

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
650V	40mΩ@10V	50A



合肥矽普半导体

Siliup Semiconductor Technology Co., Ltd

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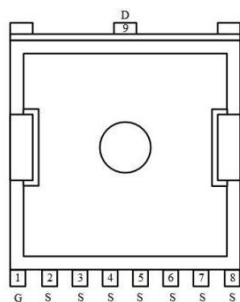
Feature

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

Applications

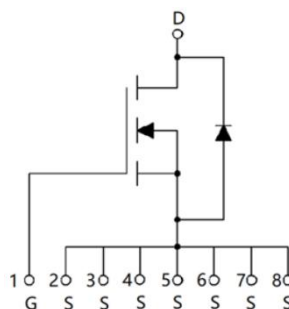
- PWM Application
- Hard switched and high frequency circuits
- Power Management

Package

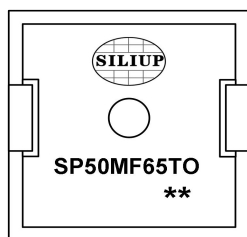


TOLL

Circuit diagram



Marking



SP50MF65TO : Product code
** : Week code

Order Information

Device	Package	Unit/Tape
SP50MF65TO	TOLL	2000

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	50	A
Continuous Drain Current (Tc=100°C)	I_D	34	A
Pulsed Drain Current	I_{DM}	200	A
Single Pulse Avalanche Energy ¹	E_{AS}	210	mJ
Power Dissipation (Tc=25°C)	P_D	305	W
Thermal Resistance Junction-to-Case	$R_{\theta JC}$	0.41	°C/W
Storage Temperature Range	T_{STG}	-55 to 150	°C
Operating Junction Temperature Range	T_J	-55 to 150	°C

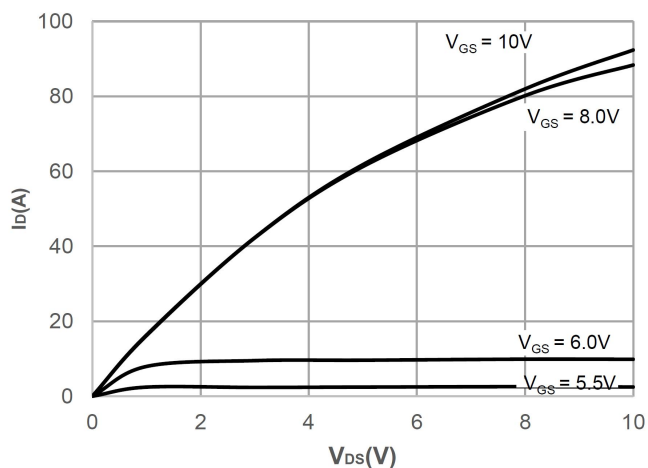
Electrical characteristics (Ta=25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	VGS = 0V,ID = 250μA	650	-	-	V
Drain-Source Leakage Current	Idss	VDS =520V, VGS = 0V	-	-	1	uA
Gate-Source Leakage Current	IGSS	VGS = ±30V, VDS = 0V	-	-	±100	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	-	40	50	mΩ
Dynamic characteristics						
Input Capacitance	Ciss	VDS=50V , VGS=0V , f=100kHz	-	4240	-	pF
Output Capacitance	Coss		-	64	-	
Reverse Transfer Capacitance	Crss		-	45	-	
Switching Characteristics						
Total Gate Charge	Qg	VDS=200V , VGS=10V , ID=40A	-	81	-	nC
Gate-Source Charge	Qgs		-	26	-	
Gate-Drain Charge	Qgd		-	24	-	
Turn-On Delay Time	Td(on)	VGS = 10V, VDS = 200V, ID=40A , RG = 20Ω	-	34	-	nS
Rise Time	Tr		-	11	-	
Turn-Off Delay Time	Td(off)		-	124	-	
Fall Time	Tf		-	5	-	
Diode Characteristics						
Diode Forward Voltage	VSD	VGS=0V , IS=1A , TJ=25℃	-	-	1.2	V
Maximum Body-Diode Continuous Current	IS		-	-	50	A
Reverse Recovery Time	trr	IS=40A,di/dt=100A/us, TJ=25℃	-	161	-	nS
Reverse Recovery Charge	Qrr		-	1.1	-	uC

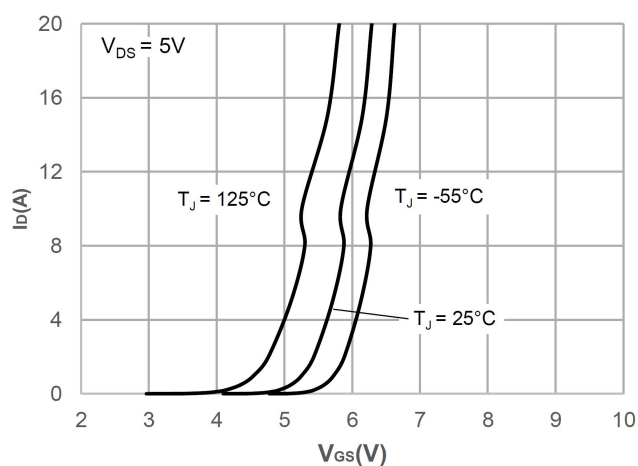
Note :

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

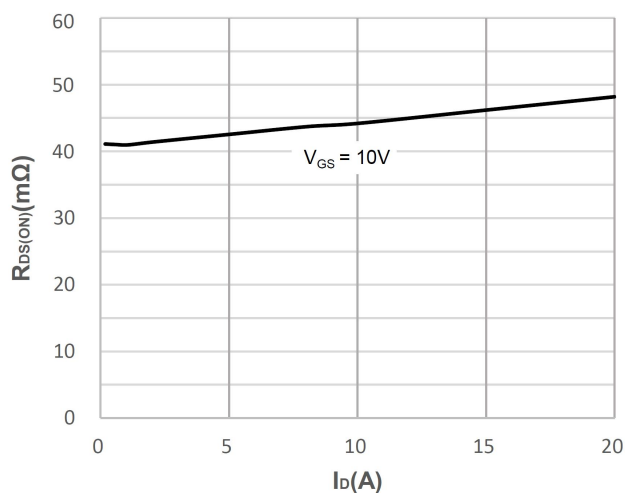
Typical Characteristics



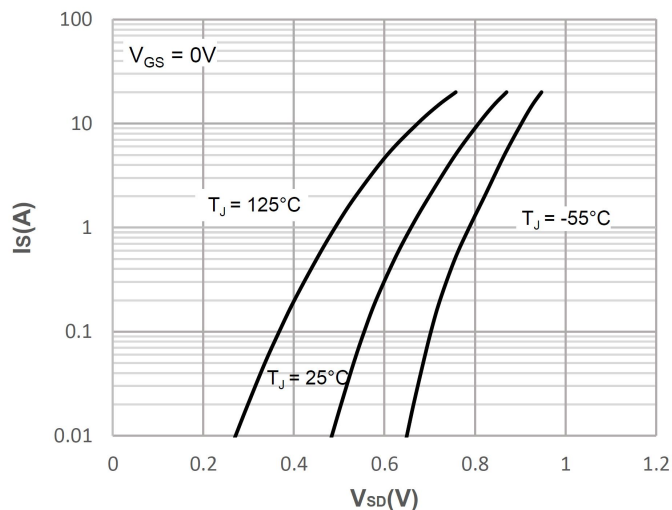
Output Characteristics



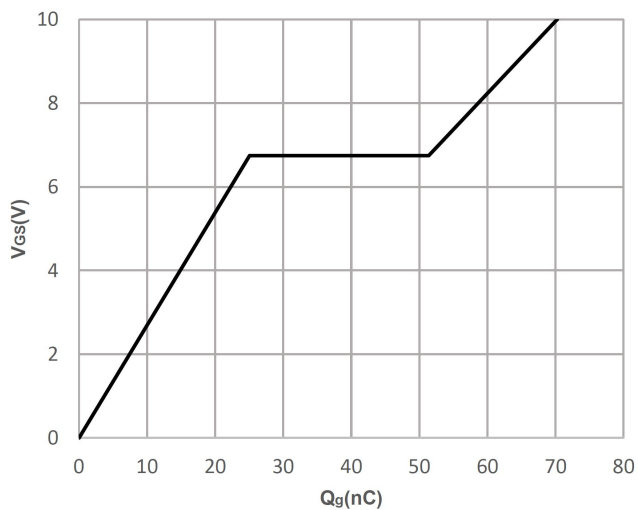
Typical Transfer Characteristics



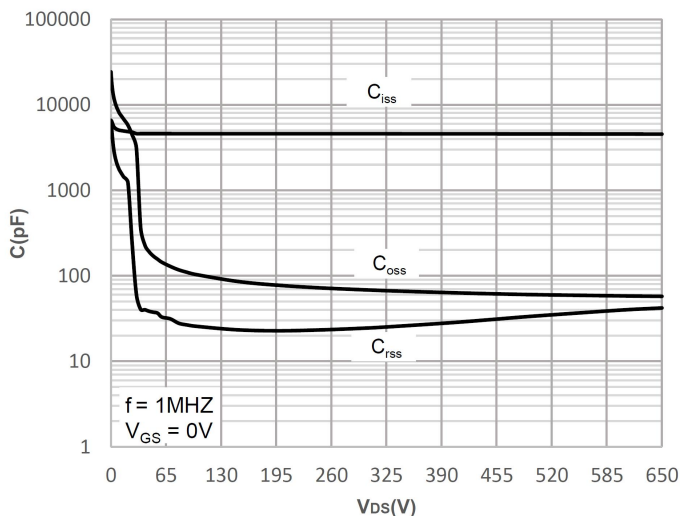
On-resistance vs. Drain Current



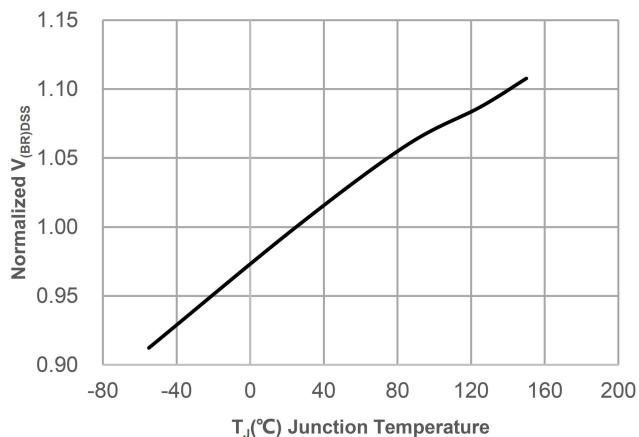
Body Diode Characteristics



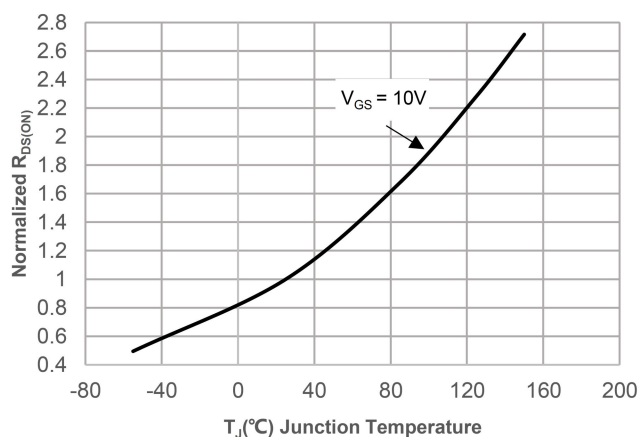
Gate Charge Characteristics



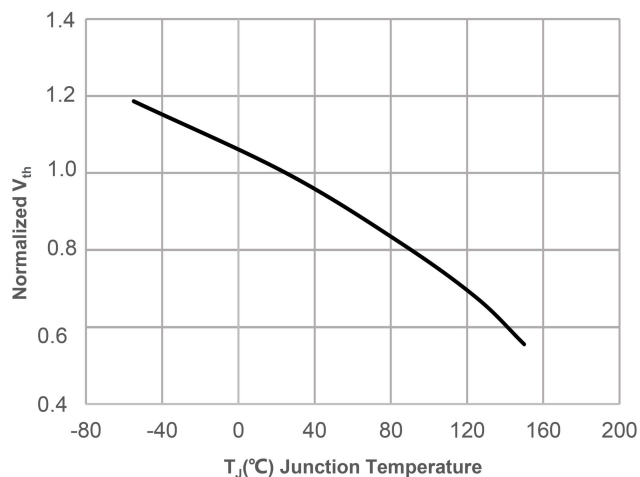
Capacitance Characteristics



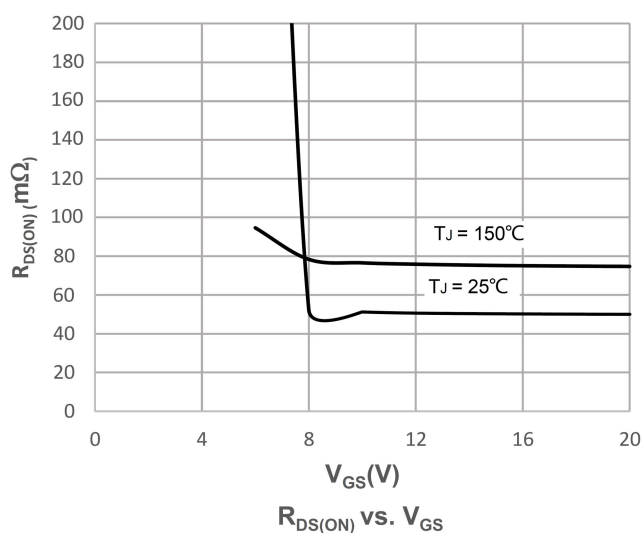
Normalized Breakdown voltage vs. Junction Temperature



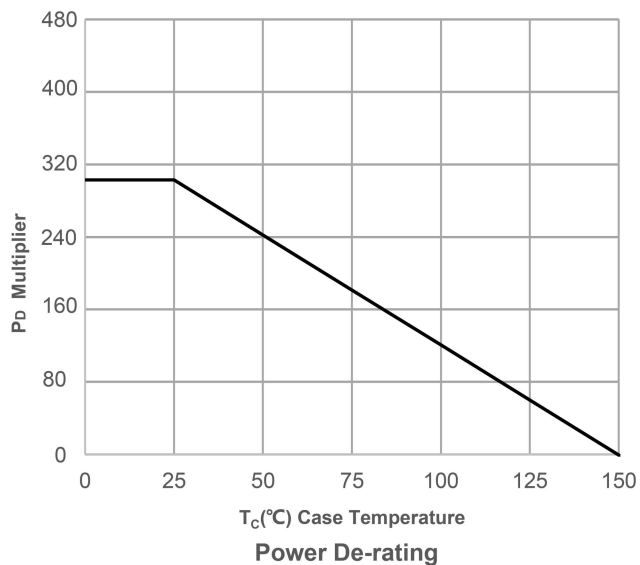
Normalized on Resistance vs. Junction Temperature



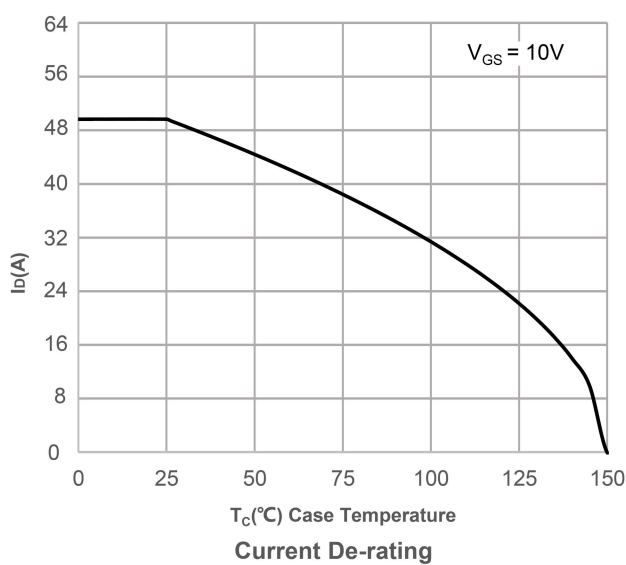
Normalized Threshold Voltage vs. Junction Temperature



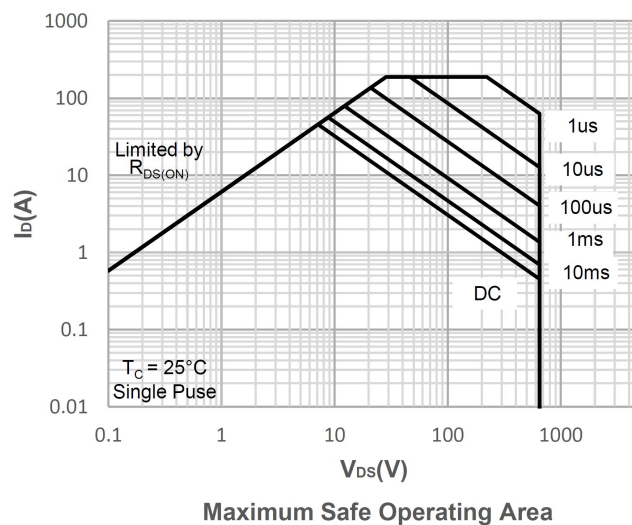
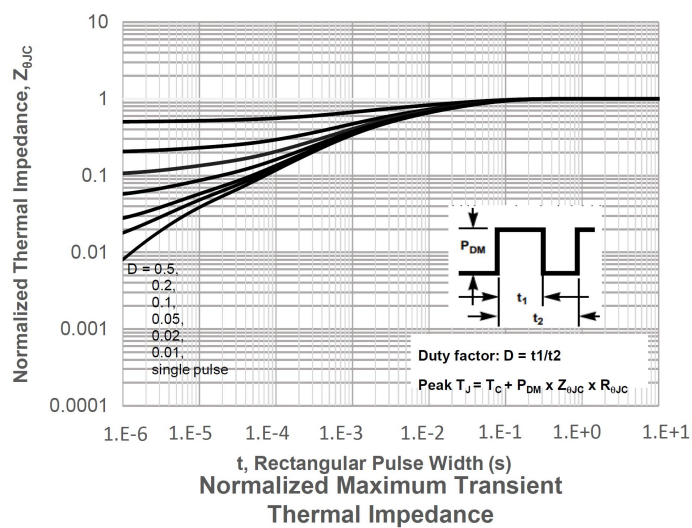
$R_{DS(ON)}$ vs. V_{GS}



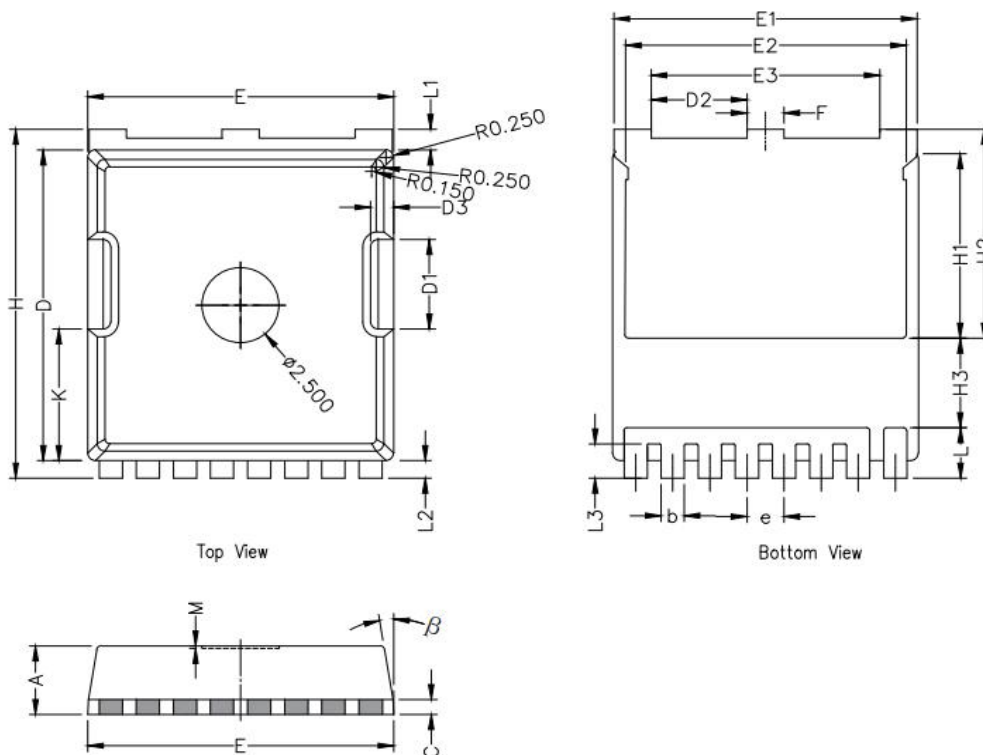
Power De-rating



Current De-rating



TOLL Package Information



Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	2.20	2.30	2.40
b	0.65	0.75	0.85
C	0.508 REF		
D	10.25	10.40	10.55
D1	2.85	3.00	3.15
E	9.75	9.90	10.05
E1	9.65	9.80	9.95
E2	8.95	9.10	9.25
E3	7.25	7.40	7.55
e	1.20 BSC		
F	1.05	1.20	1.35
H	11.55	11.70	11.85
H1	6.03	6.18	6.33
H2	6.85	7.00	7.15
H3	3.00 BSC		
L	1.55	1.70	1.85
L1	0.55	0.7	0.85
L2	0.45	0.6	0.75
M	0.08 REF.		
β	8°	10°	12°
K	4.25	4.40	4.55