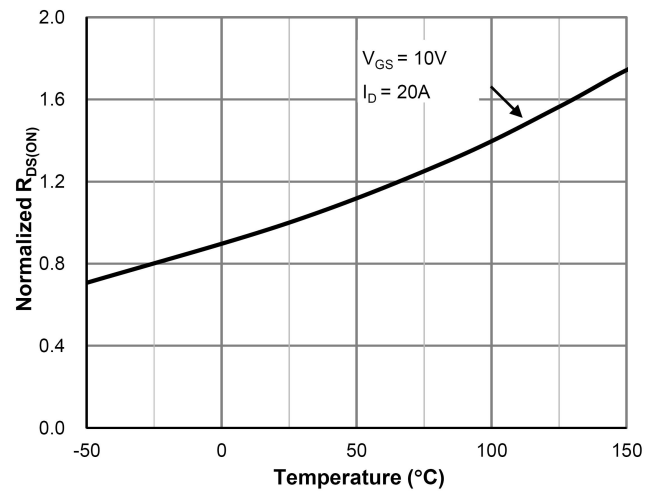
Saturation Characteristics



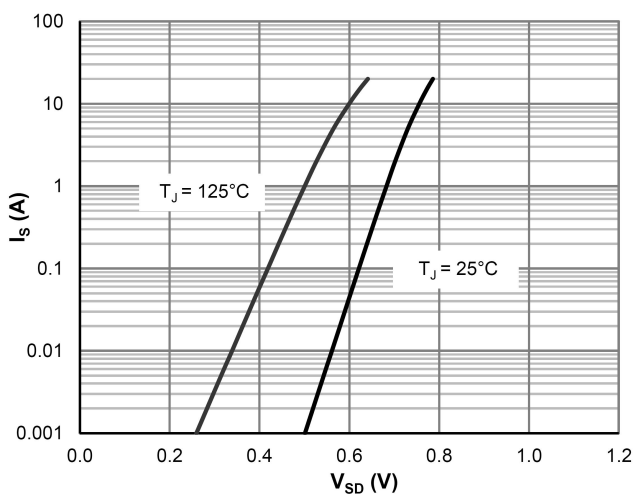
Transfer Characteristics



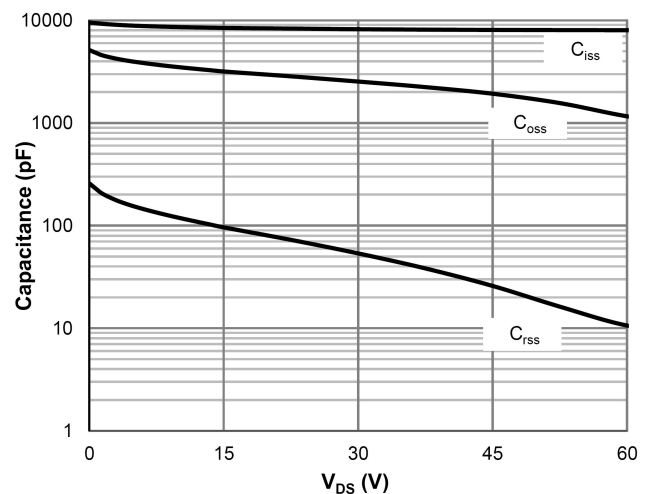
$R_{DS(ON)}$ vs. Drain Current



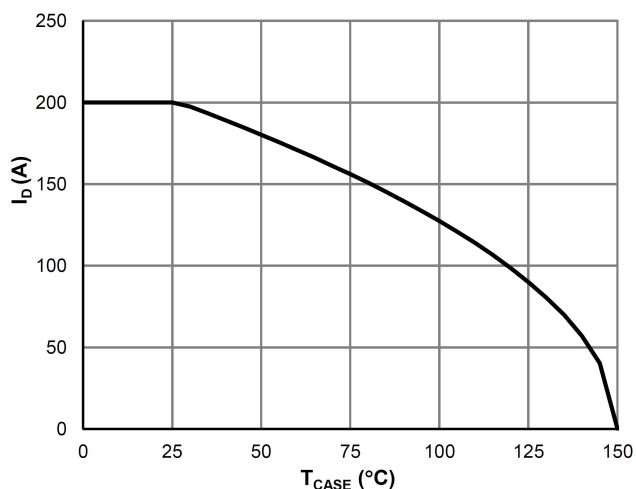
$R_{DS(ON)}$ vs. Junction Temperature



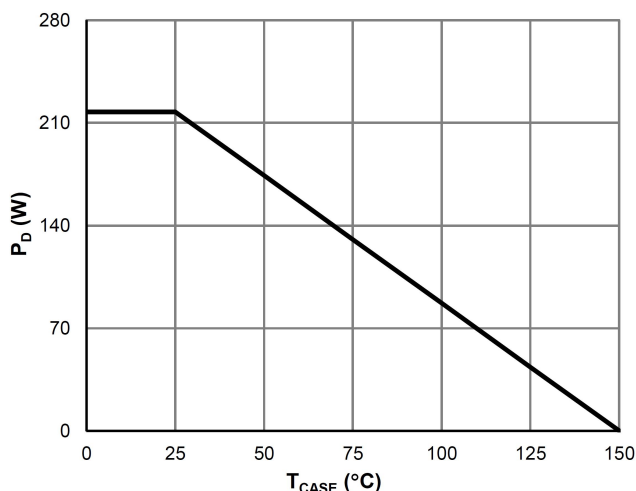
Body-Diode Characteristics



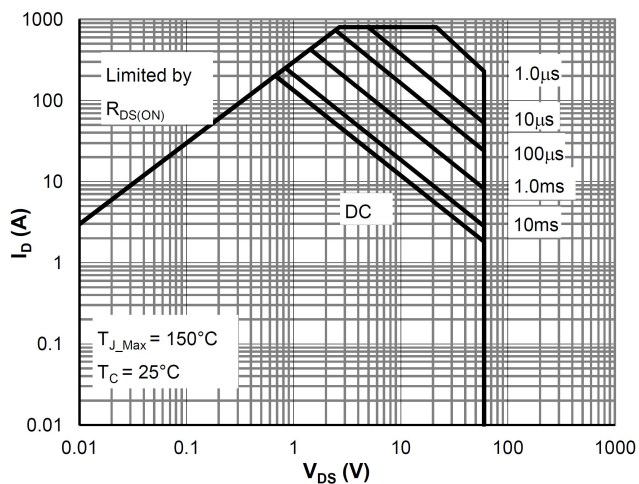
Capacitance Characteristics



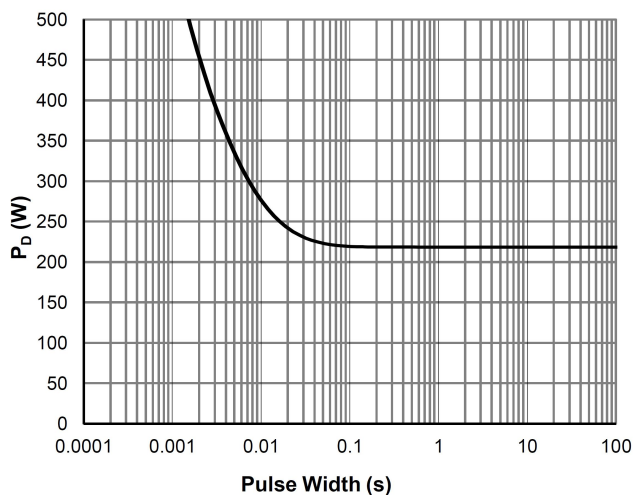
Current De-rating



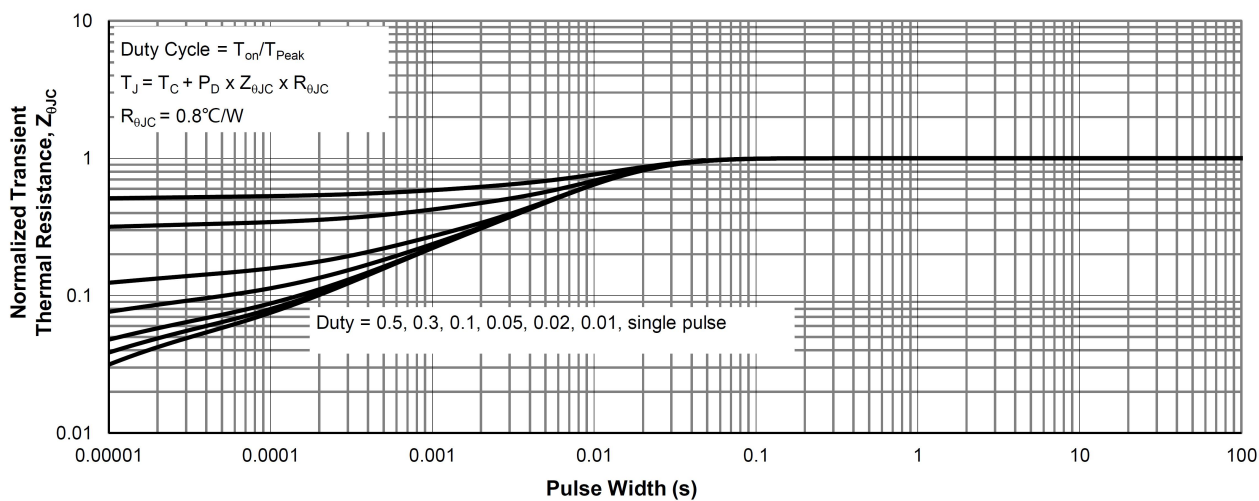
Power De-rating



Maximum Safe Operating Area

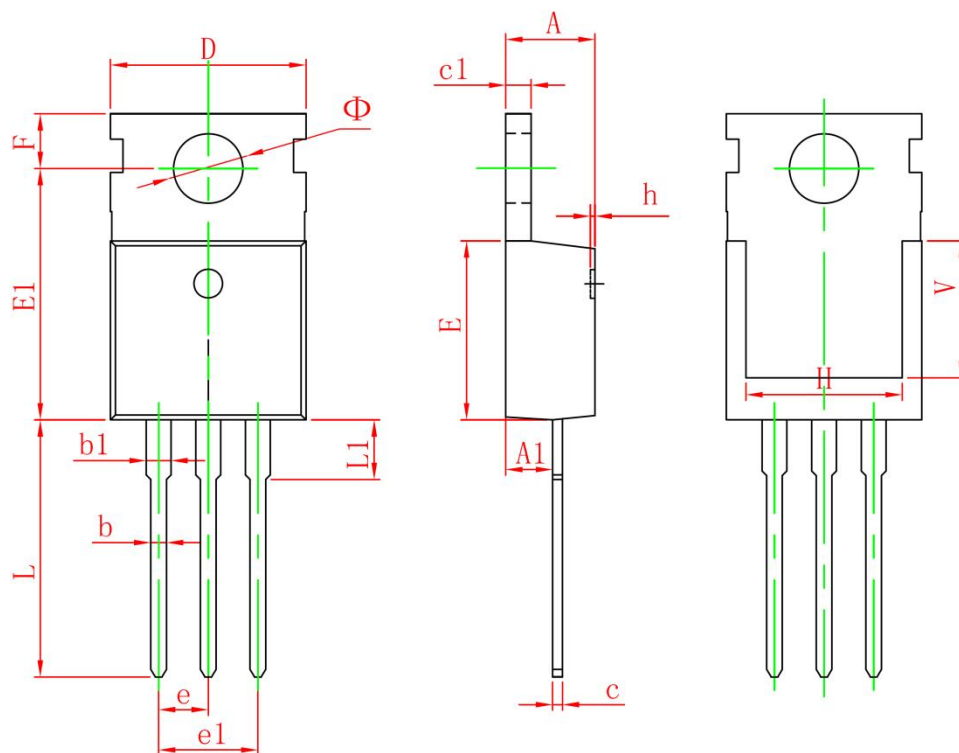


Single Pulse Power Rating, Junction-to-Case



Normalized Transient Thermal Impedance

TO-220-3L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.950	9.750	0.352	0.384
E1	12.650	13.050	0.498	0.514
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	6.900 REF.		0.276 REF.	
Φ	3.400	3.800	0.134	0.150