

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
650V	150mΩ@10V	18A



**合肥矽普半导体**

Siliup Semiconductor Technology Co., Ltd

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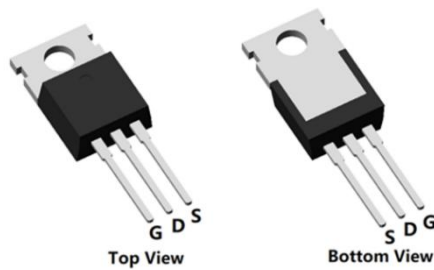
## Feature

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

## Applications

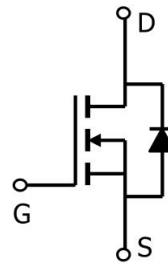
- PWM Application
- Hard switched and high frequency circuits
- Power Management

## Package

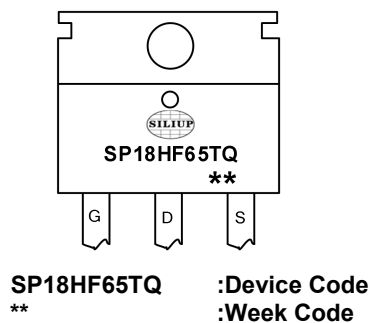


TO-220-3L(1:G 2:D 3:S)

## Circuit diagram



## Marking



## Order Information

Device	Package	Unit/Tube
SP18HF65TQ	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	$V_{GS}$	$\pm 30$	V
Continuous Drain Current (Tc=25°C)	$I_D$	18	A
Continuous Drain Current (Tc=100°C)	$I_D$	12	A
Pulsed Drain Current	$I_{DM}$	72	A
Single Pulse Avalanche Energy <sup>1</sup>	$E_{AS}$	208	mJ
Power Dissipation (Tc=25°C)	$P_D$	142	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	0.88	°C/W
Storage Temperature Range	$T_{STG}$	-55 to 150	°C
Operating Junction Temperature Range	$T_J$	-55 to 150	°C

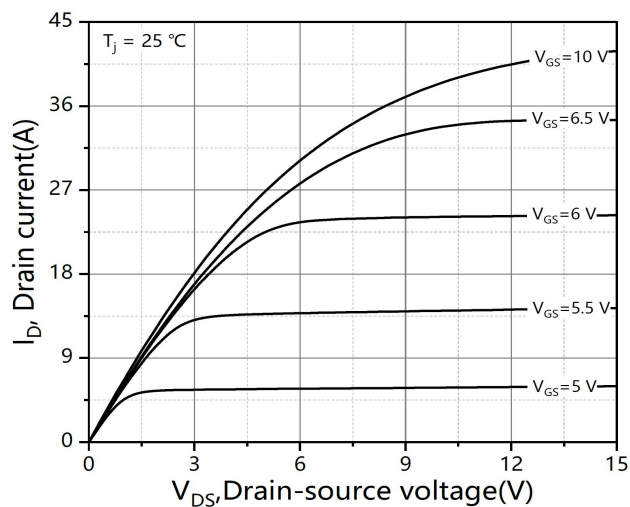
**Electrical characteristics (Ta=25°C, unless otherwise noted)**

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V	650	-	-	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> = 520V, V <sub>GS</sub> = 0V	-	-	1	uA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±30V, V <sub>DS</sub> = 0V	-	-	±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	2.5	3.5	4.5	V
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A	-	150	180	mΩ
Dynamic characteristics						
Input Capacitance	C <sub>iss</sub>	VDS=50V , VGS=0V , f=100kHz	-	1064	-	pF
Output Capacitance	C <sub>oss</sub>		-	81	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	2.5	-	
Total Gate Charge	Q <sub>g</sub>	VDS=400V , VGS=10V , ID=10A	-	24	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	5.3	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	8.5	-	
Switching Characteristics						
Turn-On Delay Time	T <sub>d(on)</sub>	VDD=400V, VGS=10V , RG=2Ω, ID=10A	-	17	-	nS
Rise Time	T <sub>r</sub>		-	32	-	
Turn-Off Delay Time	T <sub>d(off)</sub>		-	66	-	
Fall Time	T <sub>f</sub>		-	27	-	
Diode Characteristics						
Diode Forward Voltage	V <sub>SD</sub>	VGS=0V , IS=1A , TJ=25℃	-	-	1.2	V
Maximum Body-Diode Continuous Current	I <sub>S</sub>		-	-	18	A
Reverse recover time	T <sub>rr</sub>	I <sub>S</sub> =10A, di/dt=100A/us, Tj=25℃	-	195	-	nS
Reverse recovery charge	Q <sub>rr</sub>		-	2762	-	uC

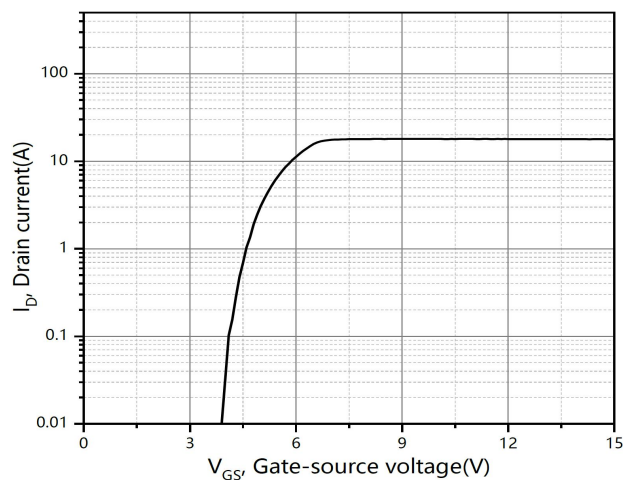
**Note :**

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

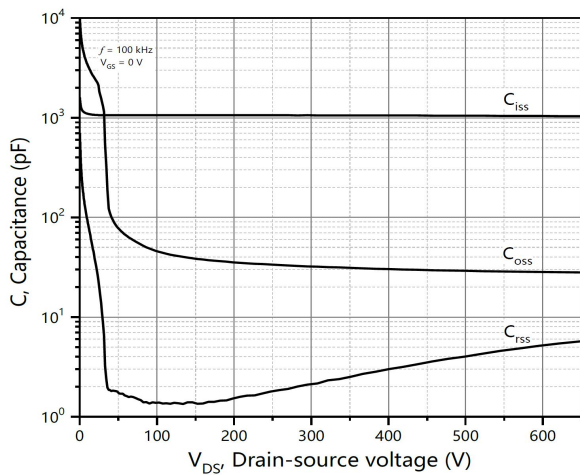
## Typical Characteristics



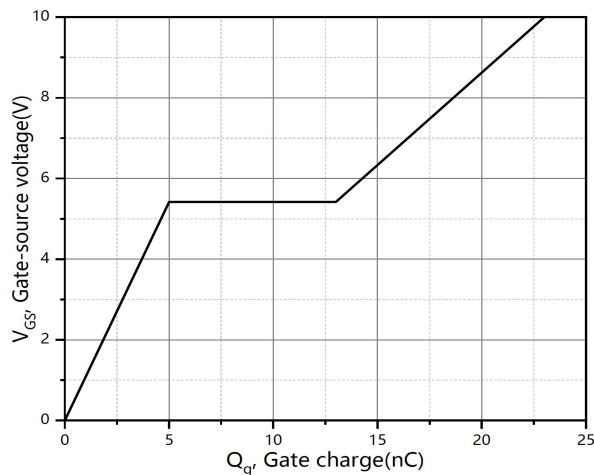
Typ. output characteristics  $T_j = 25^\circ\text{C}$



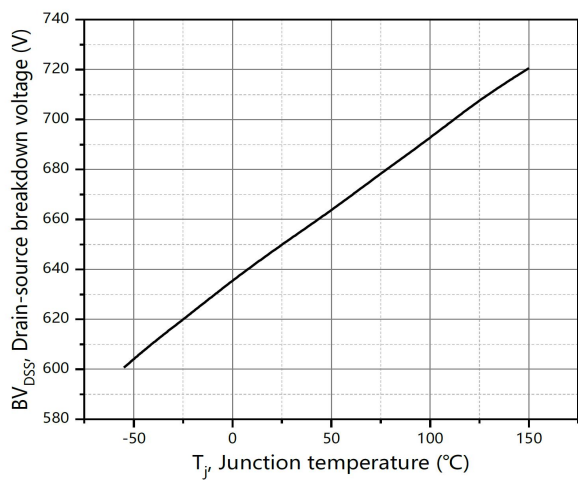
Typ. transfer characteristics



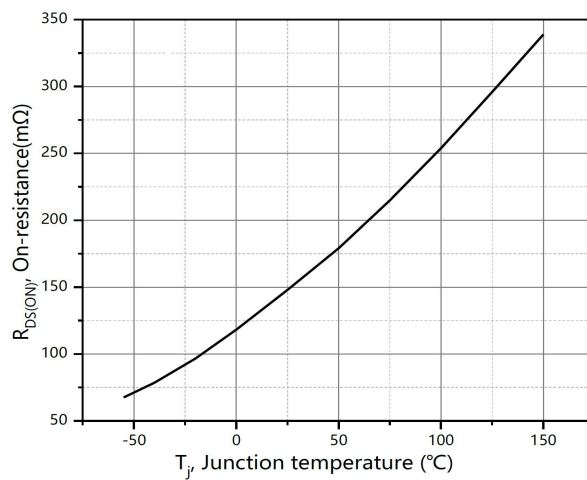
Typ. capacitances



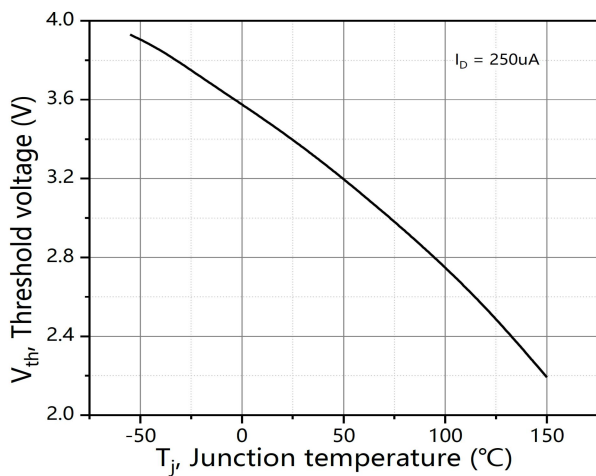
Typ. gate charge



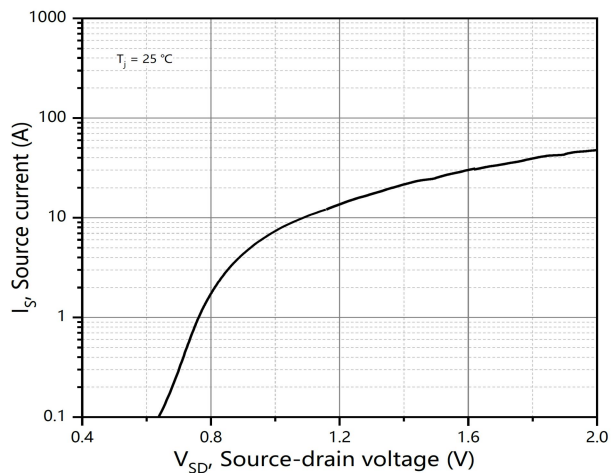
Drain-source breakdown voltage



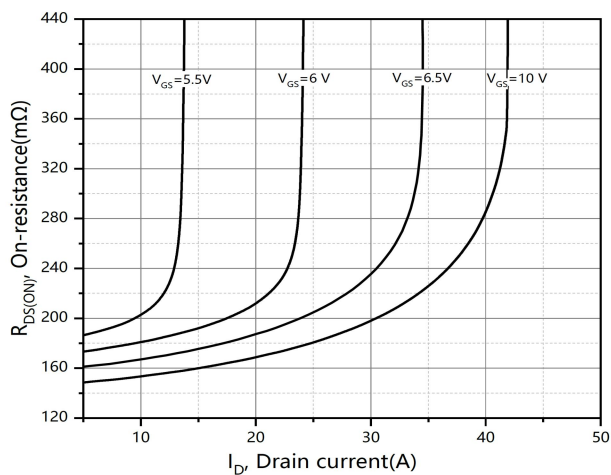
Drain-source on-state resistance



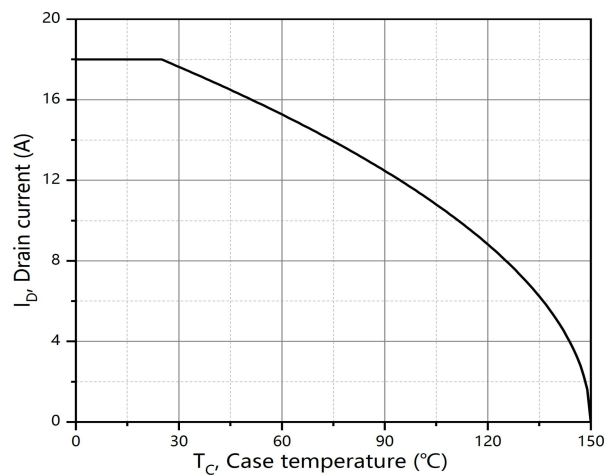
Threshold voltage



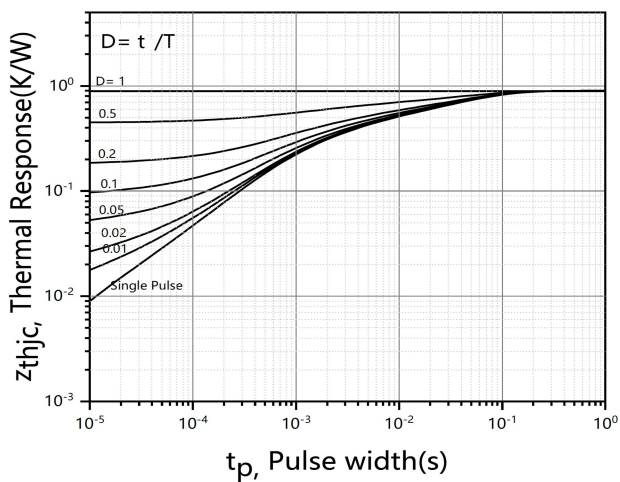
Forward characteristic of body diode



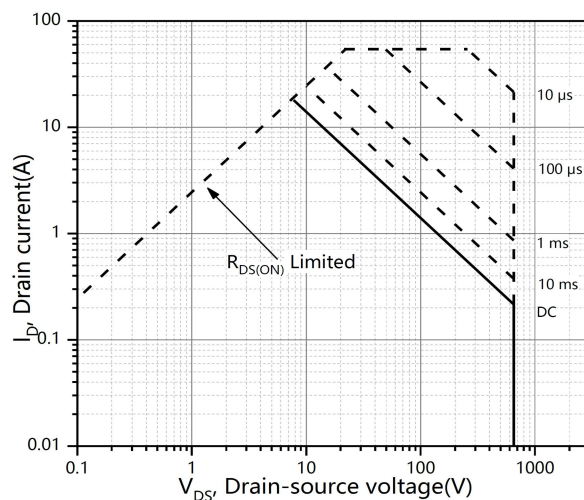
Drain-source on-state resistance



Drain current

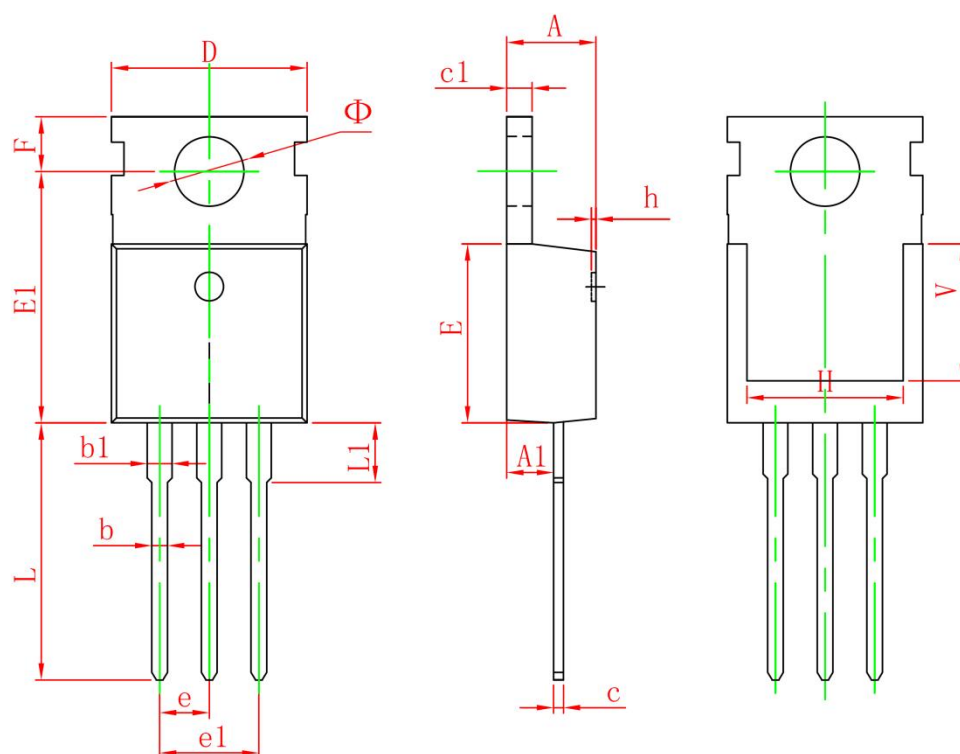


Max. transient thermal impedance



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