

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
-60V	5.8mΩ@-10V	-130A
	8.0mΩ@-4.5V	



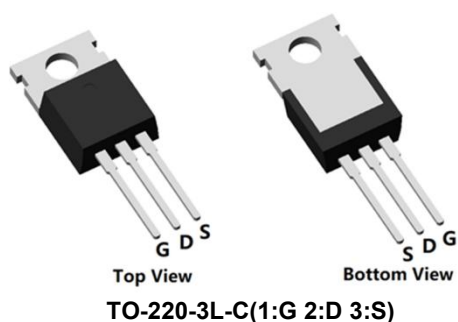
Feature

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

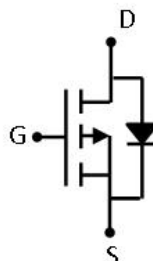
Applications

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

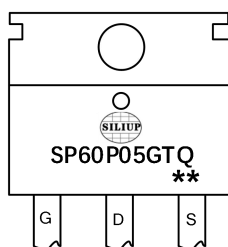
Package



Circuit diagram



Marking



SP60P05GTQ : Product code
** : Week code

Order Information

Device	Package	Unit/Tube
SP60P05GTQ	TO-220-3L	50

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

Parameter	Symbol	Rating	Unit
Drain source voltage	V_{DS}	-60	V
Gate source voltage	V_{GS}	± 20	V
Continuous drain current (Tc=25°C)	I_D	-130	A
Continuous drain current (Tc=100°C)	I_D	-87	A
Pulsed drain current	I_{DM}	-520	A
Power dissipation (Tc=25°C)	P_D	153	W
Single pulsed avalanche energy ¹	E_{AS}	1092	mJ
Thermal resistance, junction-case	$R_{\theta JC}$	0.82	°C/W
Storage Temperature Range	T_{STG}	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 150	°C

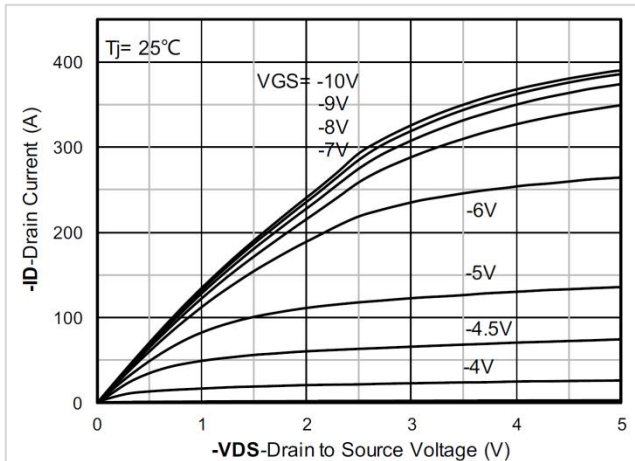
Electrical characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	VGS=0V , ID=-250uA	-60	-	-	V
Drain-Source Leakage Current	IDSS	VDS=-48V , VGS=0V , TJ=25℃	-	-	-1	uA
Gate-Source Leakage Current	IGSS	VGS=±20V , VDS=0V	-	-	±100	nA
Gate Threshold Voltage	VGS(th)	VGS=VDS , ID =-250uA	-1.0	-2.0	-3.0	V
Static Drain-Source On-Resistance	RDS(ON)	VGS=-10V , ID=-30A	-	5.8	7.3	mΩ
Static Drain-Source On-Resistance	RDS(ON)	VGS=-4.5V , ID=-30A	-	8.0	10.5	mΩ
Dynamic characteristics						
Input Capacitance	Ciss	VDS=-30V , VGS=0V , f=1MHz	-	6185	-	pF
Output Capacitance	Coss		-	1132	-	
Reverse Transfer Capacitance	Crss		-	81	-	
Switching Characteristics						
Total Gate Charge	Qg	VDS=-30V , VGS=-10V , ID=-40A	-	82	-	nC
Gate-Source Charge	Qgs		-	26	-	
Gate-Drain Charge	Qgd		-	18	-	
Turn-On Delay Time	Td(on)	VDD=-30V, VGS=-10V , RG=2.6Ω, ID=-40A	-	15	-	ns
Rise Time	Tr		-	52	-	
Turn-Off Delay Time	Td(off)		-	135	-	
Fall Time	Tf		-	168	-	
Diode Characteristics						
Diode Forward Voltage	VSD	VGS=0V , IS=-1A , TJ=25℃	-	-	-1.2	V
Reverse recover time	Trr	Is=-40A, di/dt=200A/us, TJ=25℃	-	65	-	ns
Reverse recovery charge	Qrr		-	238	-	nC
Diode Continuous Current	Is		-	-	-130	A

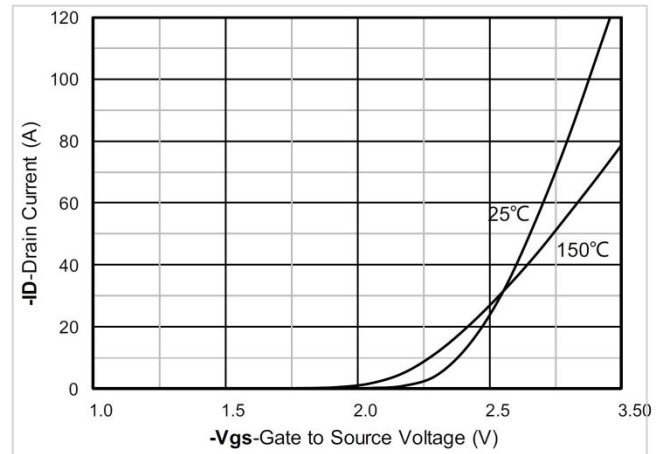
Note:

- E_{AS} is tested at starting $T_J = 25^\circ C$, $V_{DD}=50V, V_{GS} = 10V, L = 0.5mH, R_g=25m\Omega$;

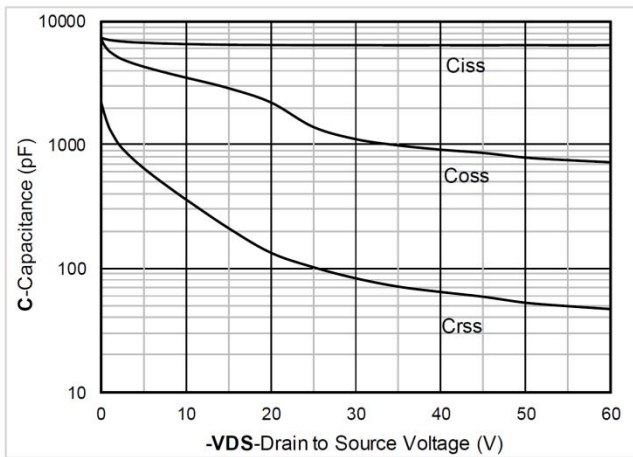
Typical Characteristics



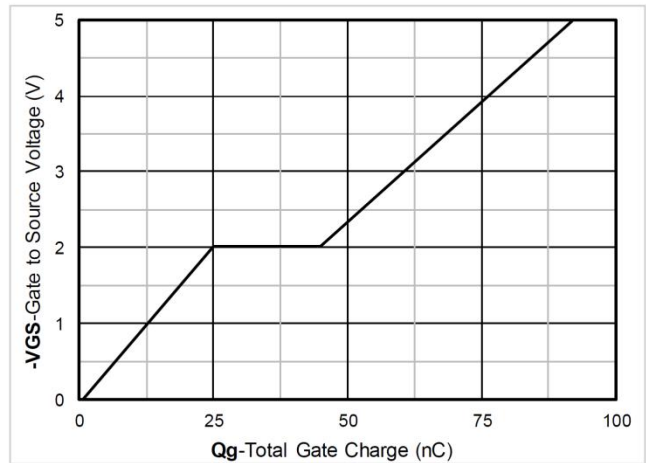
Output Characteristics



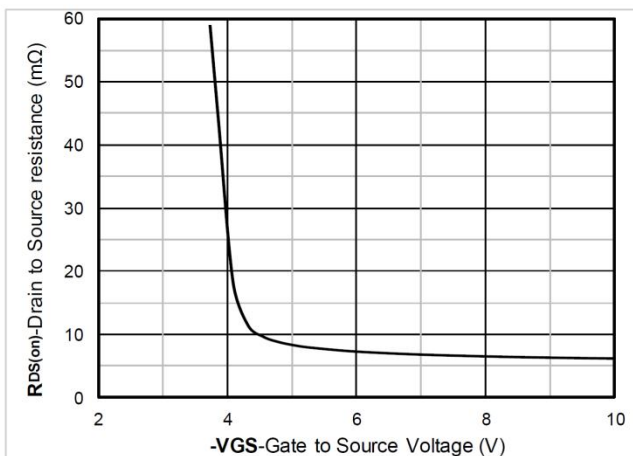
Transfer Characteristics



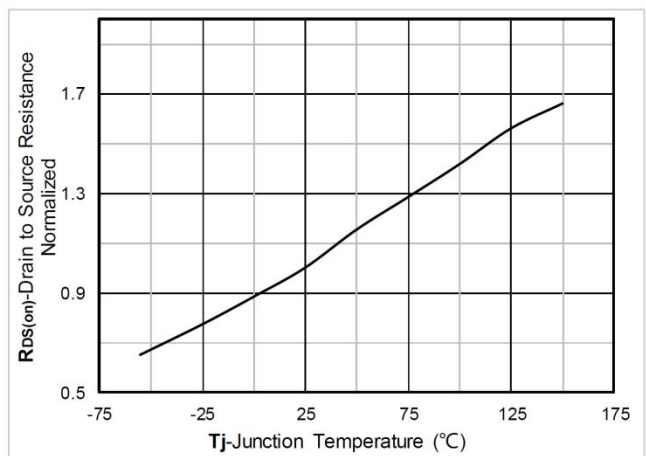
Capacitance Characteristics



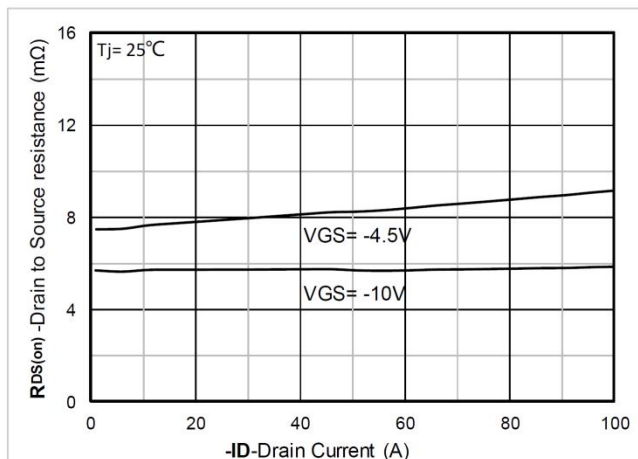
Gate Charge



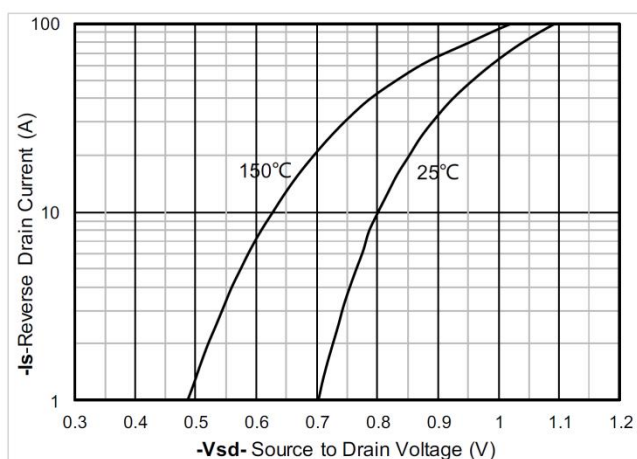
On-Resistance vs Gate to Source Voltage



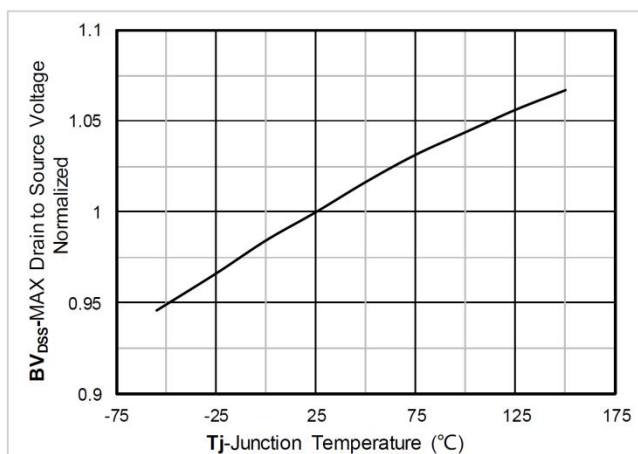
Normalized On-Resistance



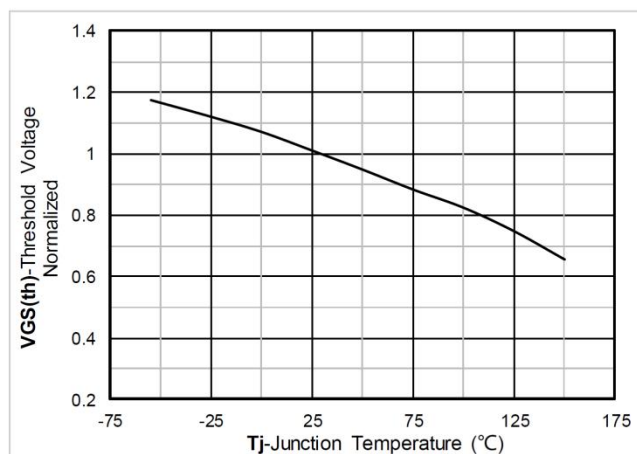
RDS(on) VS Drain Current



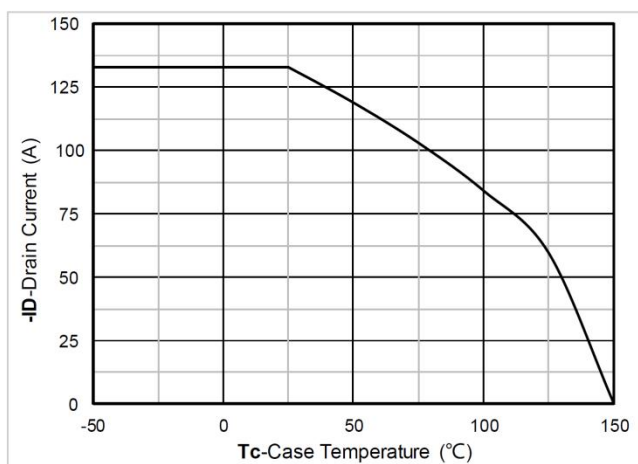
Forward characteristics of reverse diode



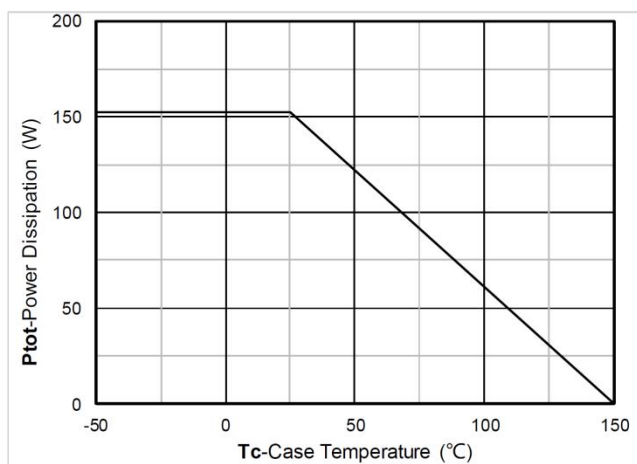
Normalized breakdown voltage



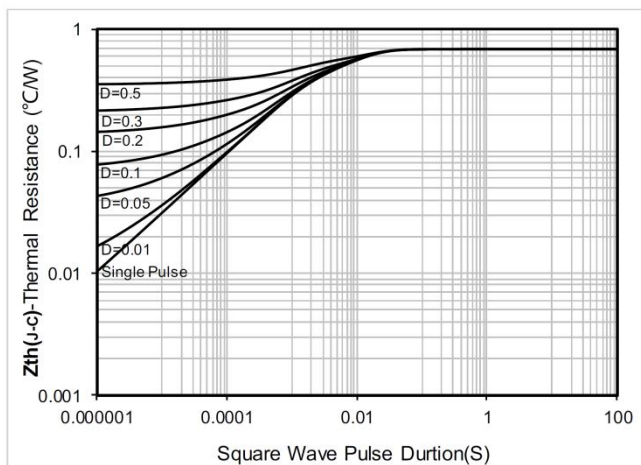
Normalized Threshold voltage



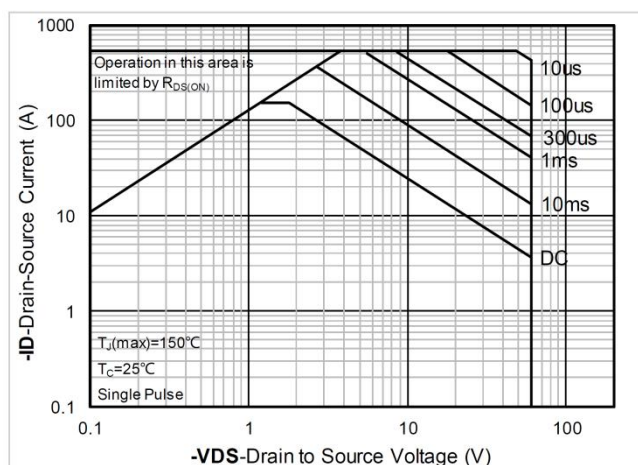
Current dissipation



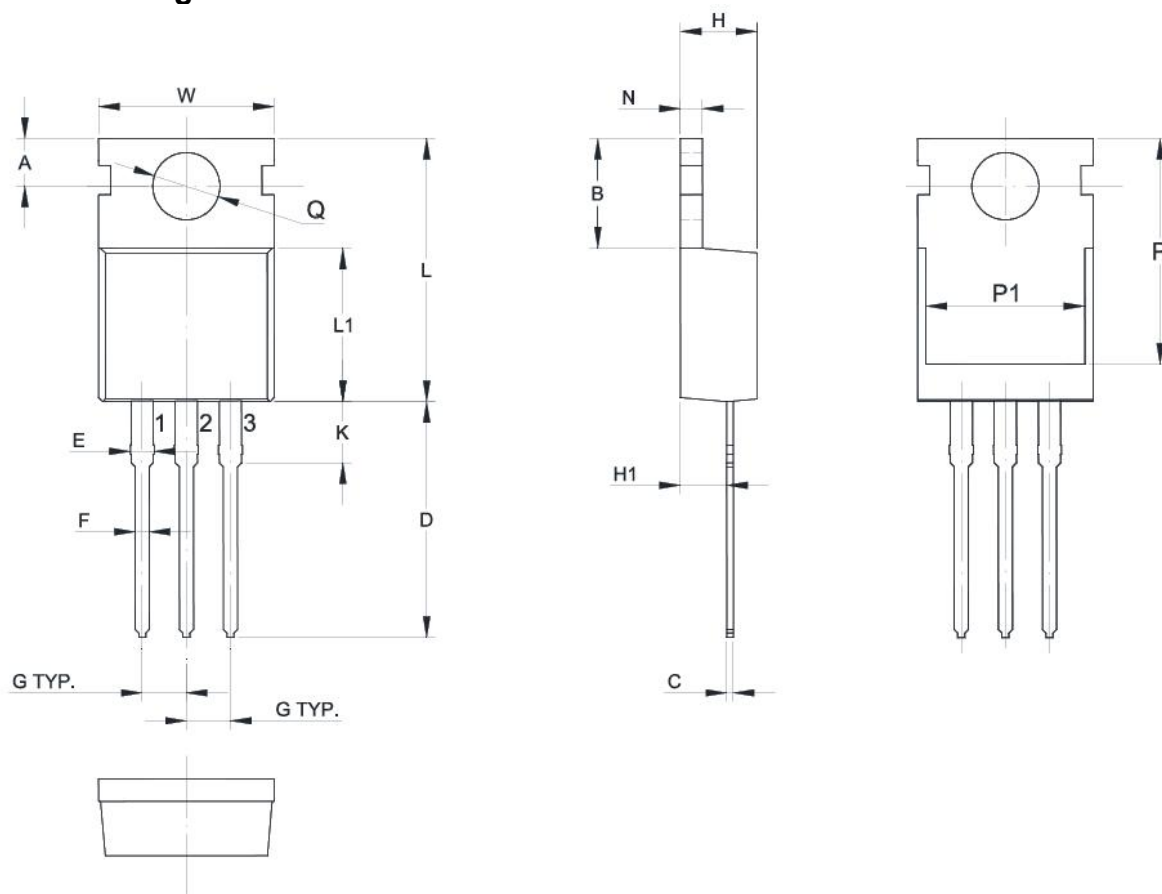
Power dissipation



Maximum Transient Thermal Impedance



Safe Operation Area

TO-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