

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
650V	175mΩ@10V	20A



合肥矽普半导体

Siliup Semiconductor Technology Co., Ltd

技术 品质 服务

www.siliup.com

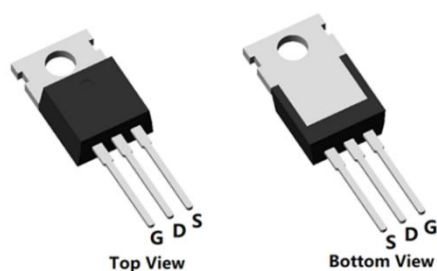
Feature

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

Applications

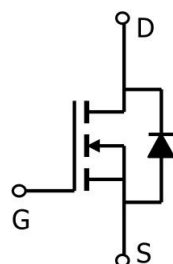
- PWM Application
- Hard switched and high frequency circuits
- Power Management

Package

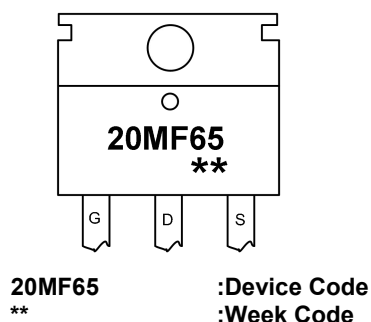


TO-220-3L(1:G 2:D 3:S)

Circuit diagram



Marking



Order Information

Device	Package	Unit/Tube
SP20MF65TQ	TO-220-3L	50

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

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	± 30	V
Continuous Drain Current (Tc=25°C)	I_D	20	A
Continuous Drain Current (Tc=100°C)	I_D	12.5	A
Pulsed Drain Current	I_{DM}	80	A
Single Pulse Avalanche Energy ¹	E_{AS}	485	mJ
Power Dissipation (Tc=25°C)	P_D	34	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	3.68	°C/W
Storage Temperature Range	T_{STG}	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 150	°C

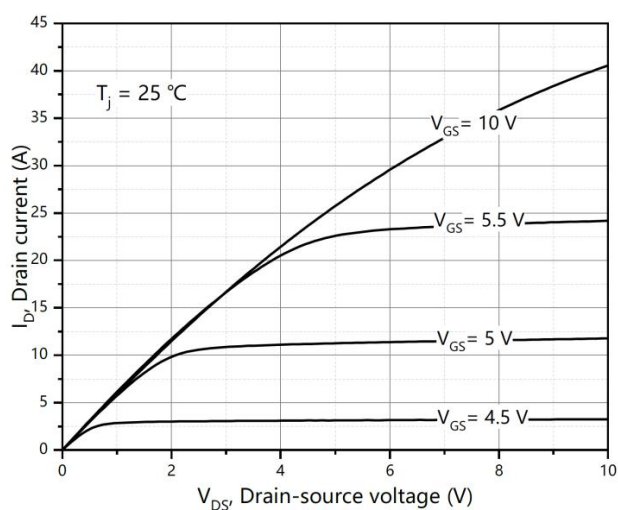
Electrical characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D = 250μA, V _{GS} = 0V	650	-	-	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} = 520V, V _{GS} = 0V	-	-	1	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} = ±30V, V _{DS} = 0V	-	-	±0.1	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	3	4	5	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D = 10A	-	175	205	mΩ
Dynamic characteristics						
Input Capacitance	C _{iSS}	VDS=50V , VGS=0V , f=1MHz	-	1745	-	pF
Output Capacitance	C _{oss}		-	102	-	
Reverse Transfer Capacitance	C _{rSS}		-	2.5	-	
Total Gate Charge	Q _g	VDS=400V , VGS=0-10V , ID=10A	-	45.5	-	nC
Gate-Source Charge	Q _{gs}		-	10.5	-	
Gate-Drain Charge	Q _{gd}		-	9	-	
Switching Characteristics						
Turn-On Delay Time	T _{d(on)}	VDD=400V, VGS=10V , RG=2Ω, ID=10A	-	31	-	nS
Rise Time	T _r		-	20	-	
Turn-Off Delay Time	T _{d(off)}		-	83	-	
Fall Time	T _f		-	9	-	
Diode Characteristics						
Diode Forward Voltage	V _{SD}	VGS=0V , IS=1A , TJ=25℃	-	-	1.2	V
Maximum Body-Diode Continuous Current	I _S		-	-	20	A
Reverse recover time	T _{rr}	IS=10A, di/dt=100A/us, Tj=25℃	-	170	-	nS
Reverse recovery charge	Q _{rr}		-	5.8	-	uC

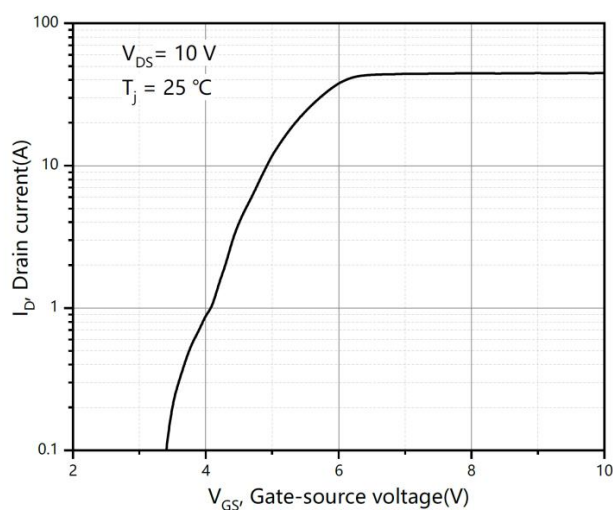
Note :

1. The test condition is $V_{DD}=150V, V_{GS}=10V, L=60mH, R_G=25\Omega$

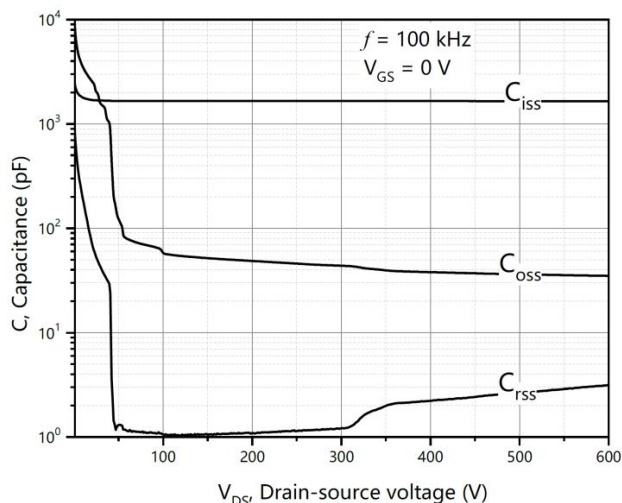
Typical Characteristics



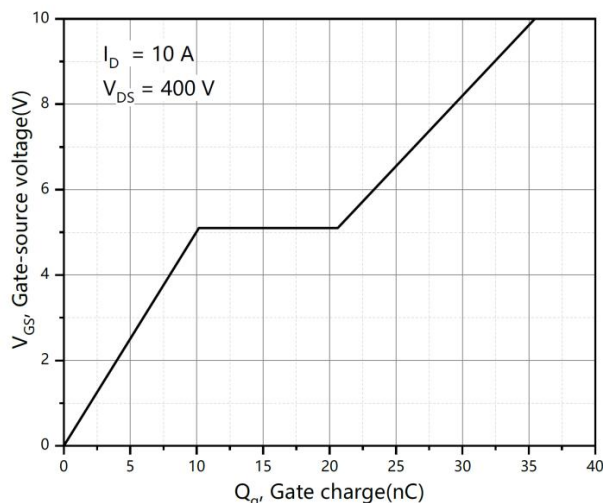
Typ. output characteristics



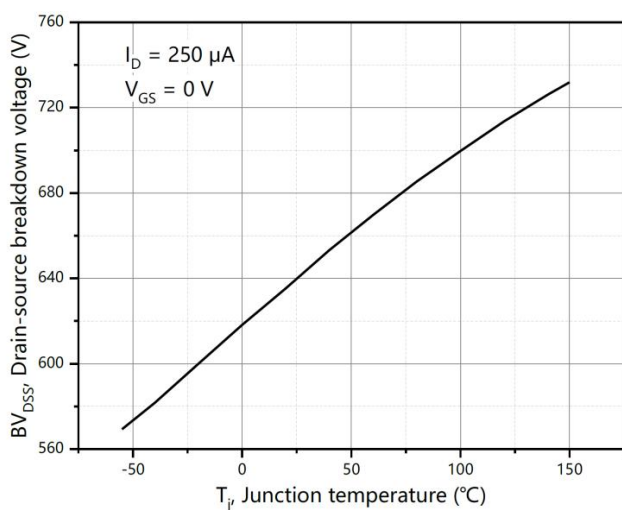
Typ. transfer characteristics



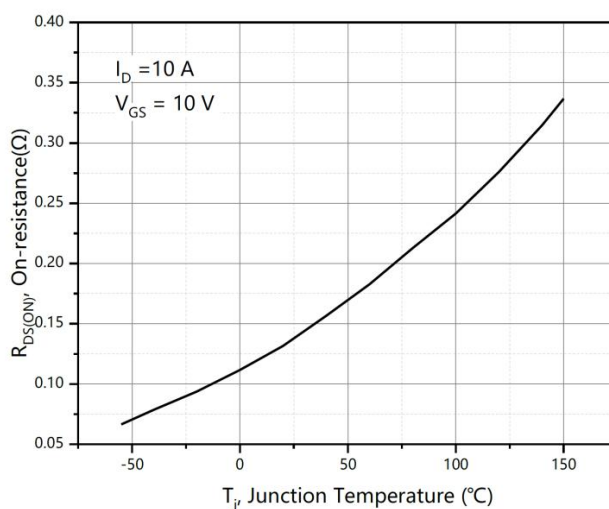
Typ. capacitances



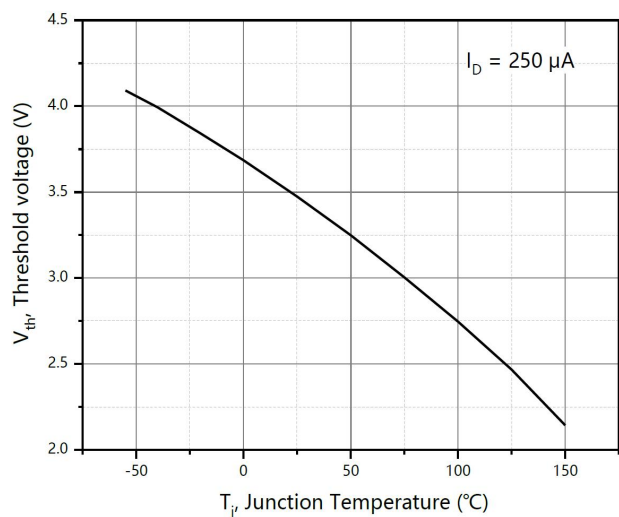
Typ. gate charge



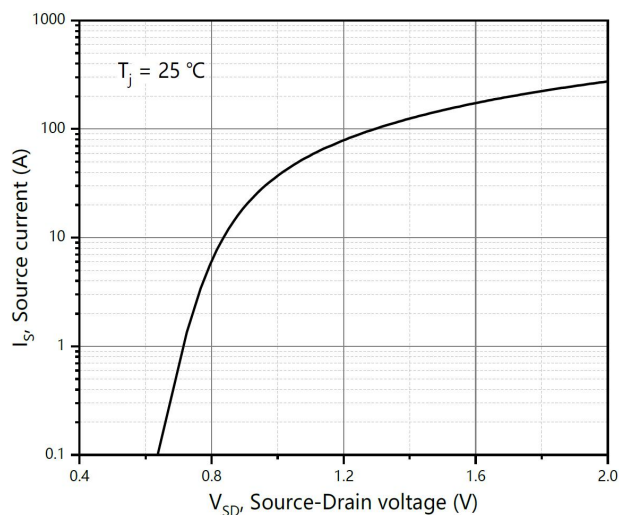
Drain-source breakdown voltage



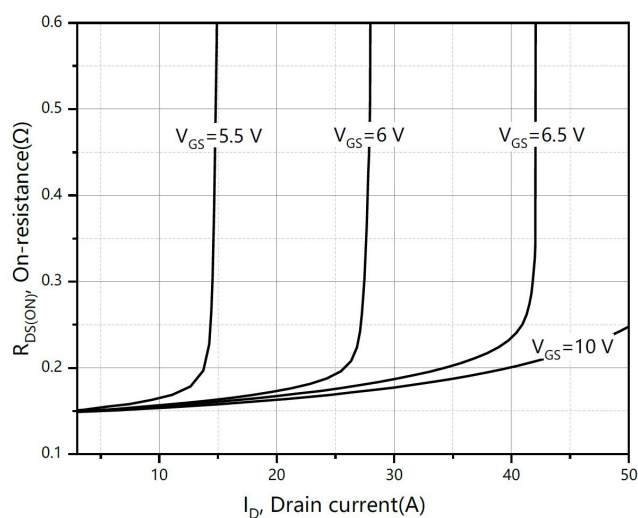
Drain-source on-state resistance



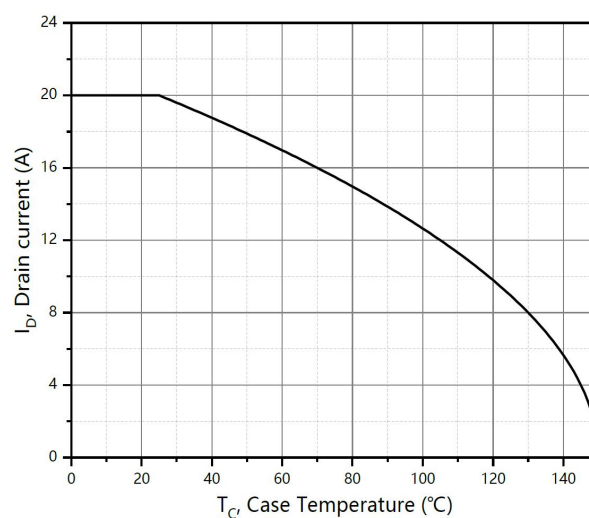
Threshold voltage



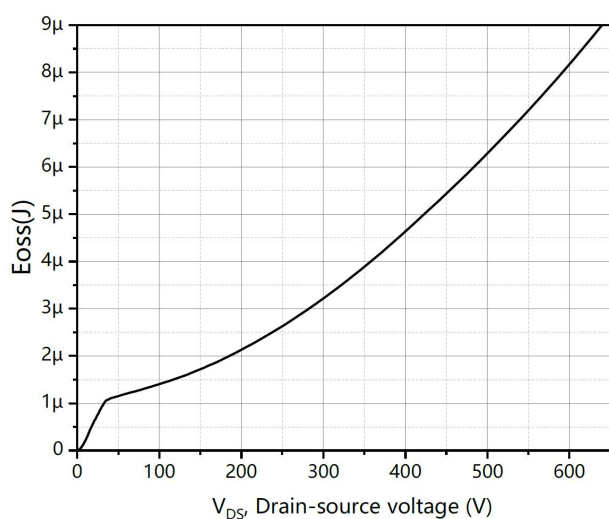
Forward characteristic of body diode



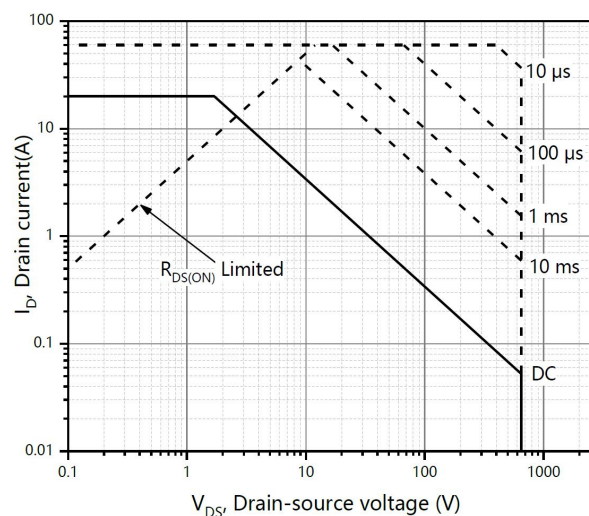
Drain-source on-state resistance



Drain current

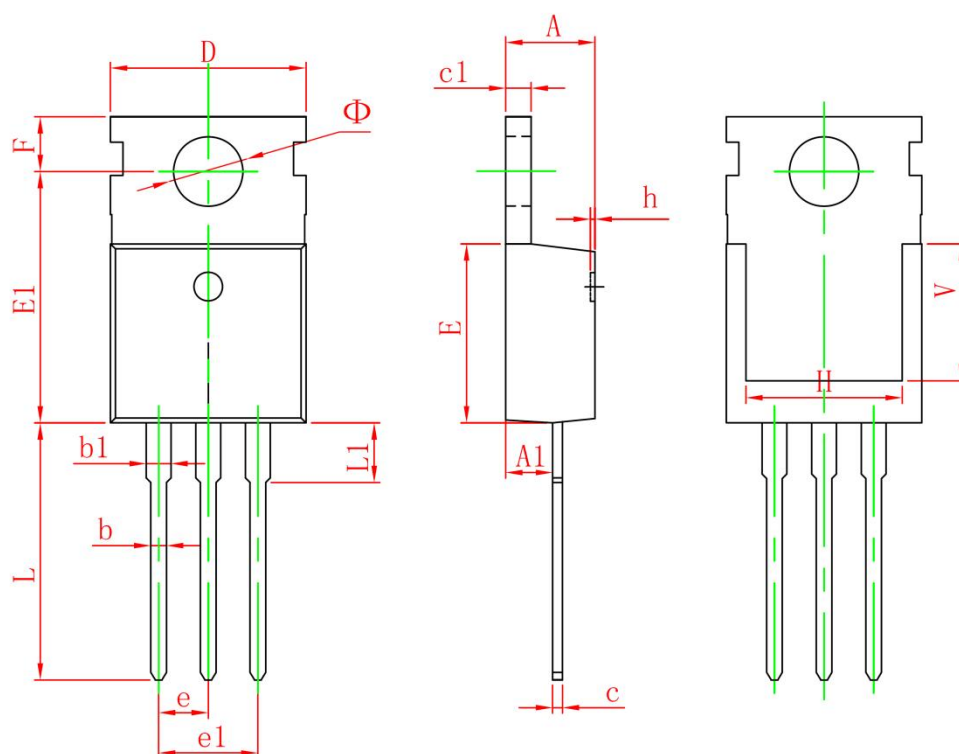


Safe operation area $T_C=25^\circ C$



Safe operation area $T_C=25^\circ C$

TO-220-3L-C 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