PSM10065H

650V 10A 400mΩ Si Super junction MOSFET with Normal body diode

PowerCubeSemi, Inc.
Potential · Convergence · Smart

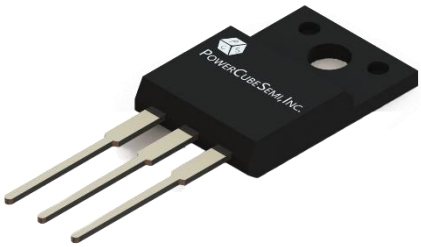
Features

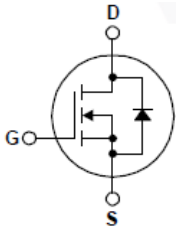
Si Super junction MOSFET

- Rated to 650V at 10Amps @T_J = 25℃
- Max $R_{DS(on)}$ = 400 mΩ
- Typ $R_{DS(on)}$ = 380 mΩ
- Gate Charge(Typ. Q_g=20 nC)
- Improved dv/dt Capability
- 100% Avalanche Tested

Application

- LCD/LED/PDP TV
- Telecom/Server Power supplies
- AC-DC Power Supply
- LED Lighting





PKG type : TO-220F

Description

PSM10065H is PowerCubeSemi's second generation of high voltage Super Junction MOSFET that is utilizing charge balance technology for outstanding low on-resistance and lower gate charge performance. This advanced technology is tailored to minimize conduction loss, provide superior switching performance, and withstand extreme dv/dt rate and higher avalanche energy. Consequently, the combination of Super Junction MOSFET is suitable for various AC/DC power conversion for system miniaturization and higher efficiency

Absolute Maximum Ratings

Symbol	Parameter	Test Condition	Value	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	650	V
I_D	Drain Current	T_c=25℃	10	A
I_{DM}	Pulsed Drain Current	Pulse width limited by junction temperature	20	A
V_{GS}	Gate-Source Voltage		±30	V
E_{AS}	Single Pulsed Avalanche Energy	I_{AS}=4.5A, R_G=25Ω V_{DD}=50V, L=20mH	170	mJ
P_d	Power Dissipation	T_C=25℃	89.2	W
T_J	Operating Junction Temperature		150	℃
T_{stg}	Storage Temperature		-55 to 150	℃

Package Marking and Ordering Information

Device Marking	Device	Package	Packing Method	Tape width	Quantity
PSM10065H	PSM10065	TO-220F	Tube	-	50 unit

Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical			Unit
			Min	Typ.	Max.	
BV_{DSS}	Drain-source breakdown voltage	V_{GS} = 0V, I_D = 1mA, T_J = 25°C	650	-	-	V
I_{DSS}	Zero gate voltage drain current	V_{DS} = 650V, V_{GS} = 0V	-	-	30	μA
I_{GSS}	Gate-source leakage current	V_{GS} = ±30V, V_{DS} = 0V	-	-	±70	nA
$V_{GS(th)}$	Gate threshold voltage	V_{DS} = V_{GS}, I_D = 250μA	3	-	5	V
$R_{DS(ON)}$	Static drain-source on state resistance	V_{GS} = 10V, I_D = 10A	-	380	400	mΩ
$t_{d(on)}$	Turn-on Delay time	V_{DD} = 380 V, I_D = 5A, V_{GS} = 10 V, R_G = 4.7Ω	-	15	-	ns
T_r	Turn-on Rise time		-	9	-	
$t_{d(off)}$	Turn-off Delay time		-	59	-	
T_f	Turn-off Fall time		-	10	-	

Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
$R_{\theta JC}$	Thermal resistance, Junction to case		1.4	-	℃/W
R_g	Gate resistance	V_{GS} = 0V, f = 100㎑	8	10	Ω
C_{iss}	Input capacitance	V_{DS} = 200V, V_{GS} = 0V, f = 1㎒	1000	-	pF
C_{oss}	Output capacitance		30	-	
C_{rss}	Reverse transfer capacitance		2	-	
$Q_{g(tot)}$	Total gate charge at 10V	V_{DS} = 520V, I_D = 10A $V_{GS(on)}$ = 10V, $V_{GS(off)}$ = 0V	20	-	nC
Q_{gs}	Gate to source gate charge		5	-	
Q_{gd}	Gate to drain "Miller" charge		10	-	

Electrical Characteristics of Si Diode

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
I_S	Maximum continuous drain to source diode forward current		-	10	A
I_{SM}	Maximum pulsed drain to source diode forward current		-	20	A
V_{SD}	Drain to source diode forward voltage	I_{SD} = 10A, V_{GS} = 0V	-	1.1	V
T_{rr}	Reverse recovery time	I_{SD} = 5A, V_{DD} = 400V, dI_F/dt=100A/㎲	265	-	ns
Q_{rr}	Reverse recovery charge		2.9	-	μC
I_{rrm}	Reverse recovery current		22		A

Typical Characteristics

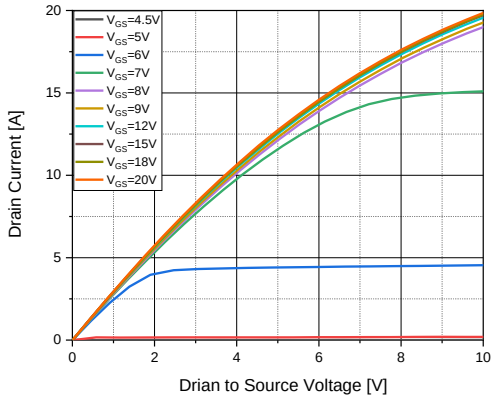


Figure 1. On-state characteristics

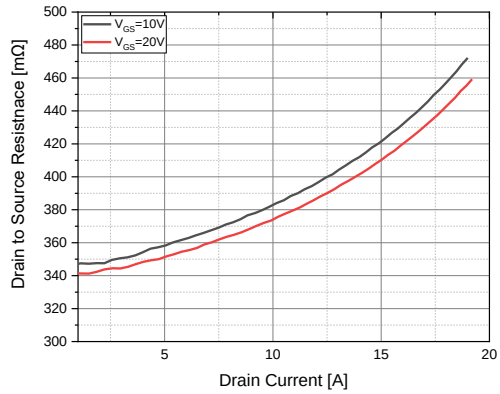


Figure 2. On resistance variation vs Drain current and gate voltage

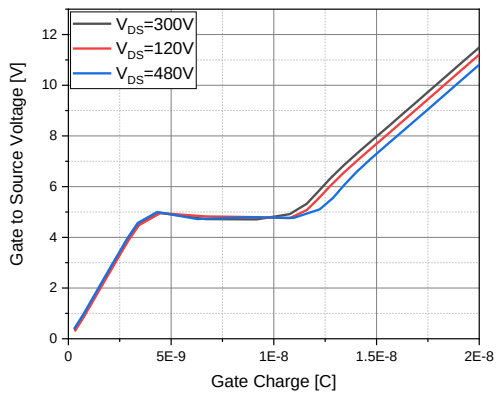


Figure 3. Gate charge characteristics

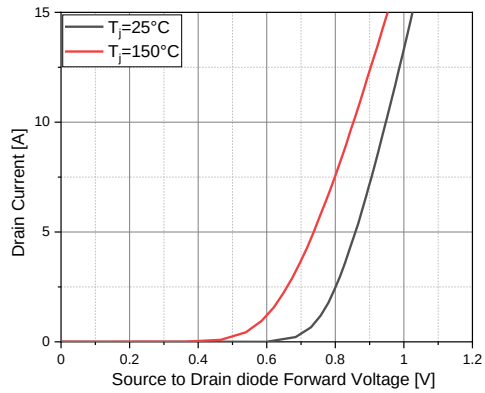


Figure 4. On-state current vs Diode forward voltage

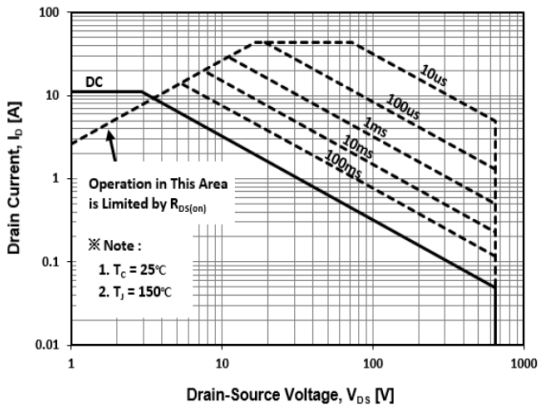


Figure 5. Maximum safe operating area

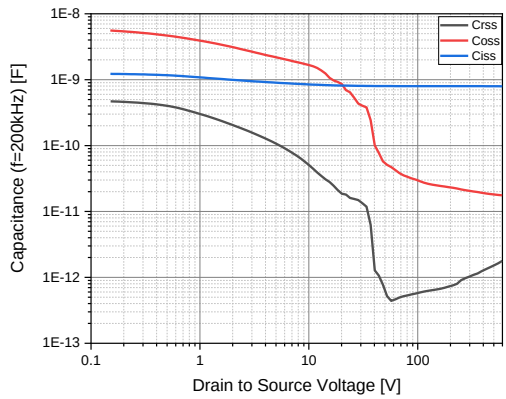


Figure 6. Capacitance characteristics

Typical Characteristics

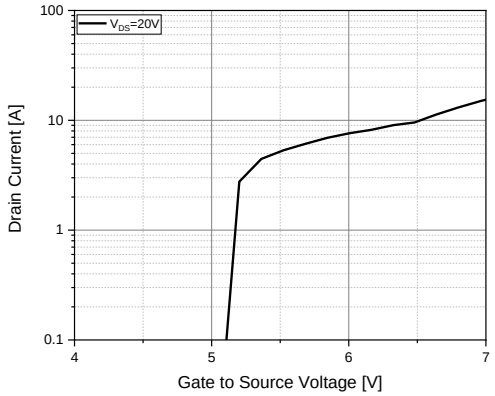


Figure 7. Transfer characteristics

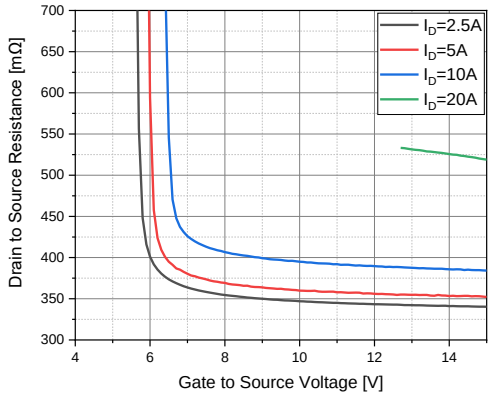


Figure 8. Drain to source resistance vs Gate to source voltage

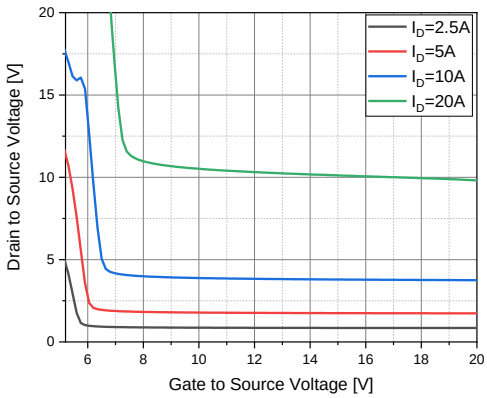


Figure 9. Drain to source voltage vs Gate to Source voltage

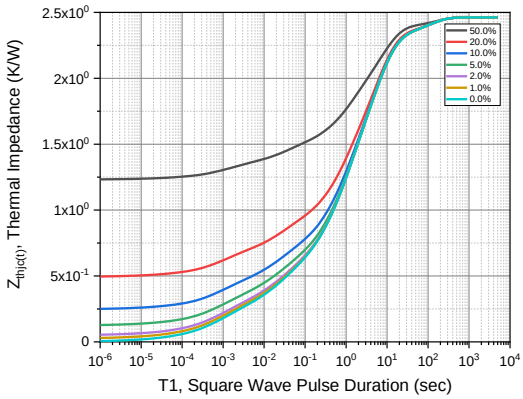
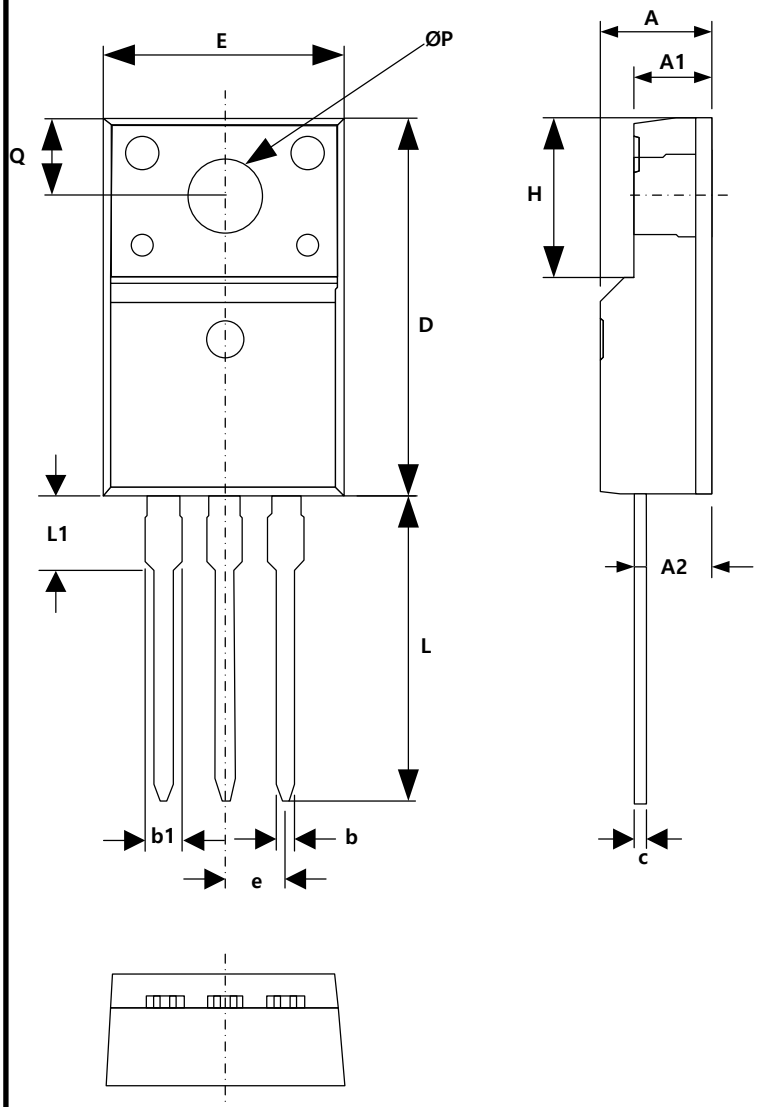


Figure 10. Transient thermal response curve

Package Outline



[Unit : mm]

SYMBOL	DIMENSIONS		NOTES
	MIN	MAX	
A	4.50	4.90	
A1	2.34	2.74	
A2	2.56	2.96	
b	0.70	0.90	
b1	1.27	1.47	
c	0.45	0.60	
D	15.67	16.07	
E	9.96	10.36	
e	2.54 BSC		
H	6.48	6.88	
L	12.68	13.28	
L1	3.03	3.43	
ϕP	3.08	3.28	
Q	3.20	3.40	