

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
650V	$0.6\Omega@10V$	12A



合肥矽普半导体

Siliup Semiconductor Technology Co., Ltd

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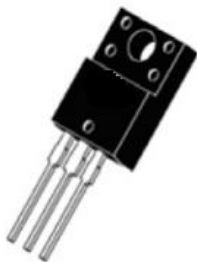
Feature

- Fast Switching
- Low Gate Charge and $R_{DS(on)}$
- 100% Single Pulse avalanche energy Test

Applications

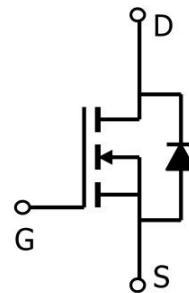
- DC-DC Converter
- Ideal for high-frequency switching and synchronous rectification

Package

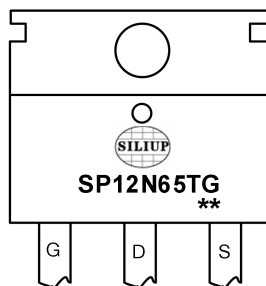


TO-220F(1:G 2:D 3:S)

Circuit diagram



Marking



SP12N65TG
**

:Device Code
:Week Code

Order Information

Device	Package	Unit/Tube
SP12N65TG	TO-220F	50

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	± 30	V
Continuous Drain Current (Tc=25°C)	I_D	12	A
Continuous Drain Current (Tc=100°C)	I_D	8	A
Pulsed Drain Current	I_{DM}	48	A
Single Pulse Avalanche Energy ¹	E_{AS}	605	mJ
Power Dissipation (Tc=25°C)	P_D	40	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	3.1	°C/W
Storage Temperature Range	T_{STG}	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 150	°C

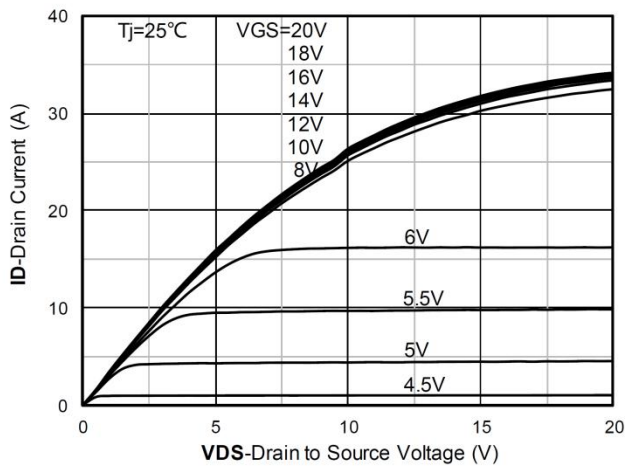
Electrical characteristics (Ta=25°C, unless otherwise noted)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$ID = 250\mu A, VGS = 0V$	650	-	-	V
Drain Cut-Off Current	$IDSS$	$VDS = 520V, VGS = 0V$	-	-	1	μA
Gate Leakage Current	$IGSS$	$VGS = \pm 30V, VDS = 0V$	-	-	± 100	nA
Gate Threshold Voltage	$VGS(th)$	$VDS = VGS, ID = 250\mu A$	2.0	3.0	4.0	V
Drain-Source ON Resistance	$RDS(ON)$	$VGS = 10V, ID = 6A$	-	0.6	0.75	Ω
Dynamic Characteristics						
Input Capacitance	$Ciss$	$VDS = 25V, VGS = 0V, f = 1.0MHz$	-	1905	-	pF
Output Capacitance	$Coss$		-	139	-	
Reverse Transfer Capacitance	$Crss$		-	9	-	
Total Gate Charge	Qg	$VDS = 500V, VGS = 10V, ID = 12A$	-	43	-	nC
Gate-Source Charge	Qgs		-	9	-	
Gate-Drain Charge	Qgd		-	15	-	
Switching Characteristics						
Turn-On Delay Time	$td(on)$	$VDD = 325V, VGS = 10V, RG = 10\Omega, ID = 10A$	-	25	-	nS
Rise Time	tr		-	39	-	
Turn-Off Delay Time	$td(off)$		-	52	-	
Fall Time	tf		-	41	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	VSD	$IS = 1A, VGS = 0V$	-	-	1.2	V
Maximum Body-Diode Continuous Current	IS		-	-	12	A
Body Diode Reverse Recovery Time	Trr	$IS = 12A, dIF/dt = 100A/us$	-	116	-	nS
Body Diode Reverse Recovery Charge	Qrr		-	10.4	-	μC

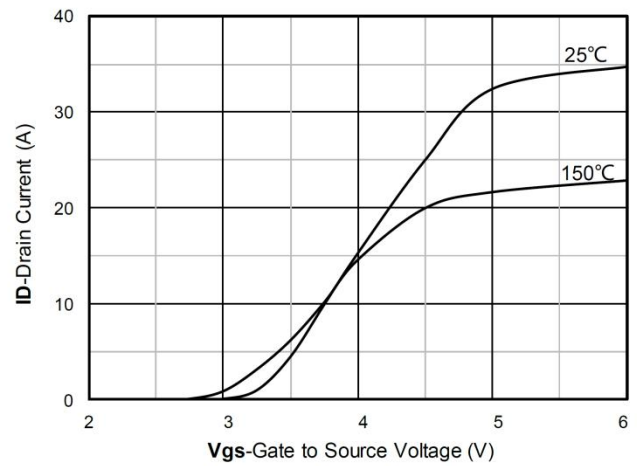
Note :

- The test condition is $V_{DD} = 50V, V_{GS} = 10V, L = 10mH, R_G = 30\Omega$;

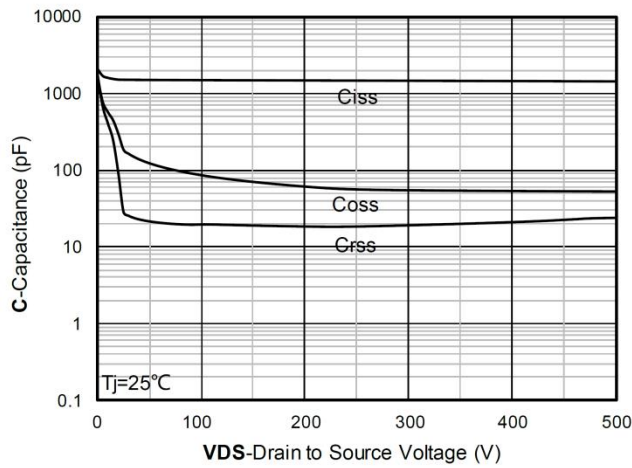
Typical Characteristics



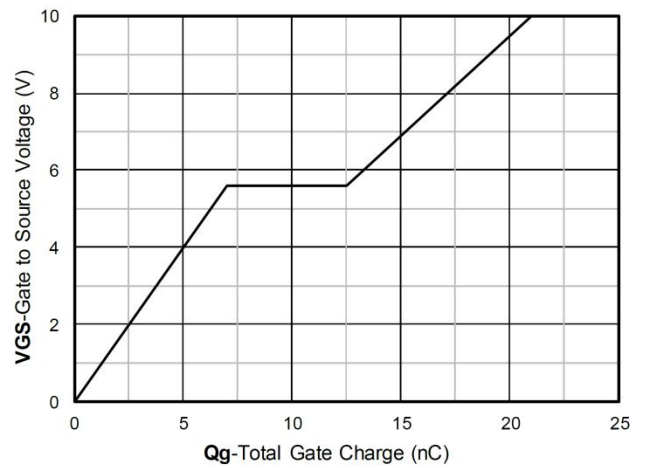
Output Characteristics



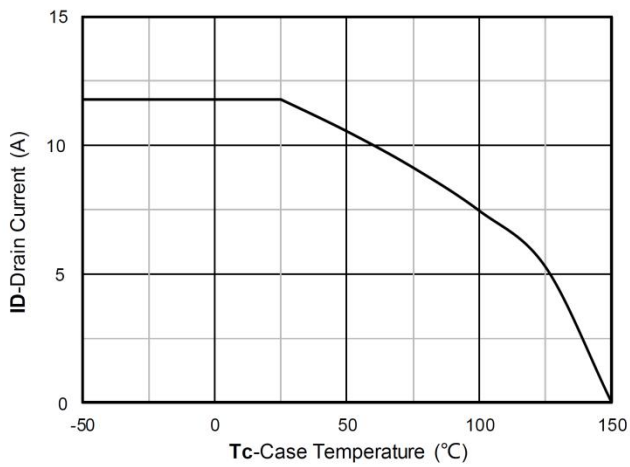
Transfer Characteristics



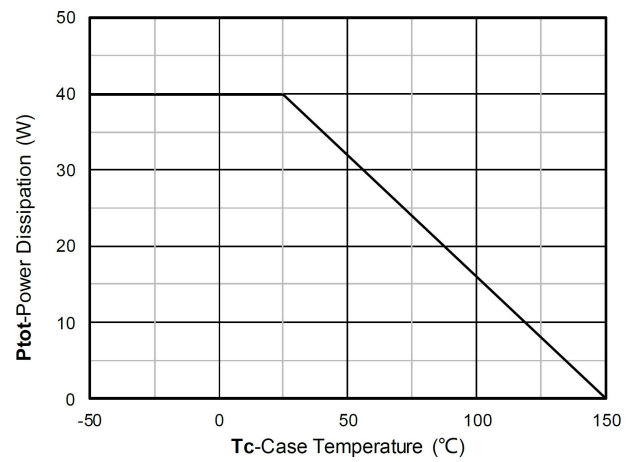
Capacitance Characteristics



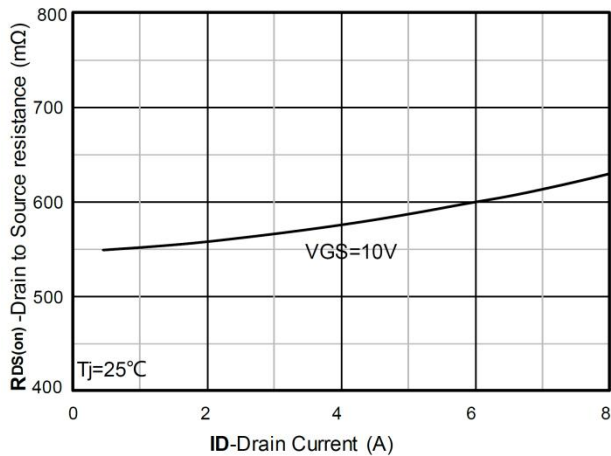
Gate Charge



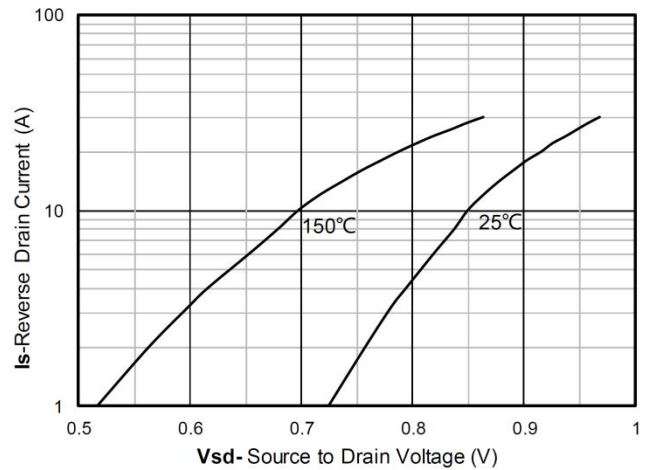
Current dissipation



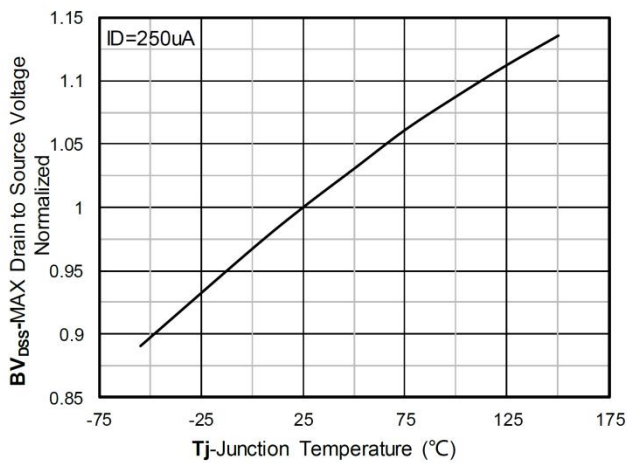
Power dissipation



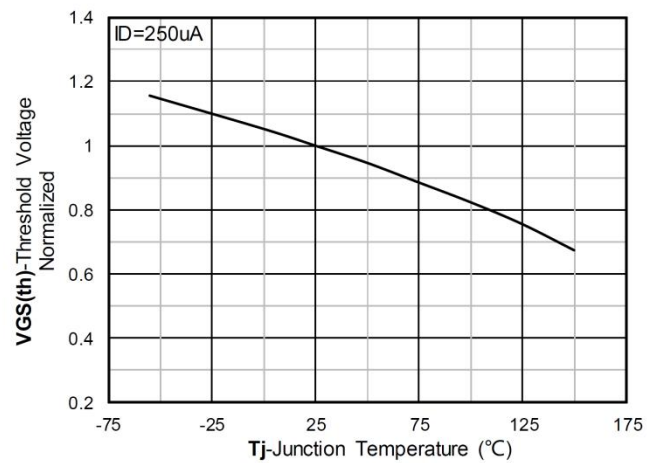
RDS(on) VS Drain Current



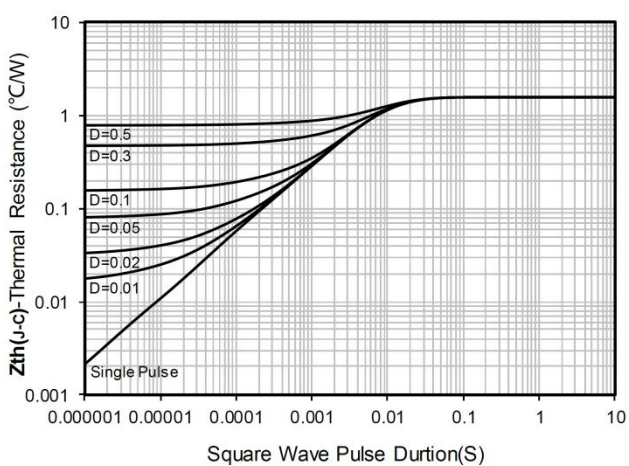
Forward characteristics of reverse diode



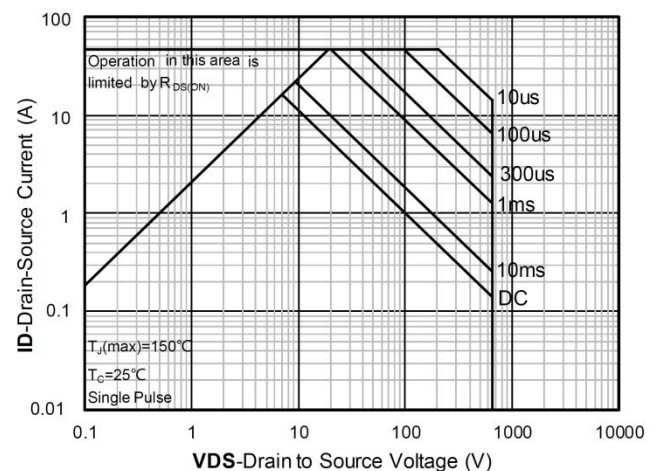
Normalized breakdown voltage



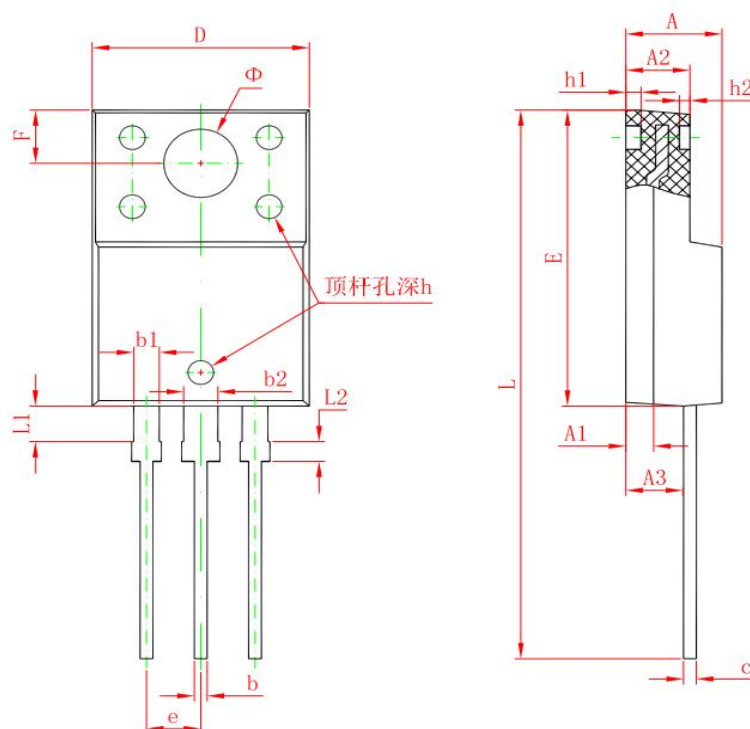
Normalized Threshold voltage



Maximum Transient Thermal Impedance



Safe Operation Area

TO-220F Package Information


Symbol	Dimensions In Millimeters	
	Min.	Max.
A	4.300	4.700
A1	1.300 REF.	
A2	2.800	3.200
A3	2.500	2.900
b	0.500	0.750
b1	1.100	1.350
b2	1.500	1.750
c	0.500	0.750
D	9.960	10.360
E	14.800	15.200
e	2.540 TYP.	
F	2.700 REF.	
Φ	3.500 REF.	
h	0.000	0.300
h1	0.800 REF.	
h2	0.500 REF.	
L	28.000	28.400
L1	1.700	1.900
L2	0.900	1.100