

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
-60V	11mΩ@10V	-90A
	14mΩ@4.5V	



合肥矽普半导体

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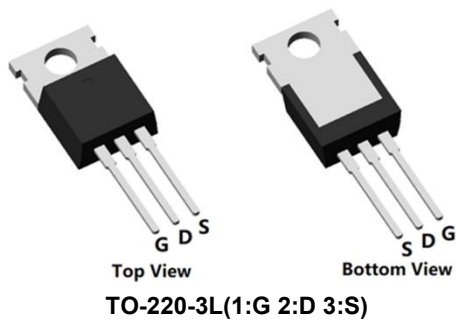
Feature

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

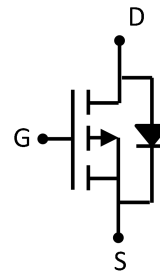
Applications

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

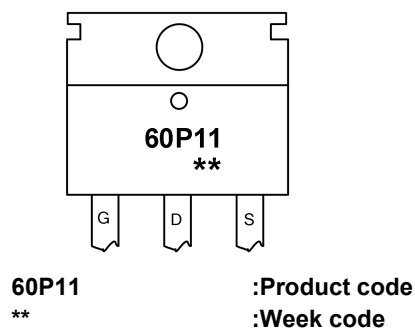
Package



Circuit diagram



Marking



Order Information

Device	Package	Unit/Tube
SP60P11TQ	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	-90	A
Continuous Drain Current (Tc=100°C)	I_D	-60	A
Pulsed Drain Current	I_{DM}	-360	A
Single Pulse Avalanche Energy ¹	E_{AS}	420	mJ
Power Dissipation (Tc=25°C)	P_D	160	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	0.78	°C/W
Storage Temperature Range	T_{STG}	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 150	°C

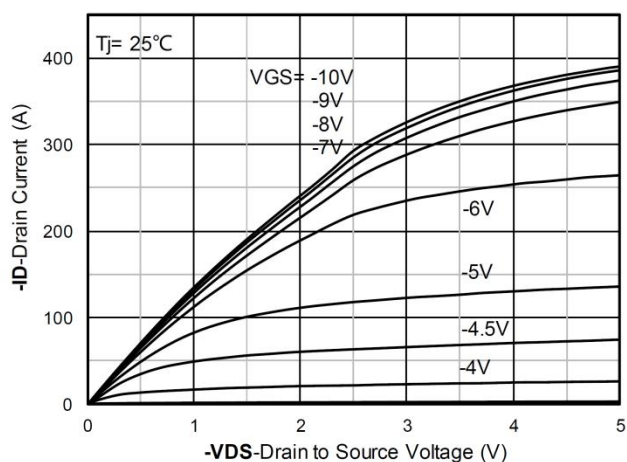
Electrical characteristics (Ta=25°C, unless otherwise noted)

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 , TJ=25℃	-	-	-1	μA
Gate Leakage Current	I _{GSS}	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	VGS=VDS , ID =-250uA	-1.0	-1.5	-2.5	V
Static Drain-Source On-Resistance	R _{DS(ON)}	VGS=-10V , ID=-20A	-	11	15	mΩ
		VGS=-4.5V , ID=-20A	-	14	18.5	
Dynamic Characteristics						
Input Capacitance	C _{iss}	VDS=-30V,VGS=0V,f=1MHz	-	7700	-	pF
Output Capacitance	C _{oss}		-	489	-	
Reverse Transfer Capacitance	C _{rss}		-	364	-	
Total Gate Charge	Q _g	VDS=-30V,VGS=-10V,ID=-20A	-	85.5	-	nC
Gate-Source Charge	Q _{gs}		-	12.1	-	
Gate-Drain Charge	Q _{gd}		-	23.2	-	
Switching Characteristics						
Turn-On Delay Time	t _{d(on)}	VDD=-30V,VGS=-10V,RG=3Ω,ID=-30A	-	9.8	-	nS
Rise Time	t _r		-	6.1	-	
Turn-Off Delay Time	t _{d(off)}		-	44	-	
Fall Time	t _f		-	12.7	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V _{SD}	I _S = -1A, VGS = 0V	-	-	-1.2	V
Maximum Body-Diode Continuous Current	I _S		-	-	-90	A
Reverse Recovery Time	T _{rr}	I _S =-20A,di/dt=100A/us,TJ=25℃	-	50	-	nS
Reverse Recovery Charge	Q _{rr}		-	69	-	nC

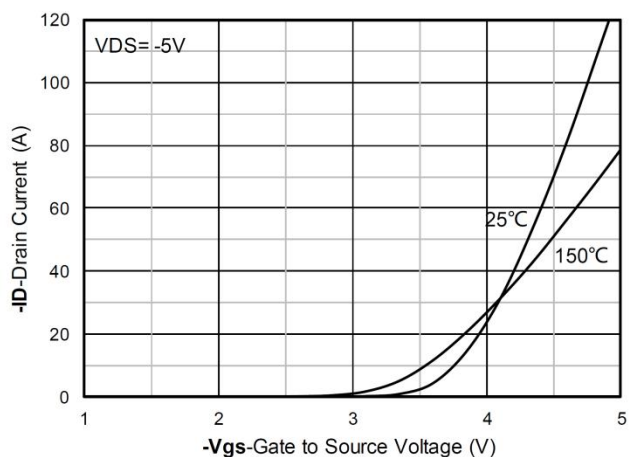
Note :

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

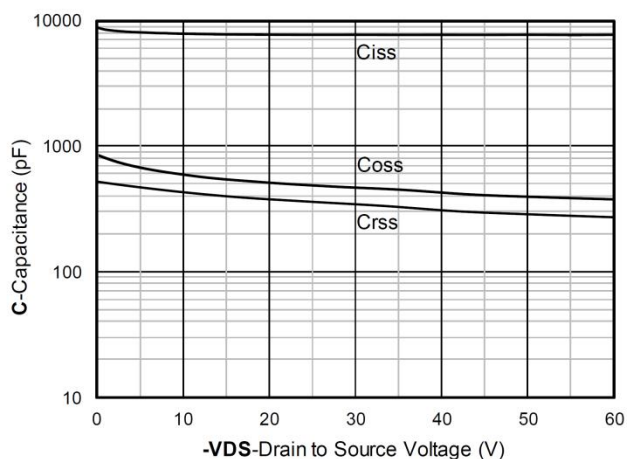
Typical Characteristics



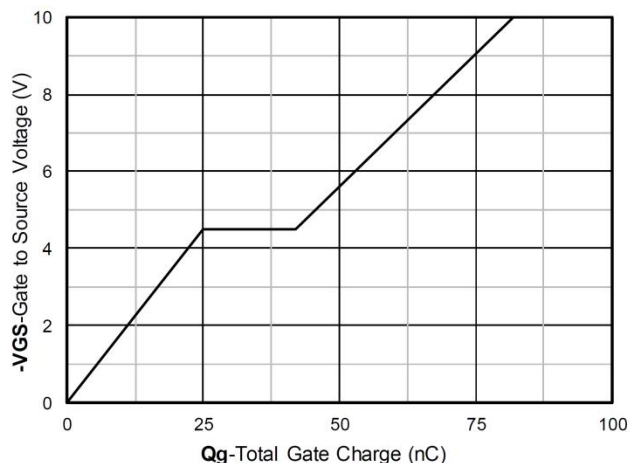
Output Characteristics



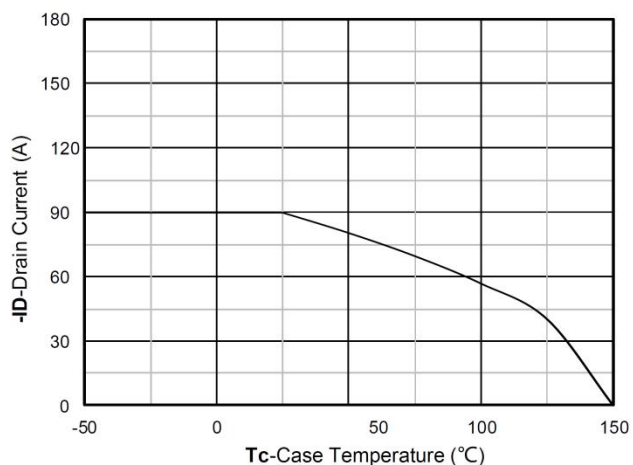
Transfer Characteristics



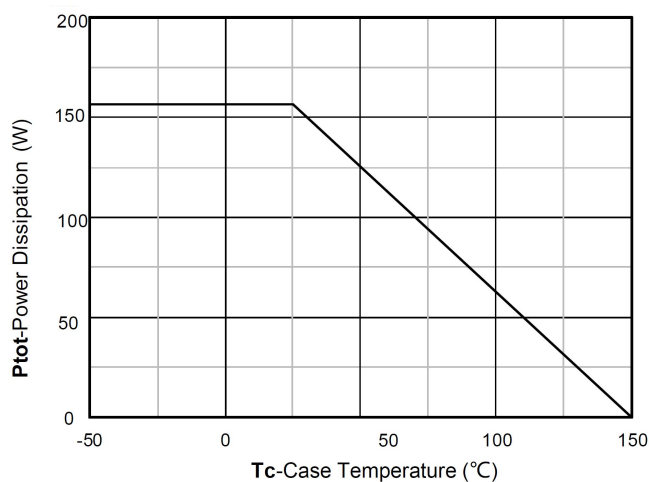
Capacitance Characteristics



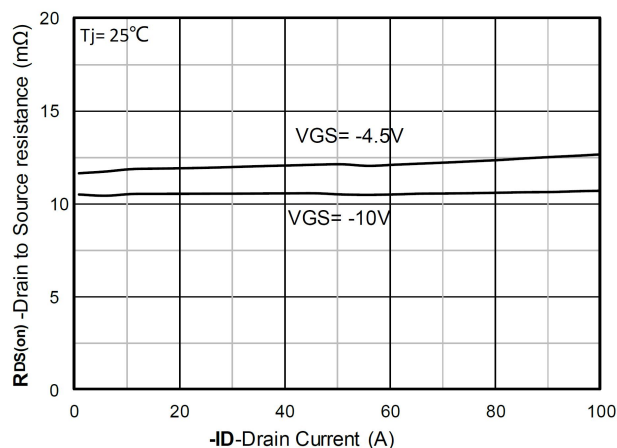
Gate Charge



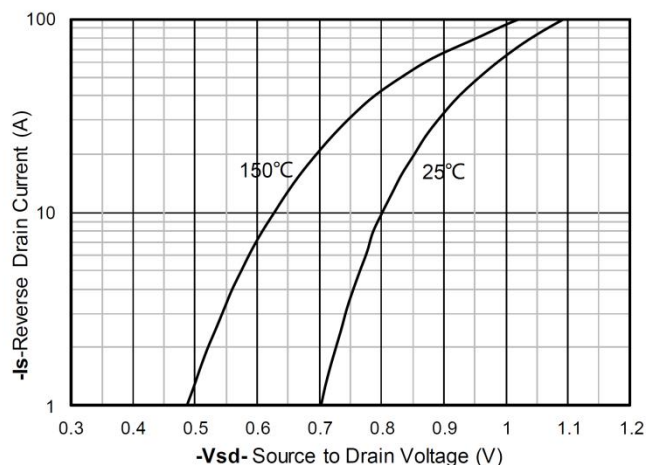
Current dissipation



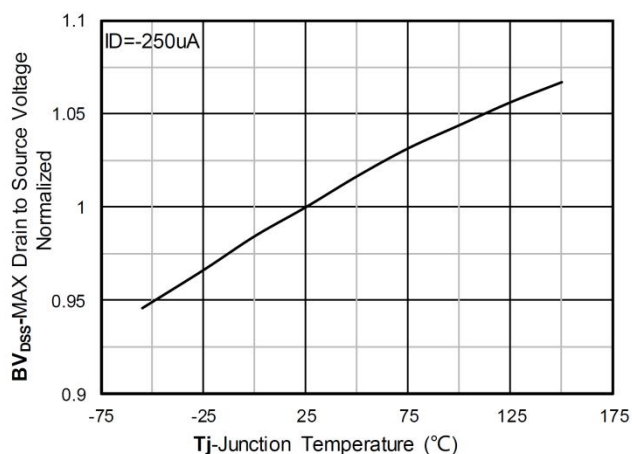
Power dissipation



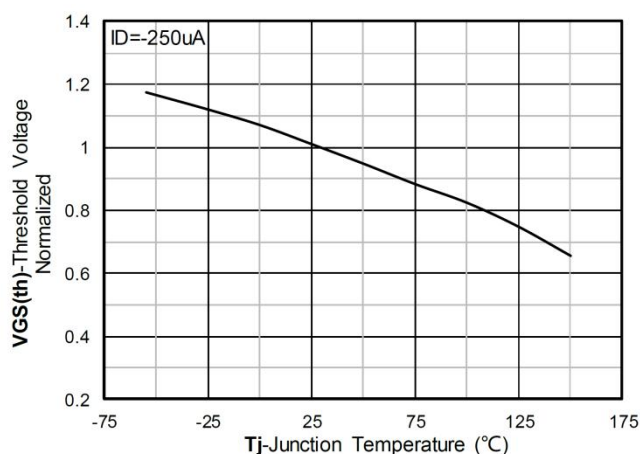
RDS(on) VS Drain Current



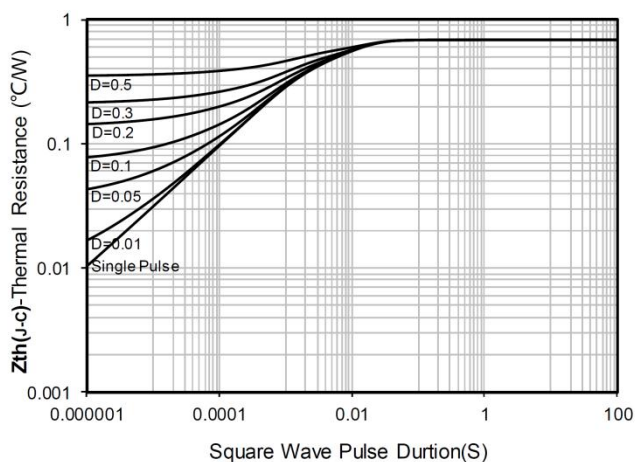
Forward characteristics of reverse diode



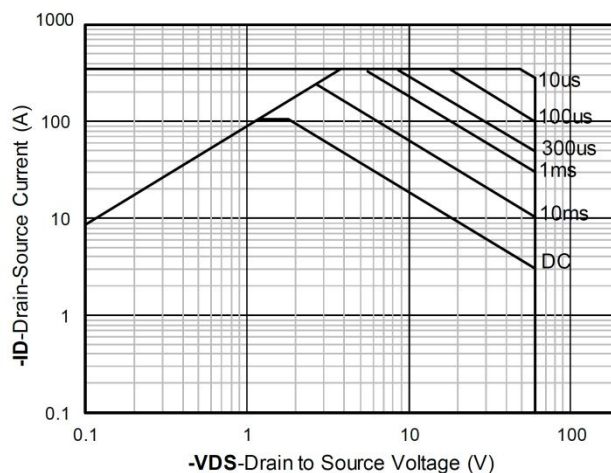
Normalized breakdown voltage



Normalized Threshold voltage

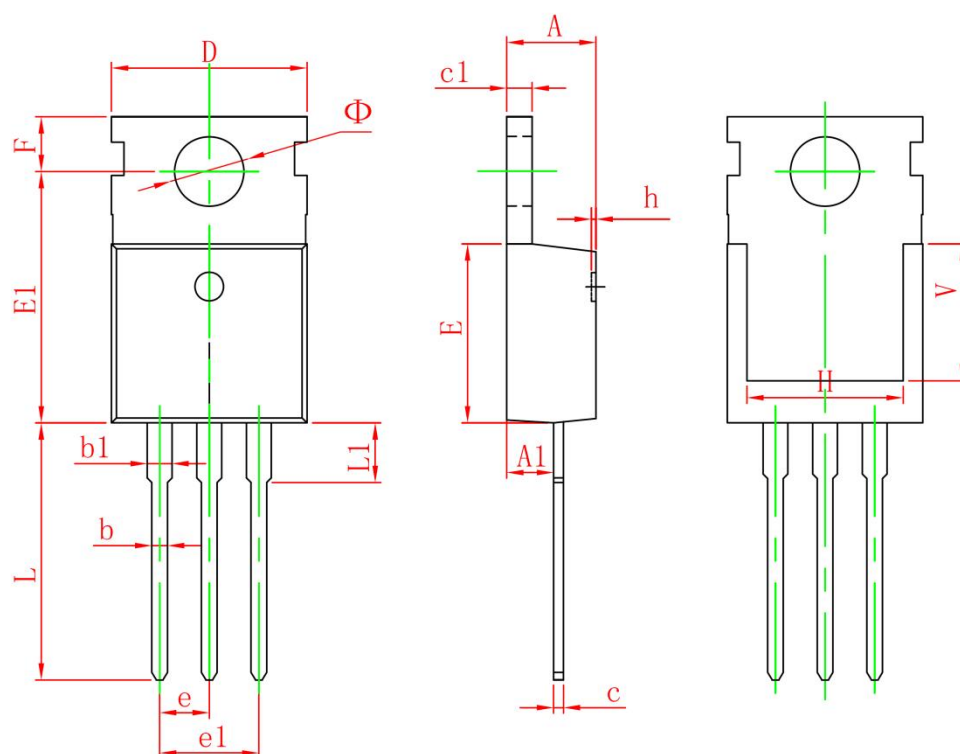


Maximum Transient Thermal Impedance



Safe Operation Area

TO-220-3L Package Information



Symbol	Dimensions In Millimeters		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