PSM10065HM

650V 10.6A 380mΩ Si Super junction MOSFET with Normal Diode

PowerCubeSemi, Inc.
Potential · Convergence · Smart

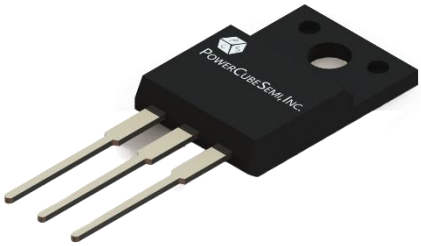
Features

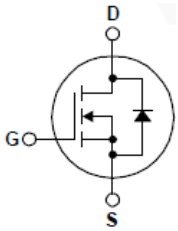
Si Super junction MOSFET

- Rated to 650V at 10.6Amps @T_J = 25℃
- Max $R_{DS(on)}$ = 380 mΩ
- Typ $R_{DS(on)}$ = 340 mΩ
- Gate Charge(Typ. Q_g=20.6 nC)
- Low power loss by high speed switching and low on-resistance
- 100% Avalanche Tested

Application

- PFC power supply stages
- Switching Applications
- Adapter





PKG type : TO-220F

Description

PSM10065HM is Power MOSFET using PowerCubeSemi's advanced Super Junction Technology that can realize very low on-resistance and gate charge. It will provide much high efficiency by using optimized charge coupling technology. These user friendly devices give an advantage of low EMI to designers as well as low switching loss.

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℃	10.6	A
I_{DM}	Pulsed Drain Current		31.8	A
V_{GS}	Gate-Source Voltage		±30	V
E_{AS}	Single Pulsed Avalanche Energy		215	mJ
P_d	Power Dissipation	T_C=25℃	30.5	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
PSM10065HM	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 = 250μA	650	-	-	V
I_{DSS}	Zero gate voltage drain current	V_{DS} = 650V, V_{GS} = 0V	-	-	1	μA
I_{GSS}	Gate-source leakage current	V_{GS} = ±30V, V_{DS} = 0V	-	-	±100	nA
$V_{GS(th)}$	Gate threshold voltage	V_{DS} =V_{GS}, I_D = 250μA	2	3	4	V
$R_{DS(ON)}$	Static drain-source on state resistance	V_{GS} = 10V, I_D = 3.2A	-	340	380	mΩ
$t_{d(on)}$	Turn-on Delay time	V_{DS} = 325 V, I_D = 10.6A, V_{GS} = 10 V, R_G = 25Ω	-	19	-	ns
T_r	Turn-on Rise time		-	38	-	
$t_{d(off)}$	Turn-off Delay time		-	108	-	
T_f	Turn-off Fall time		-	36	-	

Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
$R_{\theta JC}$	Thermal resistance, Junction to case		4.1	-	℃/W
R_g	Gate resistance	V_{GS} = 0V, f = 1.0㎒	19	-	Ω
C_{iss}	Input capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1.0㎒	763	-	pF
C_{oss}	Output capacitance		896	-	
C_{rss}	Reverse transfer capacitance		38.7	-	
$Q_{g(tot)}$	Total gate charge at 10V	V_{DS} = 520V, I_D = 10.6A V_{GS} = 10V	20.6	-	nC
Q_{gs}	Gate to source gate charge		5.3	-	
Q_{gd}	Gate to drain "Miller" charge		7.5	-	

Electrical Characteristics of Si Diode

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
I_S	Maximum continuous drain to source diode forward current		-	10.6	A
I_{SM}	Maximum pulsed drain to source diode forward current		-	31.8	A
V_{SD}	Drain to source diode forward voltage	I_{SD} = 10.6A, V_{GS} = 0V	-	1.4	V
T_{rr}	Reverse recovery time	I_{SD} = 10.6A, V_{DD} = 100V, dI_F/dt=100A/㎲	324	-	ns
Q_{rr}	Reverse recovery charge		3.8	-	μC
I_{rr}	Reverse recovery current		23.2	-	A

Typical Characteristics

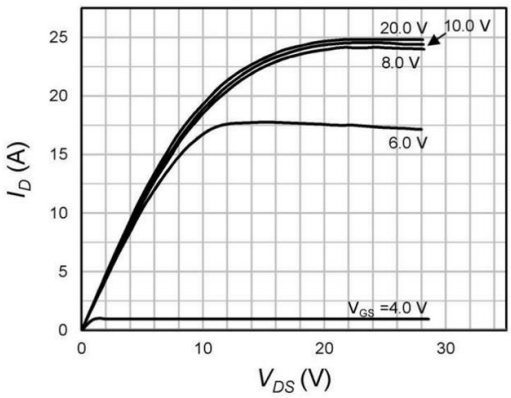


Figure 1. Output characteristics

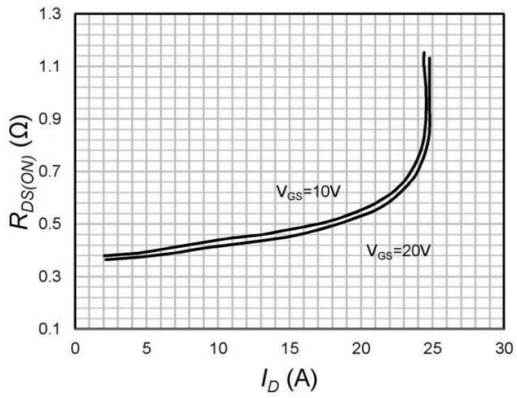


Figure 2. Drain-Source On-State Resistance vs. Drain Current

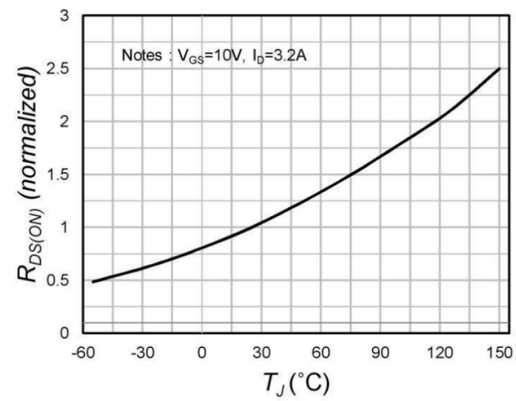


Figure 3. Drain-Source On-State Resistance (Normalized)

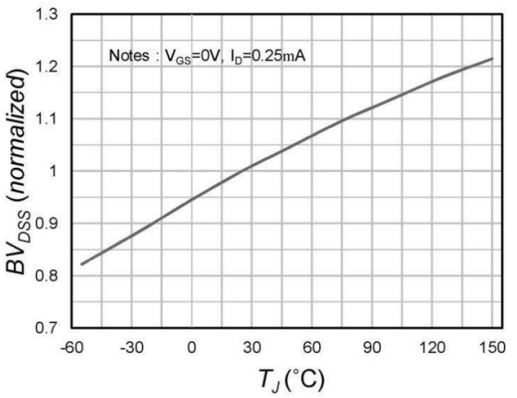


Figure 4. Drain-Source Breakdown Voltage (Normalized)

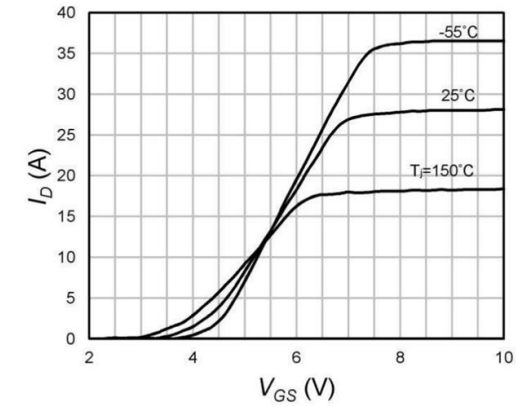


Figure 5. Transfer Characteristics

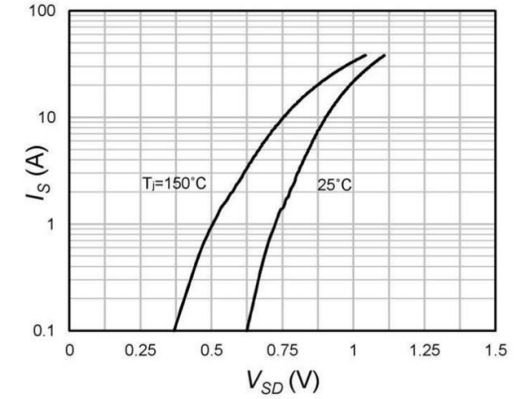


Figure 6. Forward Characteristics of Reverse Diode

Typical Characteristics

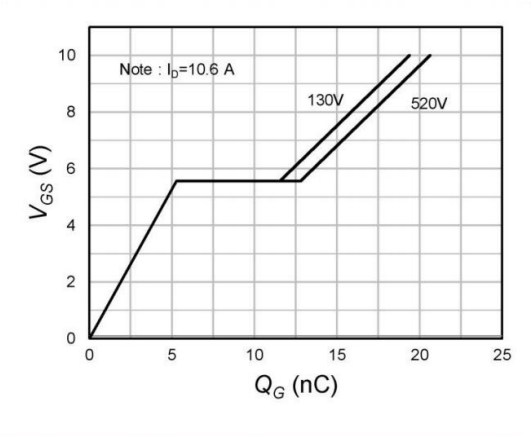


Figure 7. Gate charge

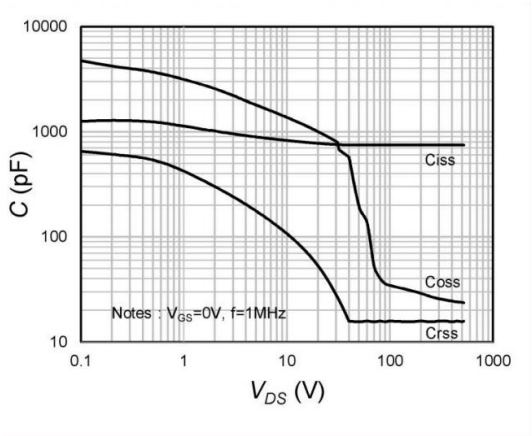


Figure 8. Capacitance

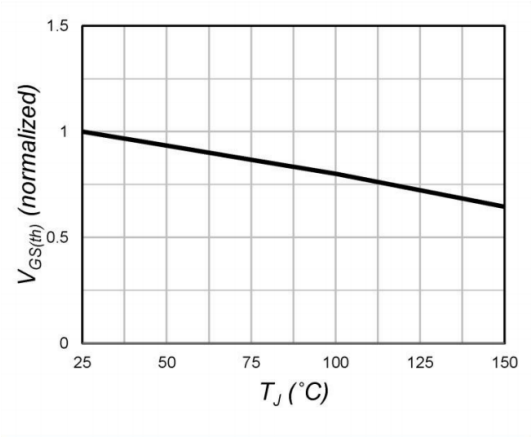


Figure 9. $V_{GS(TH)}$ Variation vs. Temperature (Normalized)

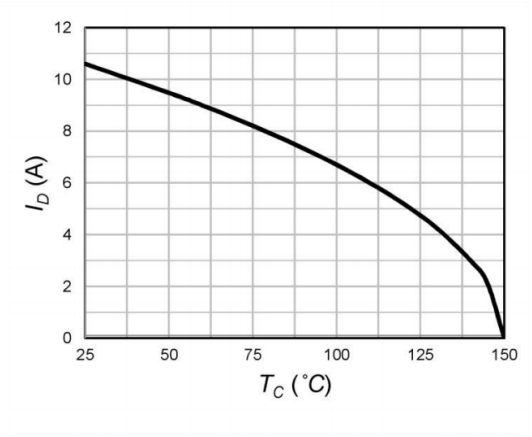


Figure 10. Maximum Drain current vs. Case temperature

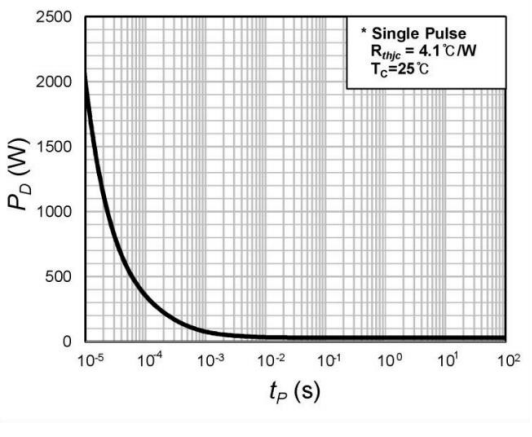


Figure 11. Power Dissipation

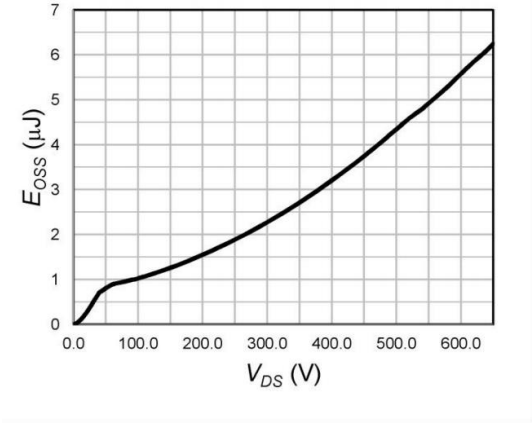


Figure 12. Output Capacitance stored energy

Typical Characteristics

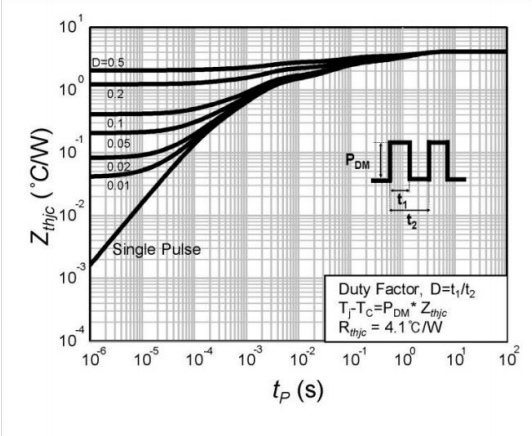


Figure 13. Transient thermal impedance

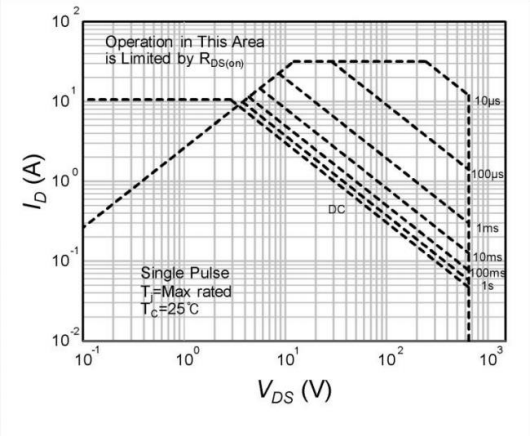
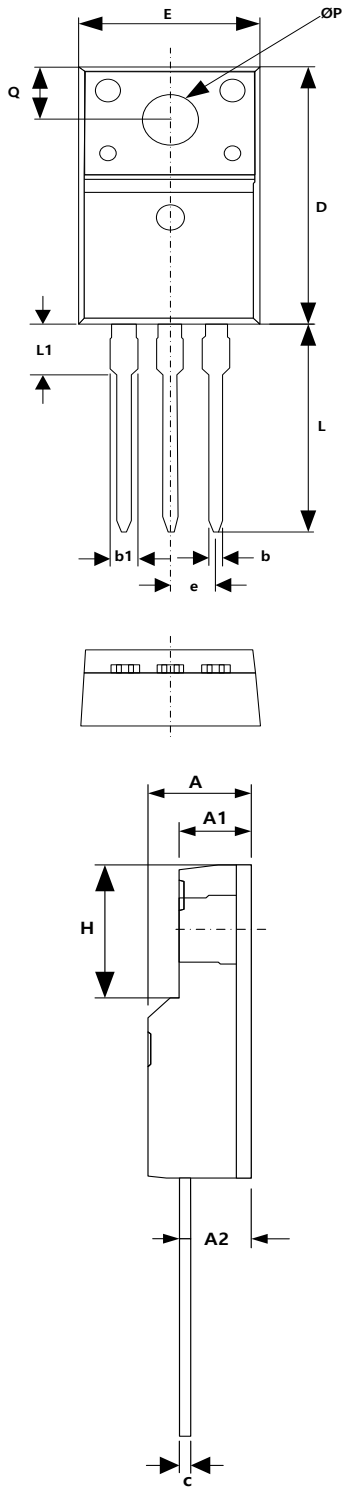


Figure 14. Safe operating area

Package Outline

Unit : mm



SYMBOL	DIMENSIONS			NOTES
	MIN	NOM	MAX	
A	4.60	4.70	4.80	
A1	2.44	2.54	2.64	
A2	2.15	2.45	2.75	
b	0.70	0.80	0.90	
b1	1.15	1.35	1.55	
c	0.50	0.60	0.70	
D	15.30	15.80	16.30	
E	9.90	10.10	10.30	
e	4.98	5.08	5.18	
H	6.40	6.60	6.80	
L	13.05	13.55	14.05	
L1	3.00	3.30	3.60	
ØP	3.00	3.20	3.40	
Q	3.10	3.30	3.50	