

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
-60V	6mΩ@10V	-120A
	7.3mΩ@4.5V	



合肥矽普半导体

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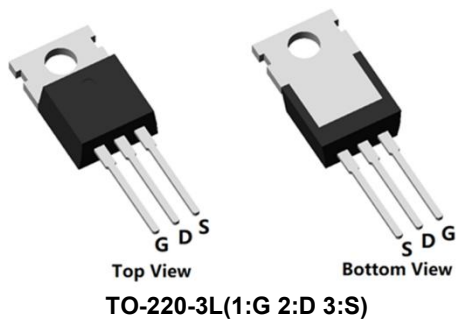
Feature

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

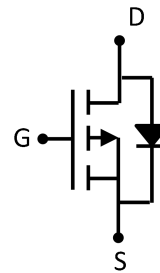
Applications

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

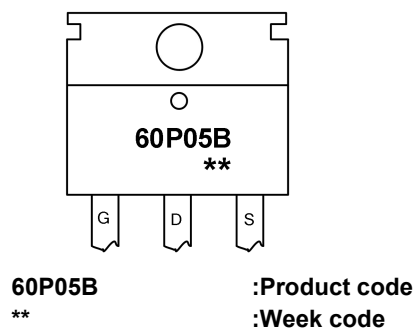
Package



Circuit diagram



Marking



Order Information

Device	Package	Unit/Tube
SP60P05BTQ	TO-220-3L	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)	I_D	-120	A
Continuous Drain Current (Tc=100°C)	I_D	-80	A
Pulsed Drain Current	I_{DM}	-480	A
Single Pulse Avalanche Energy ¹	E_{AS}	229	mJ
Power Dissipation (Tc=25°C)	P_D	375	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	0.33	°C/W
Storage Temperature Range	T_{STG}	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 150	°C

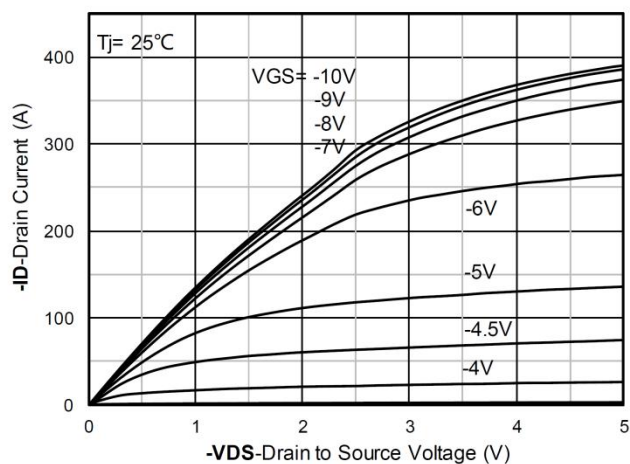
Electrical characteristics (Ta=25°C, unless otherwise noted)

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	IDSS	VDS=-48V , VGS=0V , TJ=25℃	-	-	-1	μA
Gate Leakage Current	IGSS	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	VGS(th)	VGS=VDS , ID =-250uA	-1.0	-1.5	-2.5	V
Static Drain-Source On-Resistance	RDS(ON)	VGS=-10V , ID=-20A	-	6	7.5	mΩ
		VGS=-4.5V , ID=-20A	-	7.3	9.8	
Dynamic Characteristics						
Input Capacitance	Ciss	VDS=-25V,VGS=0V,f=1MHz	-	11431	-	pF
Output Capacitance	Coss		-	1189	-	
Reverse Transfer Capacitance	Crss		-	864	-	
Total Gate Charge	Qg	VDS=-30V,VGS=-10V,ID=-110A	-	235.5	-	nC
Gate-Source Charge	Qgs		-	52.1	-	
Gate-Drain Charge	Qgd		-	63.2	-	
Switching Characteristics						
Turn-On Delay Time	td(on)	VDD=-30V,VGS=-10V,ID=-20A,RG=2.4Ω	-	19.8	-	nS
Rise Time	tr		-	26.1	-	
Turn-Off Delay Time	td(off)		-	114	-	
Fall Time	tf		-	52.7	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	VSD	Is = -1A, VGS = 0V	-	-	-1.2	V
Maximum Body-Diode Continuous Current	Is		-	-	-120	A
Reverse Recovery Time	Trr	Is=-85A,di/dt=100A/us,TJ=25℃	-	91	-	nS
Reverse Recovery Charge	Qrr		-	210	-	nC

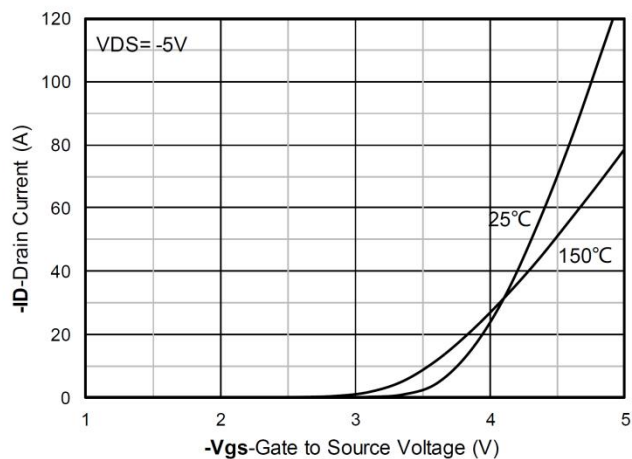
Note :

- The test condition is $V_{DD}=-30V, V_{GS}=-10V, L=0.1mH, R_G=25\Omega$

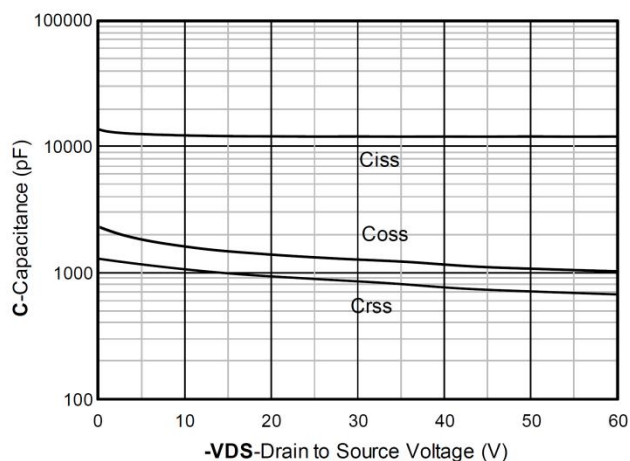
Typical Characteristics



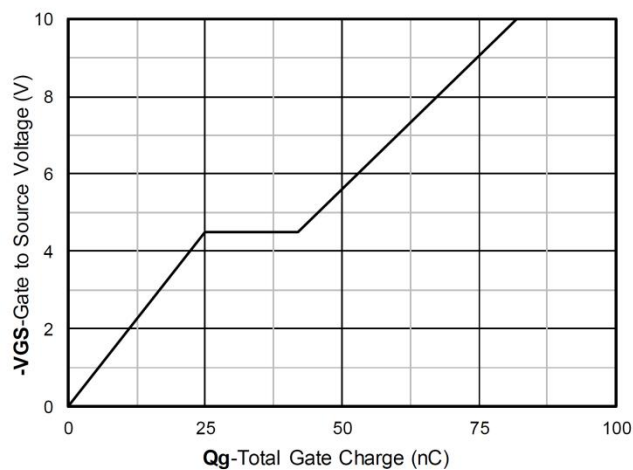
Output Characteristics



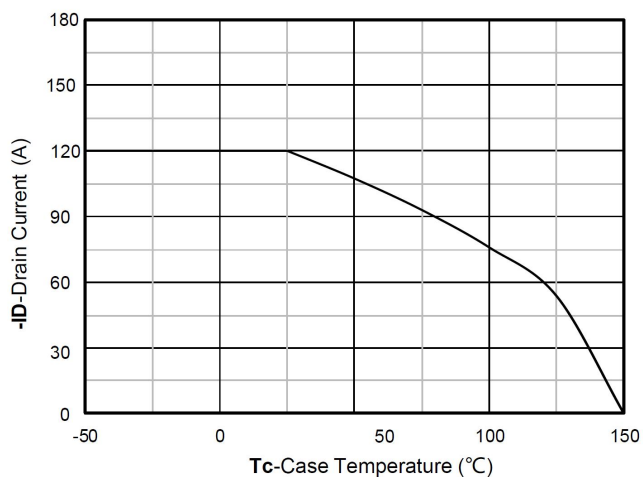
Transfer Characteristics



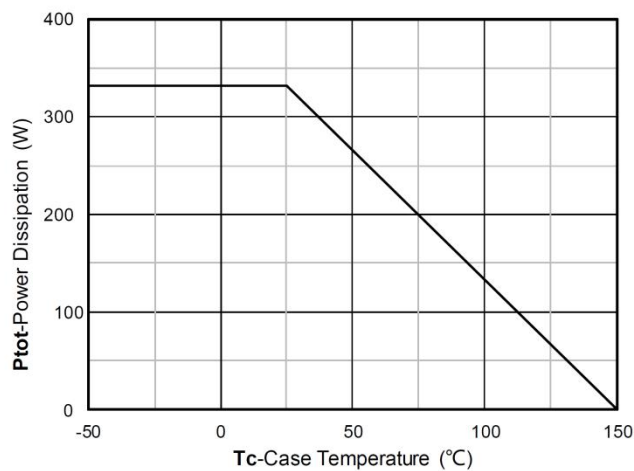
Capacitance Characteristics



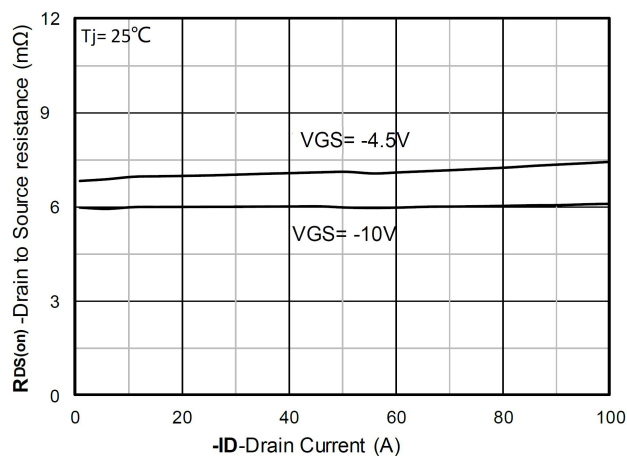
Gate Charge



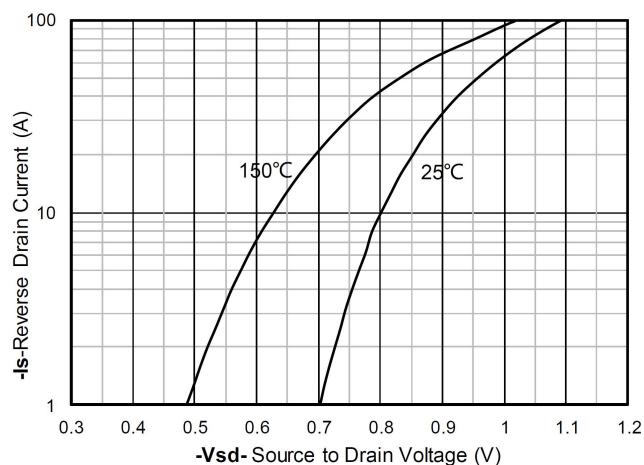
Current dissipation



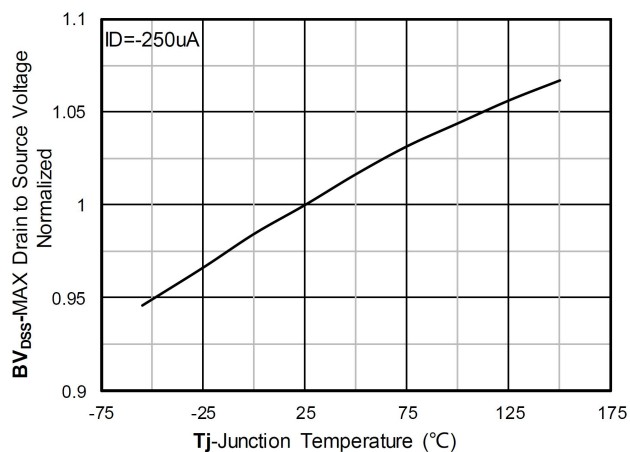
Power dissipation



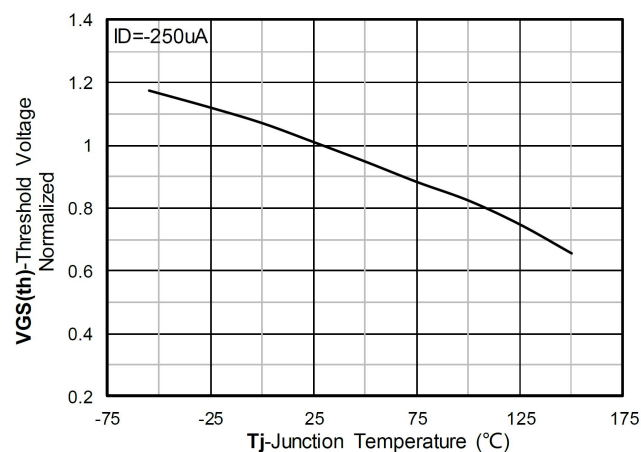
RDS(on) VS Drain Current



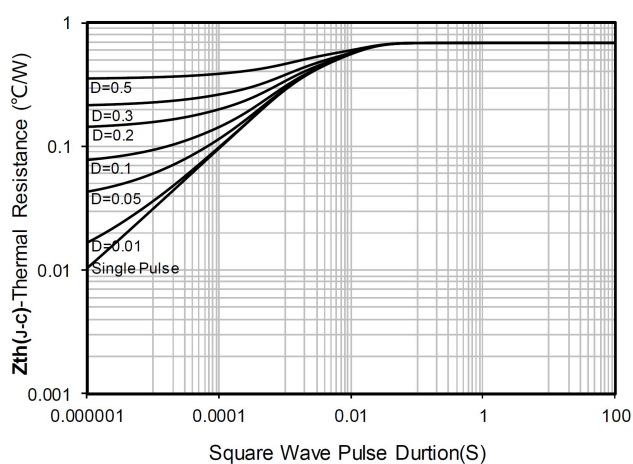
Forward characteristics of reverse diode



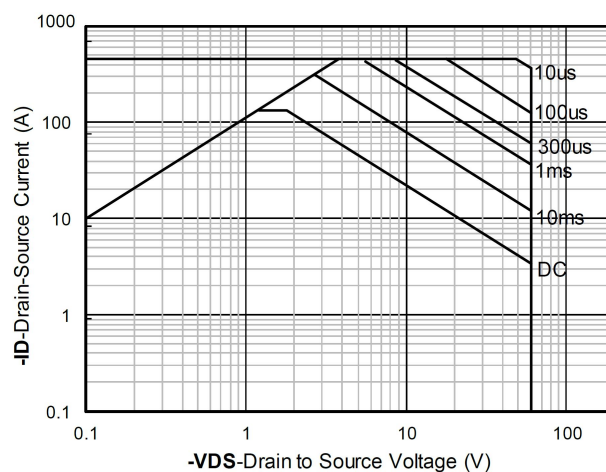
Normalized breakdown voltage



Normalized Threshold voltage

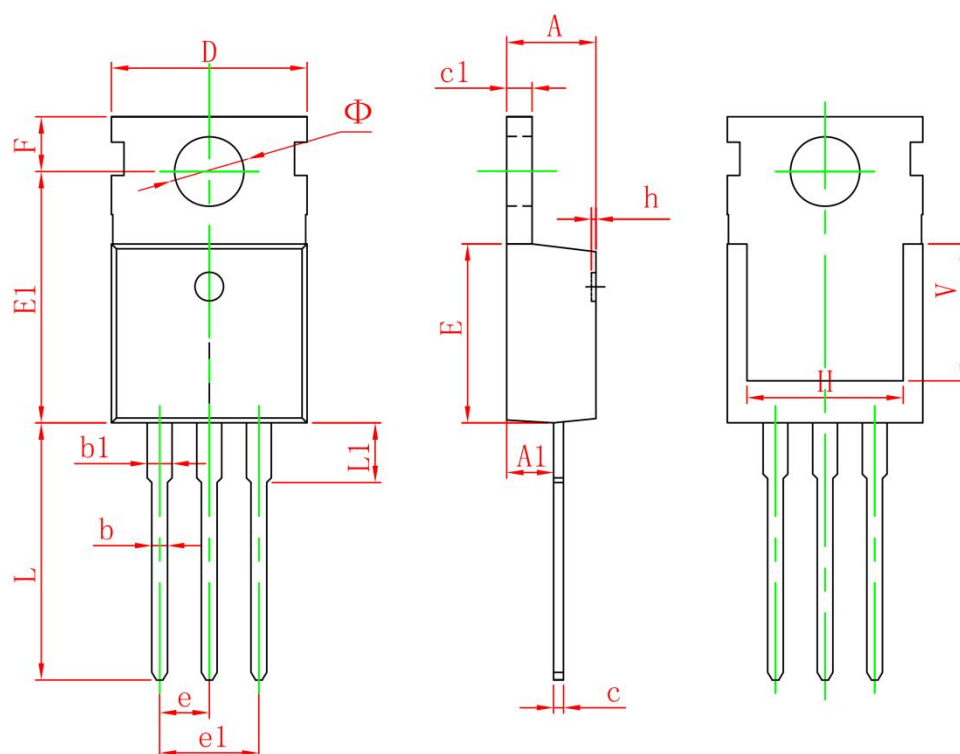


Maximum Transient Thermal Impedance



Safe Operation Area

TO-220-3L Package Information



Symbol	Dimensions In Millimeters		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