PSM05090CM

900V 5A 1490mΩ Si Super junction MOSFET with Normal Diode

PowerCubeSemi, Inc.
Potential · Convergence · Smart

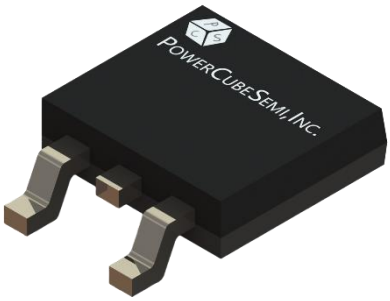
Features

Si Super junction MOSFET

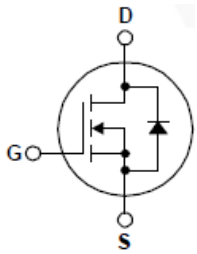
- Rated to 900V at 5Amps @T_J = 25℃
- Max $R_{DS(on)}$ = 1490 mΩ
- Typ $R_{DS(on)}$ = 1260 mΩ
- Gate Charge(Typ. Q_g=13.6 nC)
- Improved dv/dt Capability
- 100% Avalanche Tested

Application

- PFC Power Supply Stages
- Switching Applications
- Adapter



PKG type : DPAK



Halogen-Free

RoHS

Description

PSM05090CM 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	900	V
I_D	Drain Current	T_c=25℃	5	A
I_{DM}	Pulsed Drain Current	Pulse width limited by junction temperature	15	A
V_{GS}	Gate-Source Voltage		±30	V
E_{AS}	Single Pulsed Avalanche Energy		68	mJ
P_d	Power Dissipation	T_C=25℃	83	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
PSM05090CM	PSM05090	TO-252	Reel	-	-

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, T_J = 25°C	900	-	-	V
I_{DSS}	Zero gate voltage drain current	V_{DS} = 900V, 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 = 2.5A	-	1260	1490	mΩ
$t_{d(on)}$	Turn-on Delay time	V_{DS} = 450 V, I_D = 5A, V_{GS} = 10 V, R_G = 25Ω	-	14	-	ns
T_r	Turn-on Rise time		-	23	-	
$t_{d(off)}$	Turn-off Delay time		-	44	-	
T_f	Turn-off Fall time		-	21	-	

Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
$R_{\theta JC}$	Thermal resistance, Junction to case		1.5	-	℃/W
R_g	Gate resistance	V_{GS} = 0V, f = 1.0㎒	2.3	-	Ω
C_{iss}	Input capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1.0㎒	474	-	pF
C_{oss}	Output capacitance		438	-	
C_{rss}	Reverse transfer capacitance		14	-	
$Q_{g(tot)}$	Total gate charge at 10V	V_{DS} = 720V, I_D = 5A $V_{GS(on)}$ = 10V	13.6	-	nC
Q_{gs}	Gate to source gate charge		3.4	-	nC
Q_{gd}	Gate to drain "Miller" charge		5.8	-	nC

Electrical Characteristics of Si Diode

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
I_S	Maximum continuous drain to source diode forward current		-	5	A
I_{SM}	Maximum pulsed drain to source diode forward current		-	15	A
V_{SD}	Drain to source diode forward voltage	I_{SD} = 5A, V_{GS} = 0V	-	1.4	V
T_{rr}	Reverse recovery time	I_{SD} = 5A, V_{DD} = 100V, dI_F/dt=100A/㎲	486	-	ns
Q_{rr}	Reverse recovery charge		2.5	-	μC

Typical Characteristics

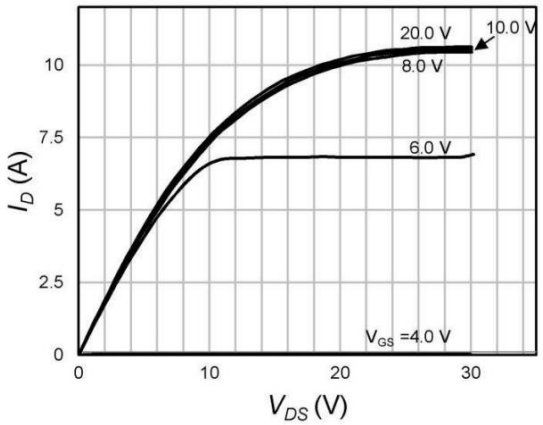


Figure 1. Output Characteristics

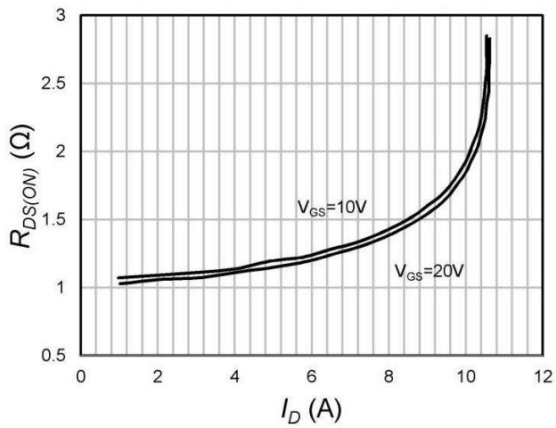


Figure 2. Drain-Source On-State Resistance vs. Drain Current

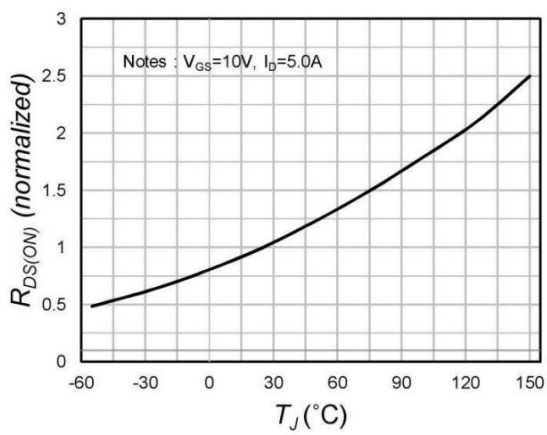


Figure 3. Drain-Source On-State Resistance (Normalized)

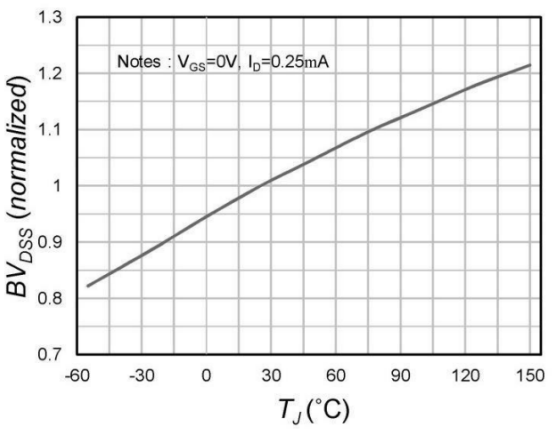


Figure 4. Drain-Source Breakdown Voltage (Normalized)

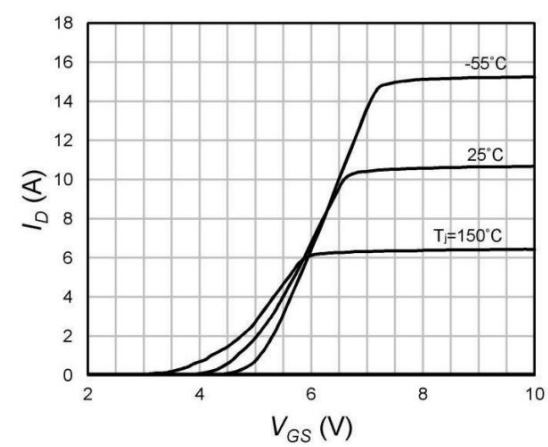


Figure 5. Transfer Characteristics

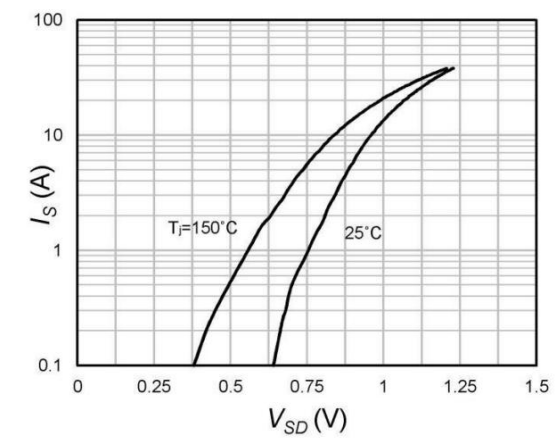


Figure 6. Forward Characteristics Of Reverse Diode

Typical Characteristics

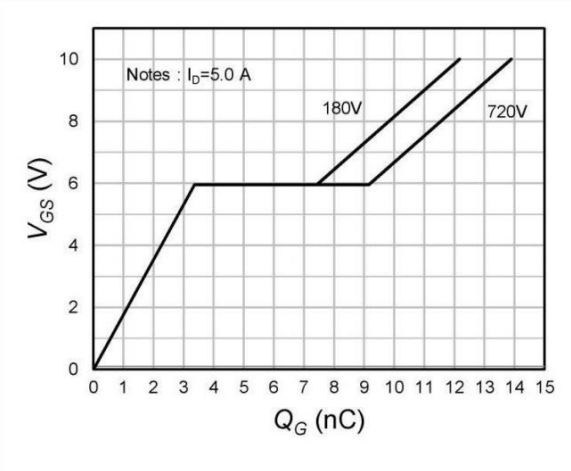


Figure 7. Gate Charge

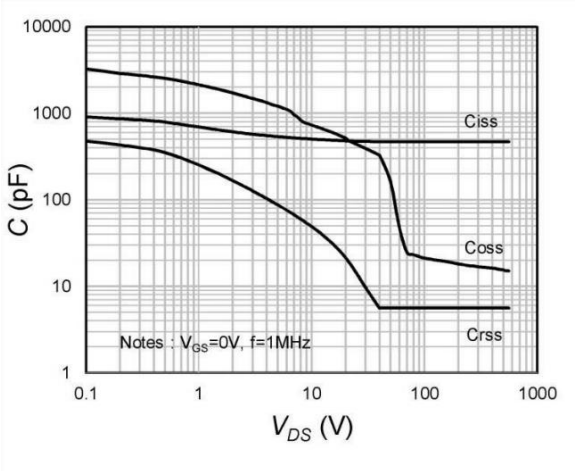


Figure 8. Capacitance Characteristics

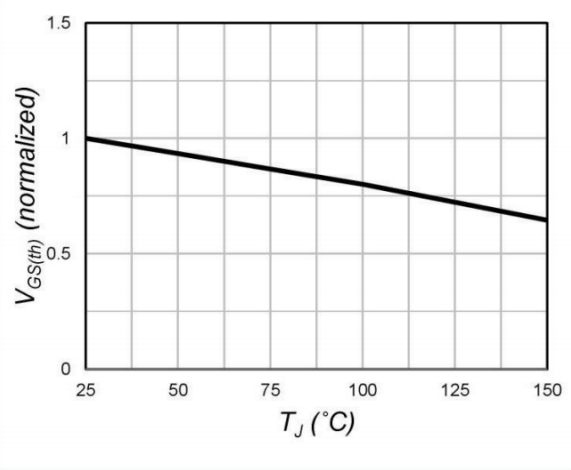


Figure 9. $V_{GS(TH)}$ variation vs. Temperature (Normalized)

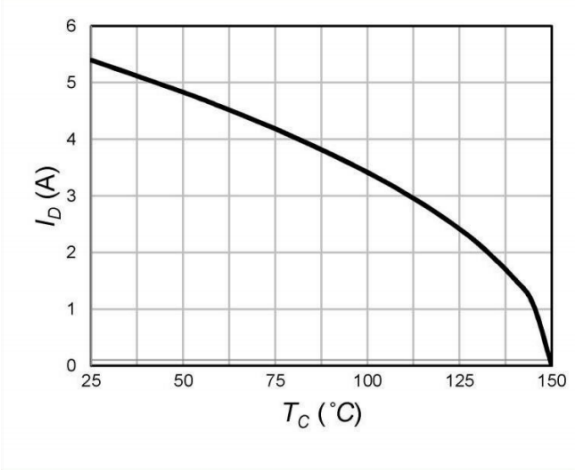


Figure 10. Maximum Drain Current vs. Case Temperature

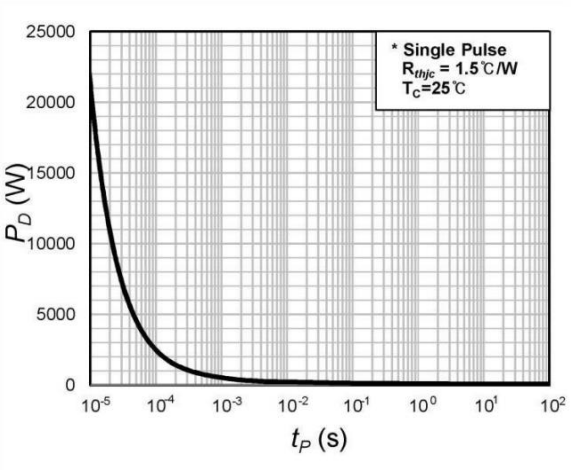


Figure 11. Power Dissipation

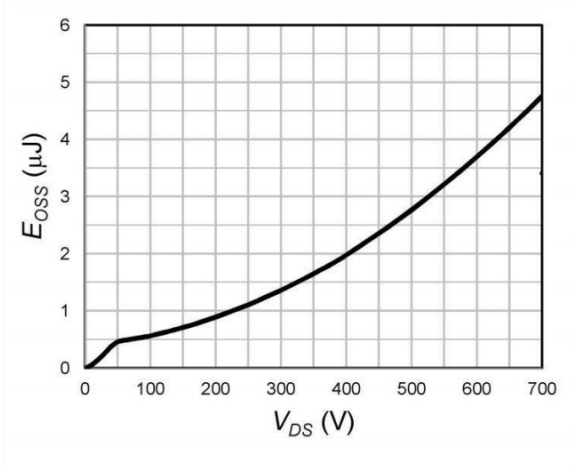


Figure 12. Output Capacitance stored energy

Typical Characteristics

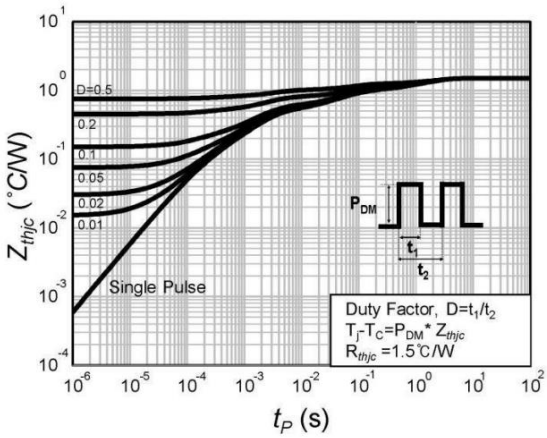


Figure 13. Transient thermal impedance

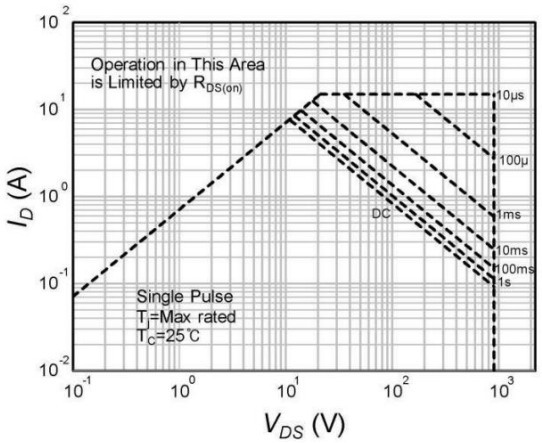
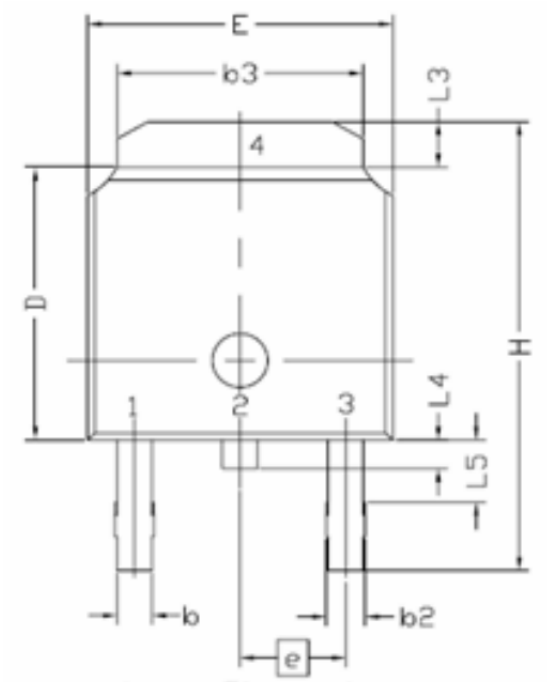
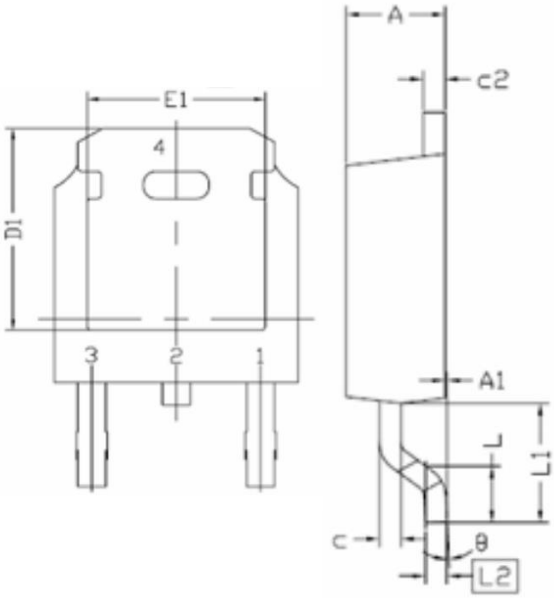


Figure 14. Safer operating area

Package Outline

Unit : mm





SYMBOL	DIMENSIONS			NOTES
	MIN	NOM	MAX	
E	6.34	6.54	6.74	
L	1.30	1.60	1.90	
L1	2.60	2.90	3.20	
L2	0.5 BSC			
L3	0.82	1.02	1.22	
L4	0.80	1.00	1.20	
L5	2.60	2.90	3.20	
D	5.80	6.10	6.40	
H	8.40	9.00	9.60	
b	1.42	1.52	1.62	
b2	2.35	2.55	2.75	
b3	5.20	5.30	5.40	
e	4.58 BSC			
A	2.08	2.28	2.48	
A1	0.00	0.15	-	
c	0.40	0.50	0.60	
c2	0.40	0.50	0.60	
D1	-	5.25	-	
E1	-	4.8	-	
θ	0.00°	10.00°		