

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
650V	35mΩ@10V	77A



合肥矽普半导体

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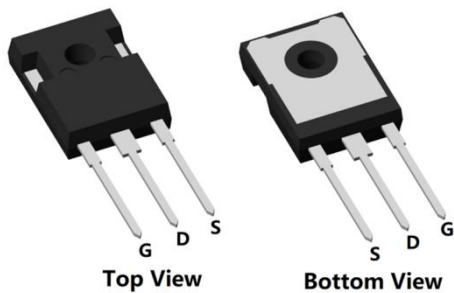
Feature

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

Applications

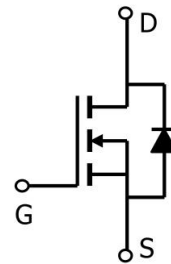
- PWM Application
- Hard switched and high frequency circuits
- Power Management

Package

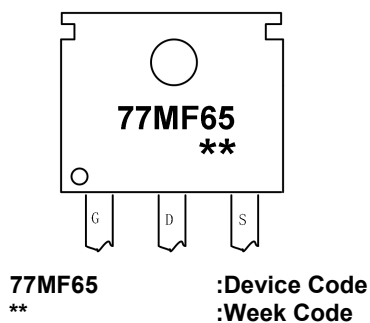


TO-247(1:G 2:D 3:S)

Circuit diagram



Marking



Order Information

Device	Package	Unit/Tube
SP77MF65TF	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}	± 30	V
Continuous Drain Current (Tc=25°C)	I_D	77	A
Continuous Drain Current (Tc=100°C)	I_D	45	A
Pulsed Drain Current	I_{DM}	308	A
Single Pulse Avalanche Energy ¹	E_{AS}	1950	mJ
Power Dissipation (Tc=25°C)	P_D	400	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	0.31	°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}	ID = 250μA, VGS = 0V	650	-	-	V
Drain-Source Leakage Current	IDSS	VDS = 480V, VGS = 0V	-	-	1	uA
Gate-Source Leakage Current	IGSS	VGS = ±30V, VDS = 0V	-	-	±0.1	nA
Gate Threshold Voltage	VGS(th)	VDS = VGS, ID = 250μA	3	4	5	V
Static Drain-Source On-Resistance	RDS(ON)	VGS = 10V, ID = 35A	-	35	41	mΩ
Dynamic characteristics						
Input Capacitance	Ciss	VDS=100V , VGS=0V , f=1MHz	-	7434	-	pF
Output Capacitance	Coss		-	255	-	
Reverse Transfer Capacitance	Crss		-	6.4	-	
Total Gate Charge	Qg	VDS=480V , VGS=10V , ID=35A	-	352.5	-	nC
Gate-Source Charge	Qgs		-	66	-	
Gate-Drain Charge	Qgd		-	228	-	
Switching Characteristics						
Turn-On Delay Time	Td(on)	VDD=480V, VGS=10V , RG=20Ω, ID=35A	-	46.7	-	nS
Rise Time	Tr		-	24	-	
Turn-Off Delay Time	Td(off)		-	108	-	
Fall Time	Tf		-	6	-	
Diode Characteristics						
Diode Forward Voltage	VSD	VGS=0V , IS=1A , TJ=25℃	-	-	1.2	V
Maximum Body-Diode Continuous Current	IS		-	-	77	A
Reverse recover time	Trr	IS=35A, di/dt=100A/us, Tj=25℃	-	307	-	nS
Reverse recovery charge	Qrr		-	21.6	-	uC

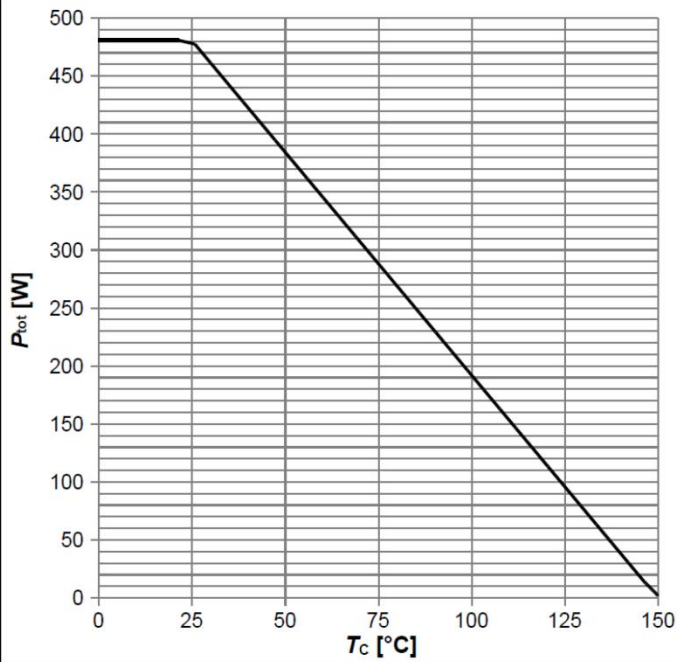
Note :

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



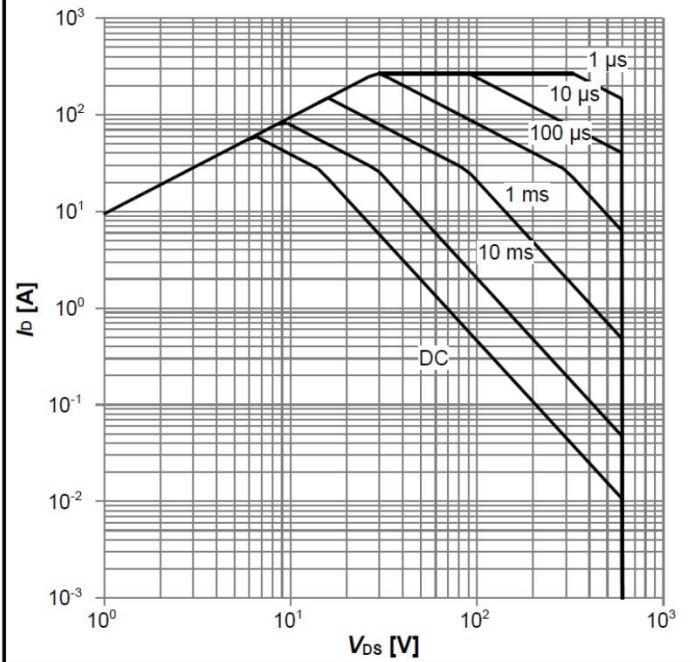
Typical Characteristics

Diagram 1: Power dissipation



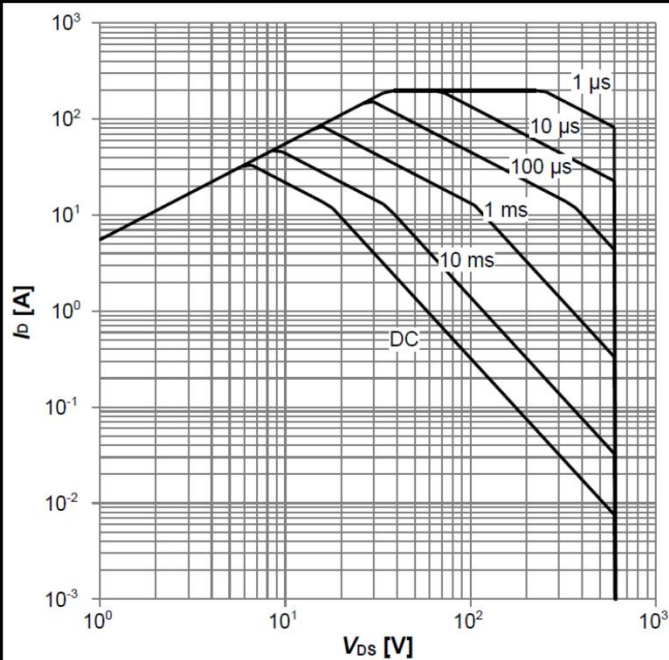
$$P_{tot}=f(T_c)$$

Diagram 2: Safe operating area



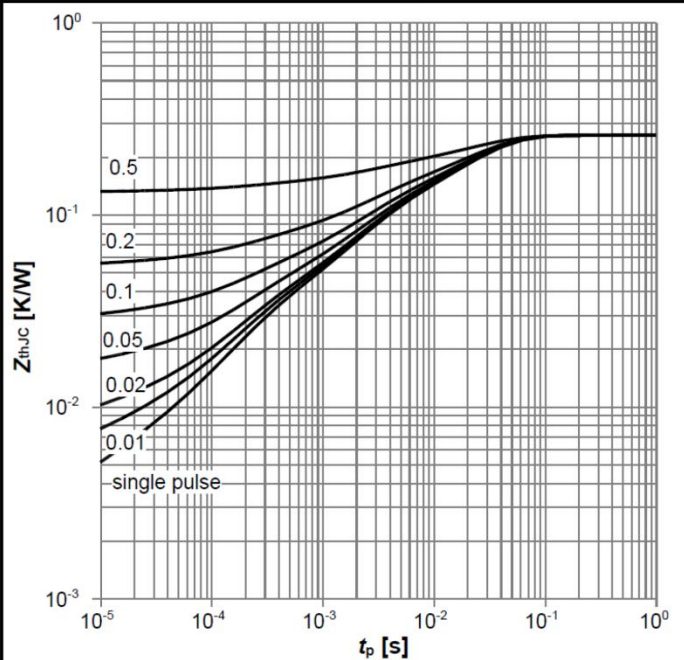
$$I_D=f(V_{DS}); T_c=25\text{ }^{\circ}\text{C}; D=0; \text{parameter: } t_p$$

Diagram 3: Safe operating area



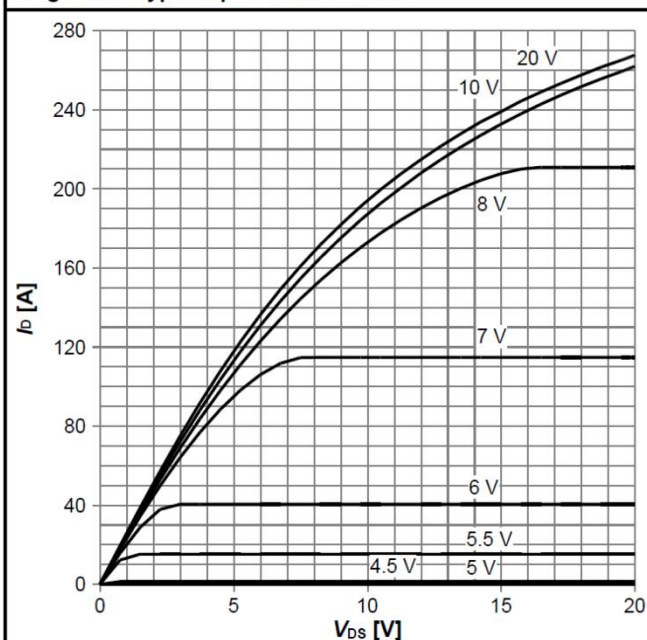
$$I_D=f(V_{DS}); T_c=80\text{ }^{\circ}\text{C}; D=0; \text{parameter: } t_p$$

Diagram 4: Max. transient thermal impedance



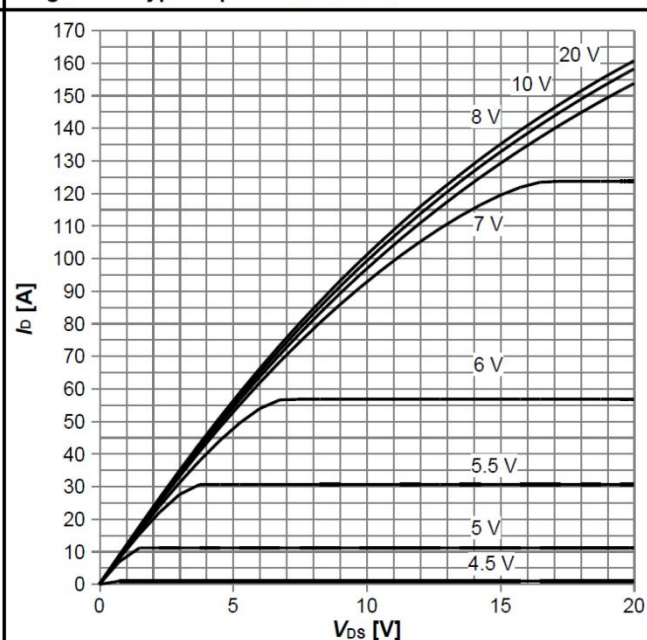
$$Z_{thJC}=f(t_p); \text{parameter: } D=t_p/T$$

Diagram 5: Typ. output characteristics



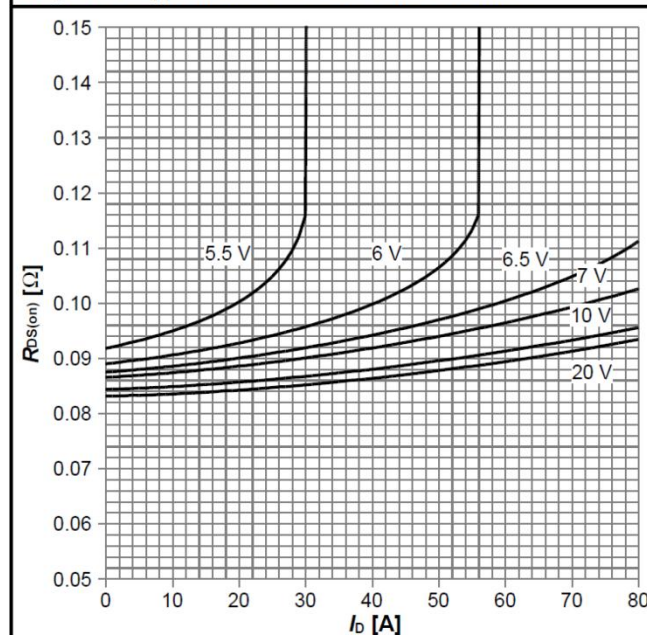
$I_D = f(V_{DS})$; $T_J = 25\text{ }^{\circ}\text{C}$; parameter: V_{GS}

Diagram 6: Typ. output characteristics



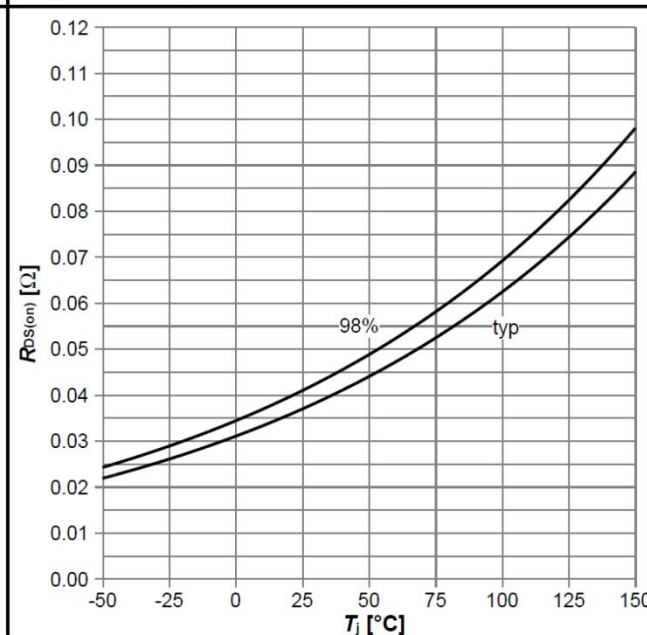
$I_D = f(V_{DS})$; $T_J = 125\text{ }^{\circ}\text{C}$; parameter: V_{GS}

Diagram 7: Typ. drain-source on-state resistance



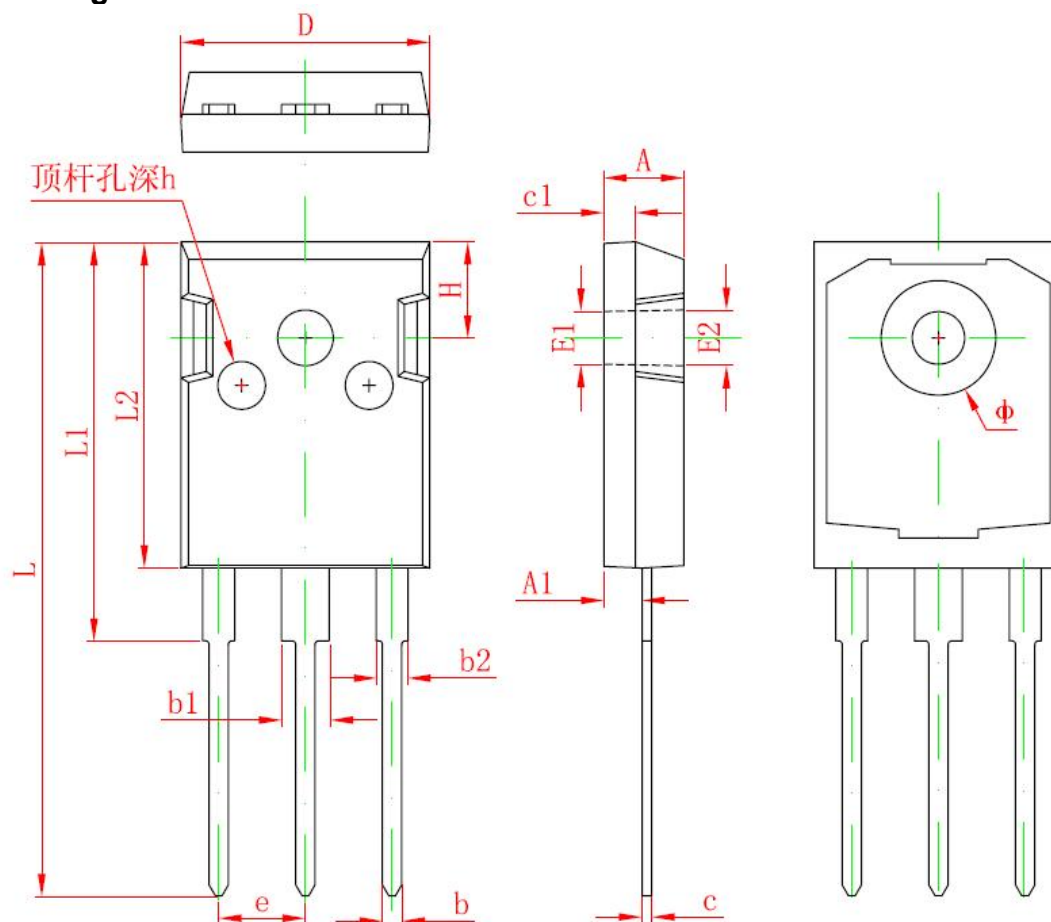
$R_{DS(on)} = f(I_D)$; $T_J = 125\text{ }^{\circ}\text{C}$; parameter: V_{GS}

Diagram 8: Drain-source on-state resistance



$R_{DS(on)} = f(T_J)$; $I_D = 35.5\text{ A}$; $V_{GS} = 10\text{ V}$

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