

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
300V	13mΩ@10V	125A



**合肥矽普半导体**

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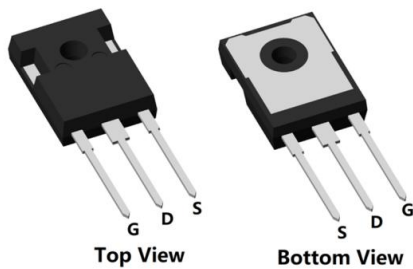
## Feature

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

## Applications

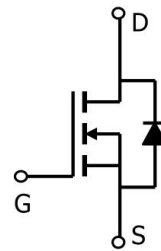
- PWM Application
- Hard switched and high frequency circuits
- Power Management

## Package

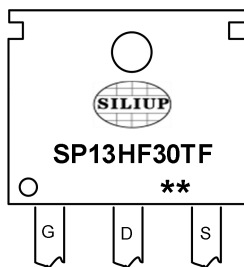


TO-247(1:G 2:D 3:S)

## Circuit diagram



## Marking



**SP13HF30TF** : Product code  
**\*\*** : Week code

## Order Information

Device	Package	Unit/Tube
SP13HF30TF	TO-247	30

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

Parameter	Symbol	Rating	Unit
Drain source voltage	$V_{DS}$	300	V
Gate source voltage	$V_{GS}$	$\pm 20$	V
Continuous drain current (Tc=25°C)	$I_D$	125	A
Continuous drain current (Tc=100°C)	$I_D$	83	A
Pulsed drain current	$I_{DM}$	380	A
Single pulsed avalanche energy <sup>1</sup>	$E_{AS}$	1332	mJ
Power dissipation (Tc=25°C)	$P_D$	500	W
Thermal resistance Junction-to-case	$R_{\theta JC}$	0.25	°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)**

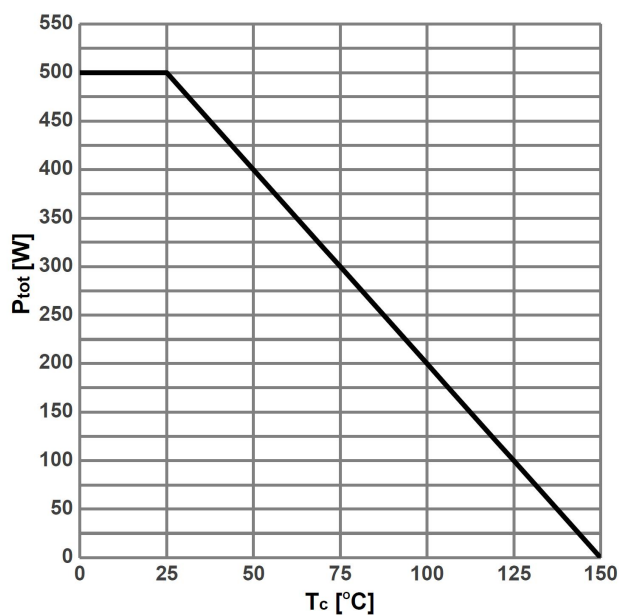
Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	B <sub>V</sub> DSS	VGS = 0V, ID = 250μA	300	350	-	V
Drain Cut-Off Current	IDSS	VDS = 240V, VGS = 0V	-	-	1	μA
Gate Leakage Current	IGSS	VGS = ±20V, VDS = 0V	-	-	±0.1	
Gate Threshold Voltage	VGS(th)	VDS = VGS, ID = 250μA	2.5	3.5	4.5	V
Drain-Source ON Resistance	RDS(ON)	VGS = 10V, ID = 35A	-	13	16	mΩ
Dynamic Characteristics						
Input Capacitance	Ciss	VDS =50V, VGS = 0V, f = 1.0MHz	-	5200	-	pF
Output Capacitance	Coss		-	340	-	
Reverse Transfer Capacitance	Crss		-	6.5	-	
Switching Characteristics						
Total Gate Charge	Qg	VDS=200V , VGS=10V , ID=40A	-	85	-	nC
Gate-Source Charge	Qgs		-	26	-	
Gate-Drain Charge	Qgd		-	22	-	
Turn-On Delay Time	td(on)	VGS = 10V, VDS = 200V, ID=40A , RG = 20Ω	-	49	-	nS
Rise Time	tr		-	32	-	
Turn-Off Delay Time	td(off)		-	82	-	
Fall Time	tf		-	8	-	
Drain-Source Body Diode Characteristics						
Diode Forward Voltage	VSD	VGS=0V , IS=1A , TJ=25℃	-	-	1.2	V
Maximum Body-Diode Continuous Current	IS		-	-	125	A
Reverse Recovery Time	Trr	VR=200V, IS=40A, di/dt=100A/us	-	118	-	nS
Reverse Recovery Charge	Qrr		-	0.56	-	uC

**Note :**

1. The test condition is  $V_{DD} = 50V, V_{GS} = 10V, L = 0.5mH, RG = 25\Omega$

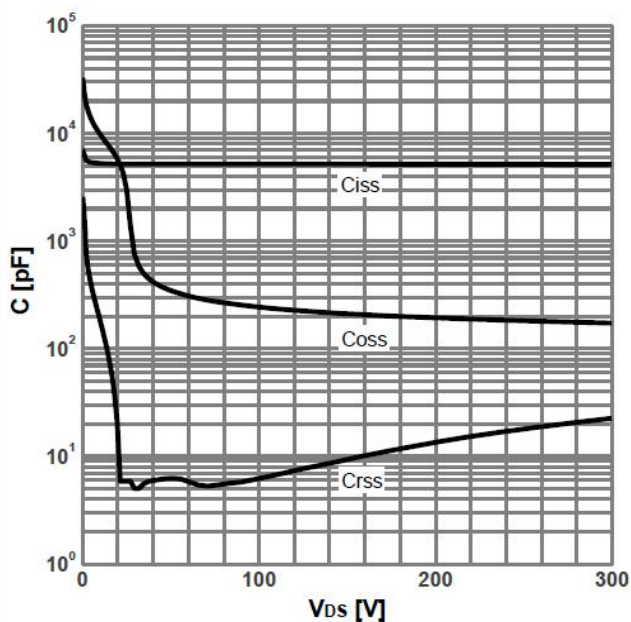
## Typical Characteristics

**Power dissipation**



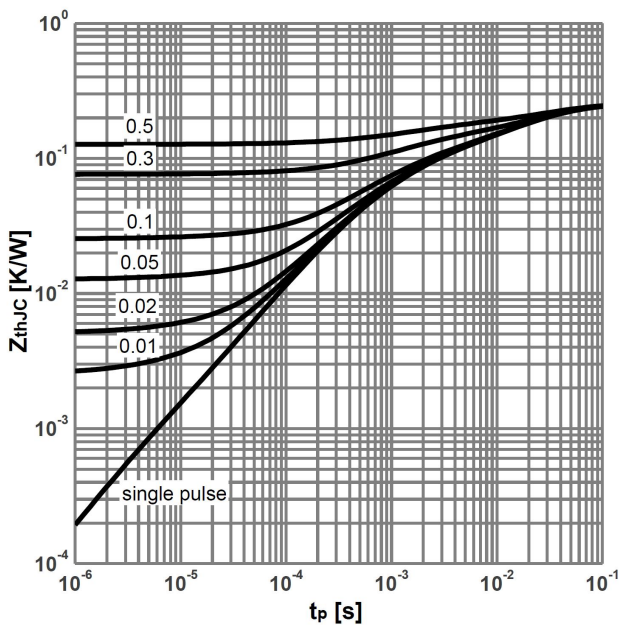
$$P_{tot}=f(T_c)$$

**Typ. capacitances**



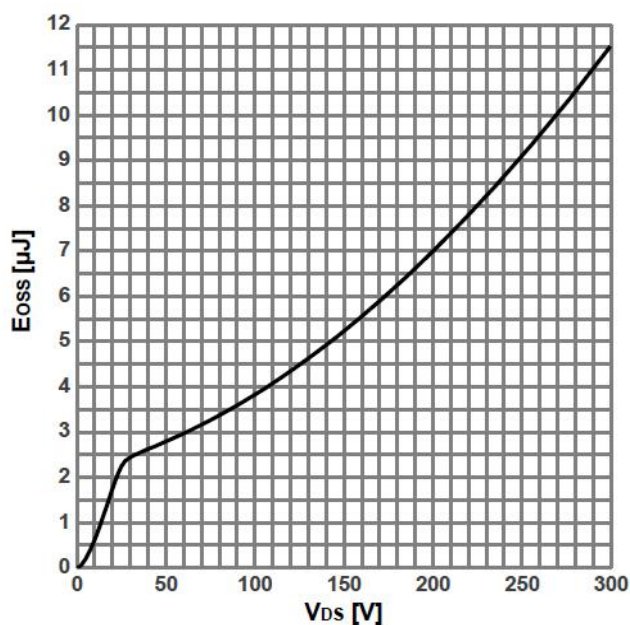
$$C=f(V_{DS}); V_{GS}=0V; f=1MHz$$

**Max. transient thermal impedance**



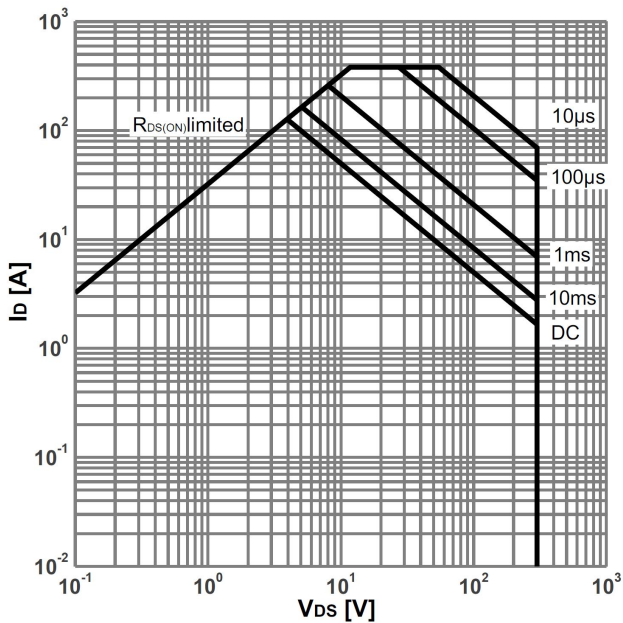
$$Z_{thJC}=f(t_p); \text{ parameter: } D= t_p/T$$

**Typ. Coss stored energy**



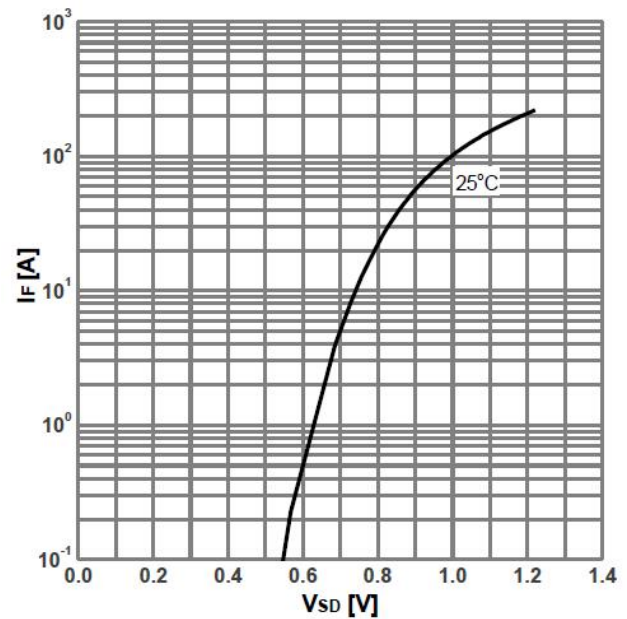
$$E_{OSS} = f(V_{DS})$$

**Safe operating area**



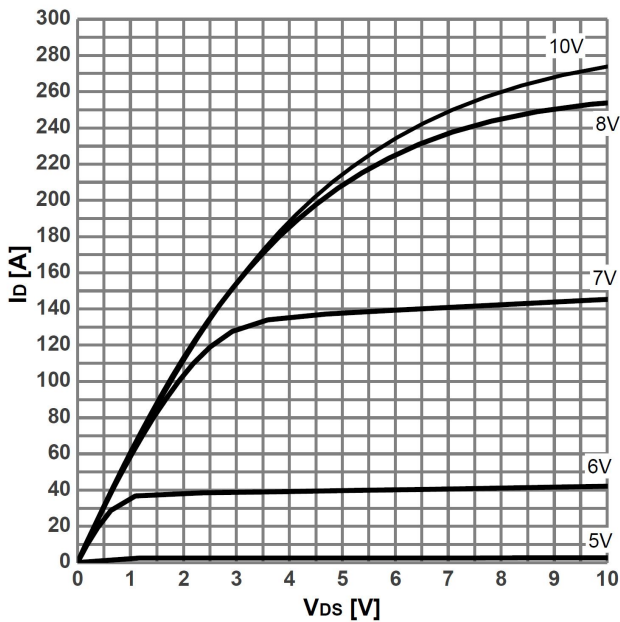
$I_D = f(V_{DS})$ ;  $T_J = 25^\circ\text{C}$ ;  $D = 0$ ; parameter:  $t_p$

**Forward characteristics of reverse diode**



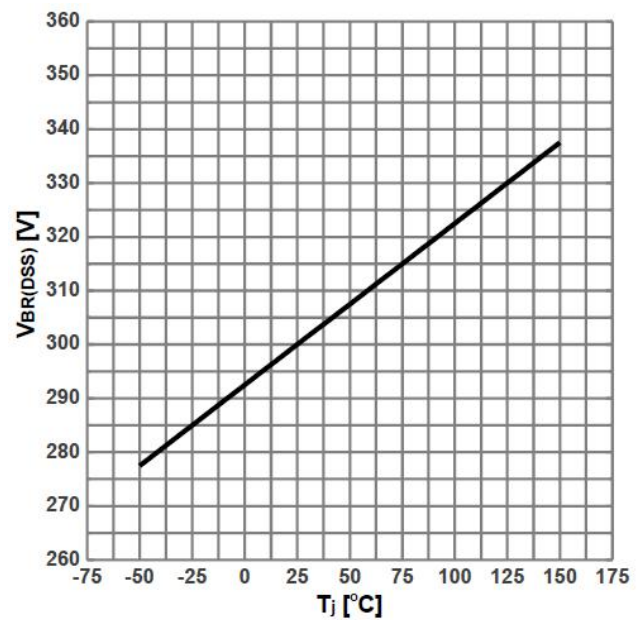
$I_F = f(V_{SD})$ ; parameter:  $T_J$

**Typ. output characteristics**



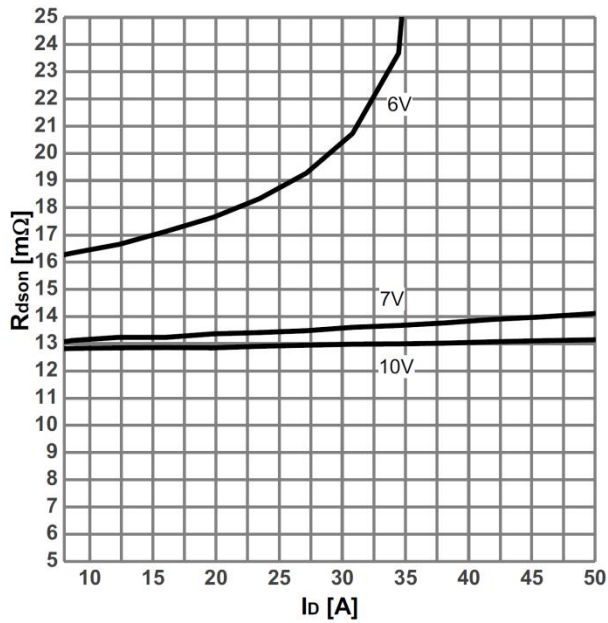
$I_D = f(V_{DS})$ ;  $T_J = 25^\circ\text{C}$ ; parameter:  $V_{GS}$

**Drain-source breakdown voltage**



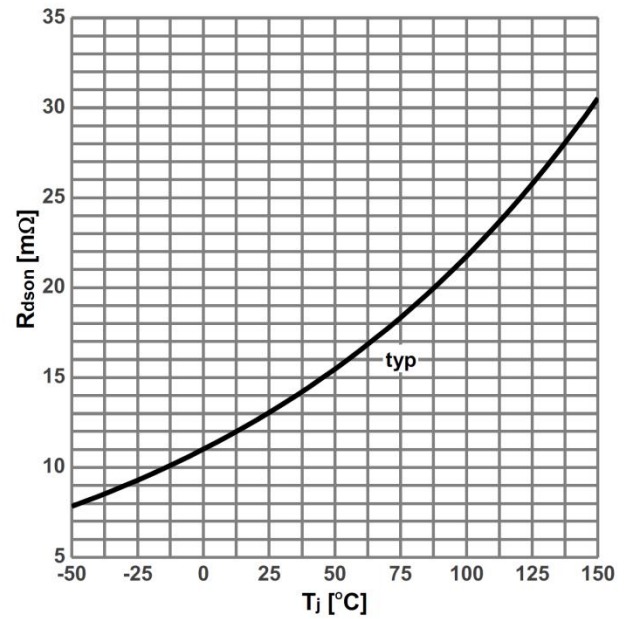
$V_{BR(DSS)} = f(T_J)$ ;  $I_D = 1\text{mA}$

Typ. drain-source on-state resistance



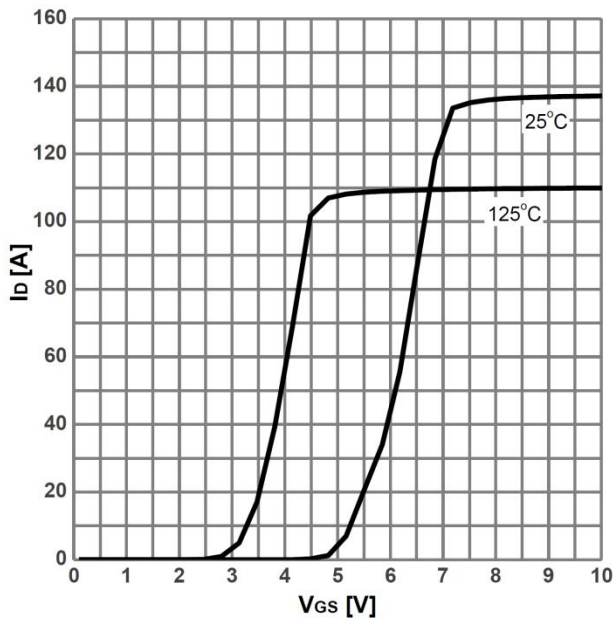
$R_{DS(on)}=f(I_D)$ ;  $T_J=25^\circ\text{C}$ ; parameter:  $V_{GS}$

Drain-source on-state resistance



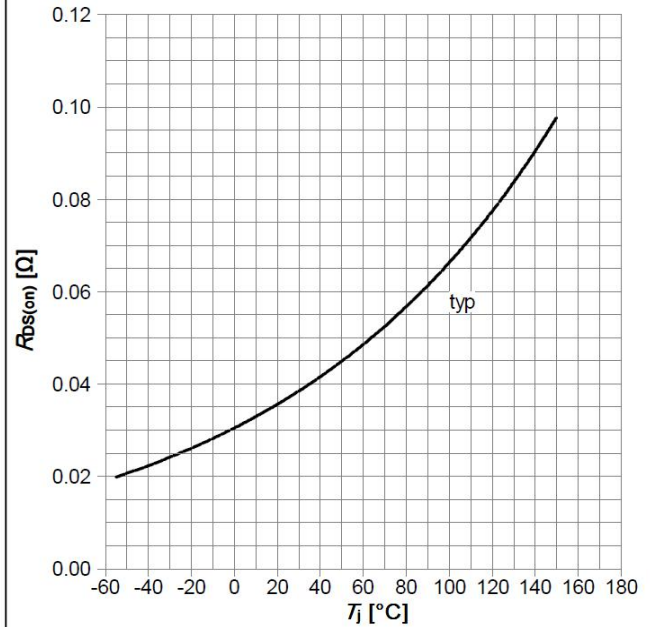
$R_{DS(on)}=f(T_J)$ ;  $I_D=36\text{A}$ ;  $V_{GS}=10\text{V}$

Typ. transfer characteristics

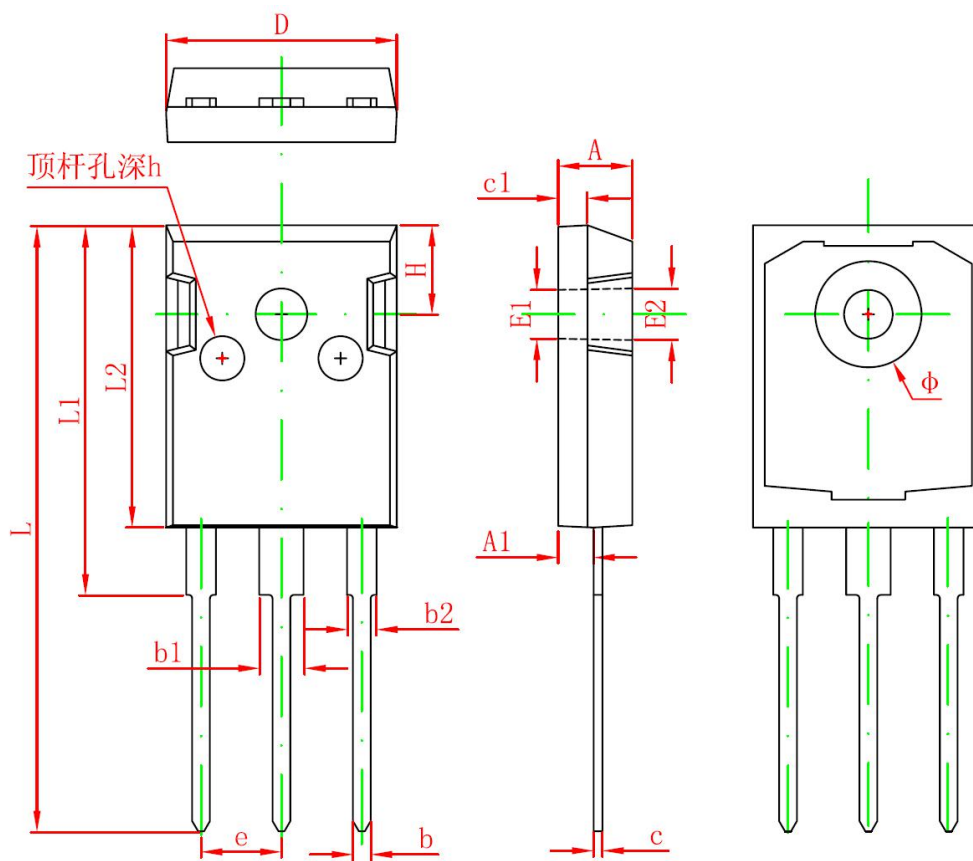


$I_D=f(V_{GS})$ ;  $V_{DS}=20\text{V}$ ; parameter:  $T_J$

Typ. gate charge



$V_{GS}=f(Q_{gate})$ ;  $I_D=40\text{A}$  pulsed;  $V_{DS}=200\text{V}$

**TO-247 Package Information**


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.850	5.150	0.191	0.200
A1	2.200	2.600	0.087	0.102
b	1.000	1.400	0.039	0.055
b1	2.800	3.200	0.110	0.126
b2	1.800	2.200	0.071	0.087
c	0.500	0.700	0.020	0.028
c1	1.900	2.100	0.075	0.083
D	15.450	15.750	0.608	0.620
E1	3.500 REF.		0.138 REF.	
E2	3.600 REF.		0.142 REF.	
L	40.900	41.300	1.610	1.626
L1	24.800	25.100	0.976	0.988
L2	20.300	20.600	0.799	0.811
Φ	7.100	7.300	0.280	0.287
e	5.450 TYP.		0.215 TYP.	
H	5.980 REF.		0.235 REF.	
h	0.000	0.300	0.000	0.012