

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
650V	60mΩ@10V	47A



**合肥矽普半导体**

Siliup Semiconductor Technology Co., Ltd

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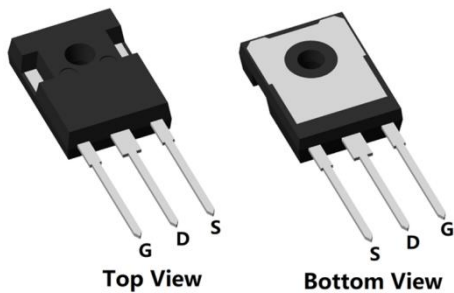
## Feature

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

## Applications

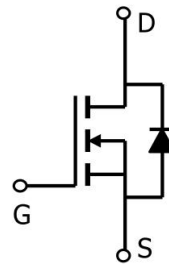
- PWM Application
- Hard switched and high frequency circuits
- Power Management

## Package

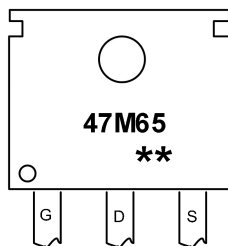


TO-247(1:G 2:D 3:S)

## Circuit diagram



## Marking



47M65  
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:Device Code  
:Week Code

## Order Information

Device	Package	Unit/Tube
SP47M65TF	TO-247	30

**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)	$I_D$	47	A
Continuous Drain Current (Tc=100°C)	$I_D$	29	A
Pulsed Drain Current	$I_{DM}$	188	A
Single Pulse Avalanche Energy <sup>1</sup>	$E_{AS}$	1160	mJ
Power Dissipation (Tc=25°C)	$P_D$	391	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	0.32	°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)**

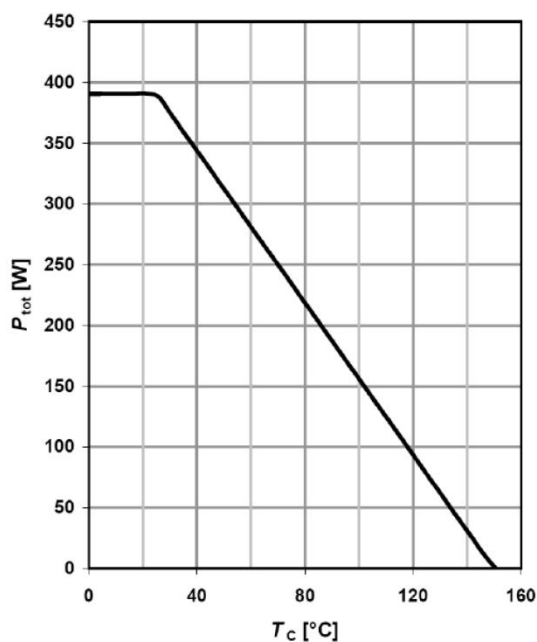
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V	650	-	-	V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> = 520V, V <sub>GS</sub> = 0V	-	-	1	uA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±30V, V <sub>DS</sub> = 0V	-	-	±0.1	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	2	3	4	V
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 23A	-	60	70	mΩ
Dynamic characteristics						
Input Capacitance	C <sub>iss</sub>	VDS=25V , VGS=0V , f=1MHz	-	3080	-	pF
Output Capacitance	C <sub>oss</sub>		-	140	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	7	-	
Total Gate Charge	Q <sub>g</sub>	VDS=480V , VGS=10V , ID=23A	-	194	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	35	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	90	-	
Switching Characteristics						
Turn-On Delay Time	T <sub>d(on)</sub>	VDD=480V, VGS=10V , RG=2Ω, ID=10A	-	22	-	nS
Rise Time	T <sub>r</sub>		-	10	-	
Turn-Off Delay Time	T <sub>d(off)</sub>		-	90	-	
Fall Time	T <sub>f</sub>		-	5	-	
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>		-	-	47	A
Reverse recover time	T <sub>rr</sub>	I <sub>S</sub> =23A, di/dt=100A/us, Tj=25℃	-	710	-	nS
Reverse recovery charge	Q <sub>rr</sub>		-	19	-	uC

**Note :**

1. The test condition is  $V_{DD}=100V, V_{GS}=10V, L=60mH, R_G=25\Omega$

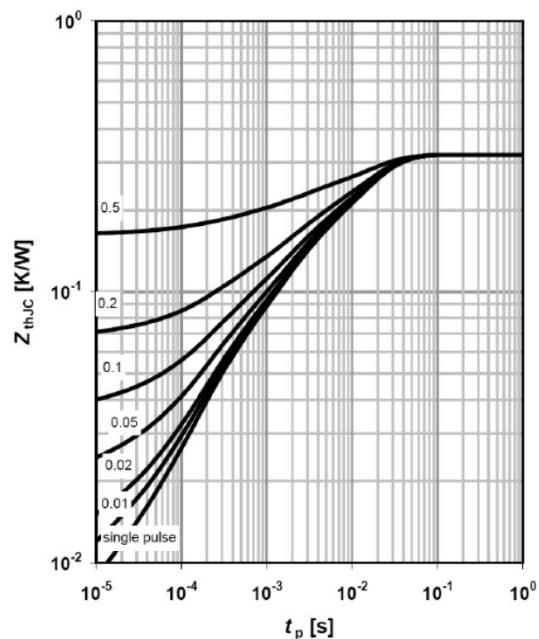
## Typical Characteristics

Power dissipation



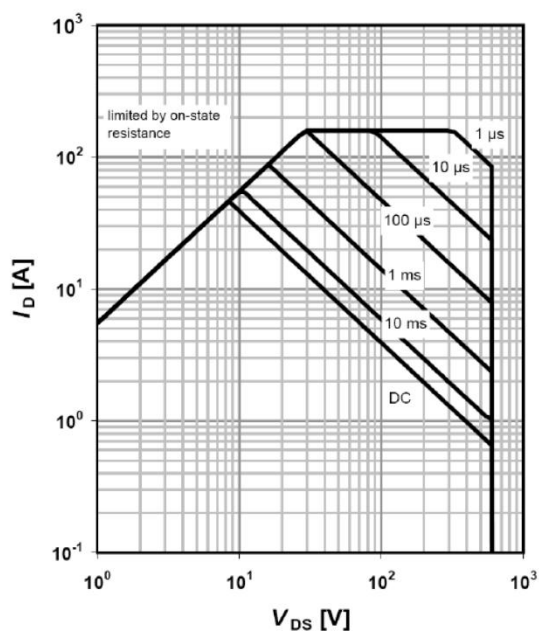
$$P_{tot} = f(T_c)$$

Max. transient thermal impedance



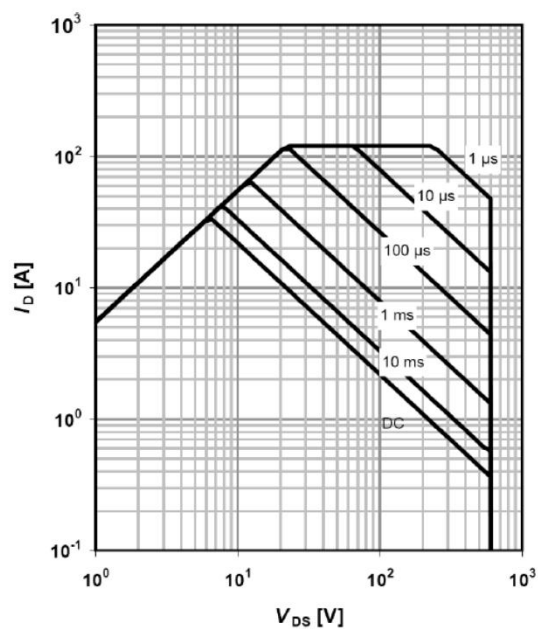
$$Z_{(thJC)} = f(t_p); \text{ parameter: } D = t_p / T$$

Safe operating area  $T_c = 25^\circ\text{C}$



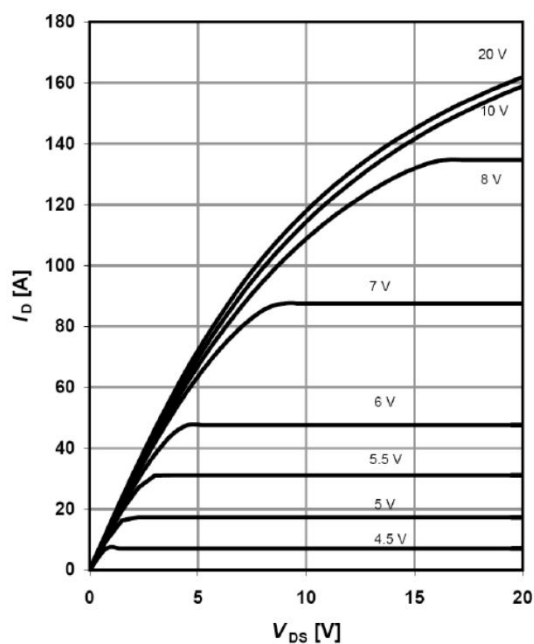
$$I_D = f(V_{DS}); T_c = 25^\circ\text{C}; V_{GS} > 7\text{V}; D=0; \text{ parameter } t_p$$

Safe operating area  $T_c = 80^\circ\text{C}$



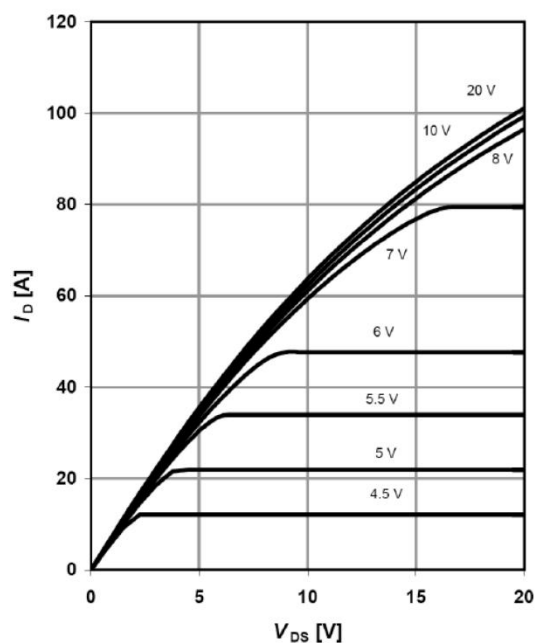
$$I_D = f(V_{DS}); T_c = 80^\circ\text{C}; V_{GS} > 7\text{V}; D=0; \text{ parameter } t_p$$

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



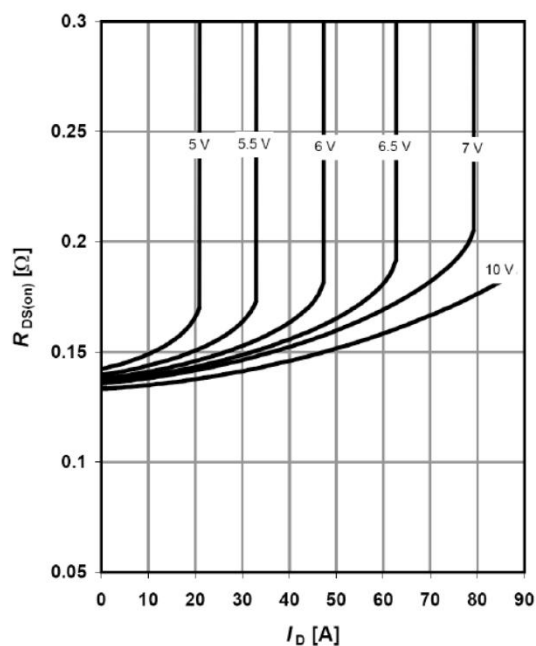
$I_D=f(V_{DS}); T_j=25\text{ }^{\circ}\text{C}; \text{parameter: } V_{GS}$

Typ. output characteristics  $T_j=125\text{ }^{\circ}\text{C}$



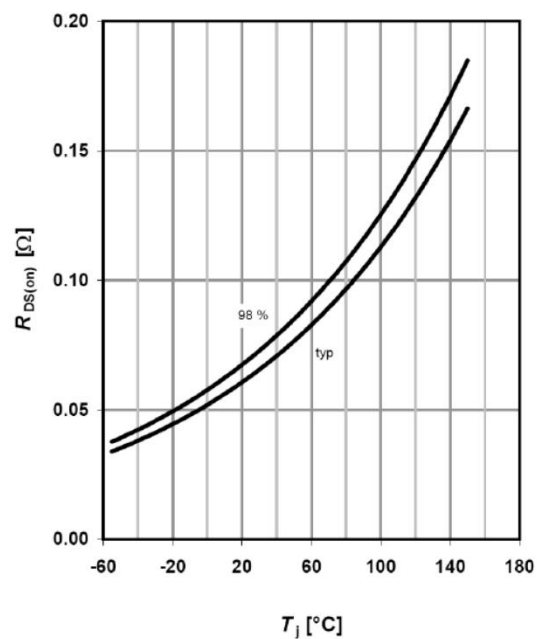
$I_D=f(V_{DS}); T_j=125\text{ }^{\circ}\text{C}; \text{parameter: } V_{GS}$

Typ. drain-source on-state resistance



$R_{DS(on)}=f(I_D); T_j=125\text{ }^{\circ}\text{C}; \text{parameter: } V_{GS}$

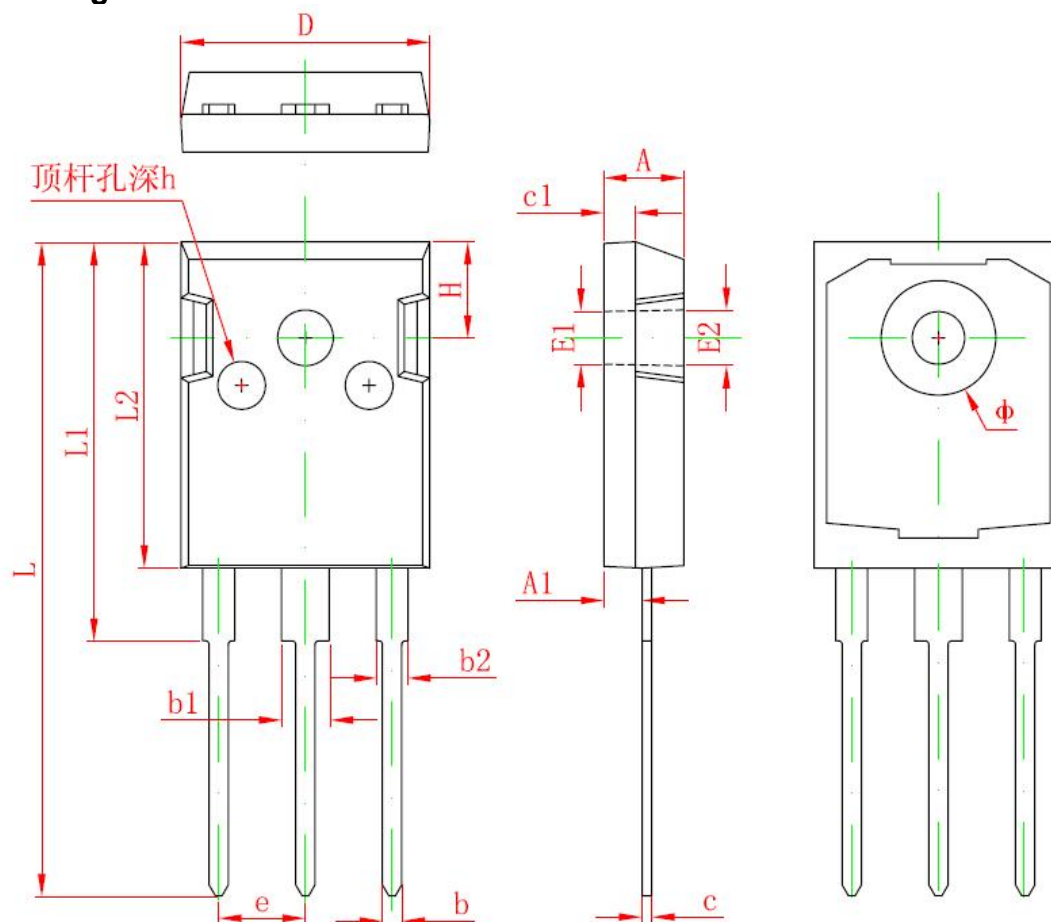
Drain-source on-state resistance



$R_{DS(on)}=f(T_j); I_D=17.6\text{ A}; V_{GS}=10\text{ V}$



## 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
b2	1.800	2.200	0.071	0.087
b	1.000	1.400	0.039	0.055
b1	2.800	3.200	0.110	0.126
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.	
H1	5.980 REF.		0.235 REF.	
h	0.000	0.300	0.000	0.012