PM005N135AM

135V 120A 5mΩ Single N channel Trench MOSFET with Normal Diode

PowerCubeSemi, Inc.
Potential · Convergence · Smart

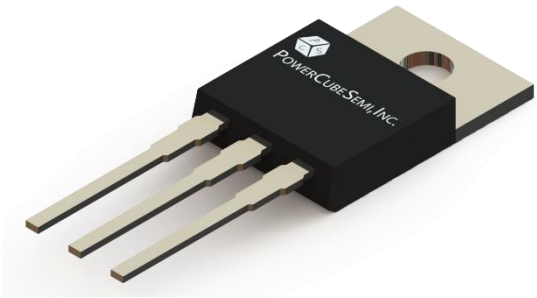
Features

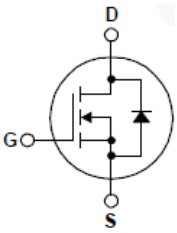
Si Single N channel Trench MOSFET

- Rated to 135V at 120Amps @T_J = 25℃
- Max $R_{DS(on)}$ = 5.0 mΩ
- Typ $R_{DS(on)}$ = 4.2 mΩ
- Gate Charge(Typ. Q_g=123 nC)
- 100% UIL Tested
- 100% Rg Tested

Application

- Low Power drives of E-bike
- Light Electric vehicles
- DC/DC Converter
- General purpose applications





PKG type : TO-220

Description

PM005N135AM, PowerCubeSemi's latest generation of middle voltage MOSFET technology, which provides high performance in the lowest Rds(on), fast switching performance, and excellent quality. These devices can also be utilized in industrial applications such as low power drivers of E-bike, light electric vehicles, DC/DC converter, and general purpose applications.

Absolute Maximum Ratings

Symbol	Parameter	Test Condition	Value	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	135	V
I_D	Drain Current	T_c=25℃	120	A
I_{DM}	Pulsed Drain Current	Pulse width limited by junction temperature	480	A
V_{GS}	Gate-Source Voltage		±20	V
E_{AS}	Single Pulsed Avalanche Energy	I_{AS}=30A, V_{GS}=10V, L=1.0mH	450	mJ
P_d	Power Dissipation	T_C=25℃	375	W
T_j	Operating Junction Temperature		175	℃
T_{stg}	Storage Temperature		-55 to 175	℃

Package Marking and Ordering Information

Device Marking	Device	Package	Packing Method	Tape width	Quantity
PM005N135AM	PM005N135	TO-220	Tube	-	-

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	135	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 135V, V_{GS} = 0V	-	-	1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS} = ±20V, V_{DS} = 0V	-	-	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} =V_{GS}, I_D = 250μA	2.5	-	3.9	V
$R_{DS(ON)}$	Static Drain-Source on state resistance	V_{GS} = 10V, I_D = 50A	-	4.2	5.0	mΩ
g_{FS}	Forward Transconductance	V_{DS} =10V, I_D = 50A	-	122	-	S
$t_{d(on)}$	Turn-on Delay time	V_{DS} = 70 V, I_D = 50A, V_{GS} = 10 V, R_G = 3Ω	-	36	-	ns
T_r	Turn-on Rise time		-	21	-	
$t_{d(off)}$	Turn-off Delay time		-	83	-	
T_f	Turn-off Fall time		-	13	-	

Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
$R_{\theta JC}$	Thermal resistance, Junction to case		0.4	-	℃/W
R_g	Gate resistance	V_{GS} = 0V, f = 1.0㎒	3	-	Ω
C_{iss}	Input capacitance	V_{DS} = 70V, V_{GS} = 0V, f = 1.0㎒	9267	-	pF
C_{oss}	Output capacitance		923	-	
C_{rss}	Reverse transfer capacitance		27	-	
$Q_{g(tot)}$	Total gate charge at 10V	V_{DS} = 70V, I_D = 50A $V_{GS(on)}$ = 10V	123	-	nC
Q_{gs}	Gate to source gate charge		41	-	
Q_{gd}	Gate to drain "Miller" charge		22	-	

Electrical Characteristics of Si Diode

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
I_S	Maximum continuous drain to source diode forward current		-	120	A
I_{SM}	Maximum pulsed drain to source diode forward current		-	480	A
V_{SD}	Drain to source diode forward voltage	I_S = 50A, V_{GS} = 0V	0.9	1.2	V
T_{rr}	Reverse recovery time	I_F = 50A, V_{GS} = 0V, dI_F/dt=125A/㎲	117	-	ns
Q_{rr}	Reverse recovery charge		538	-	nC

Typical Characteristics

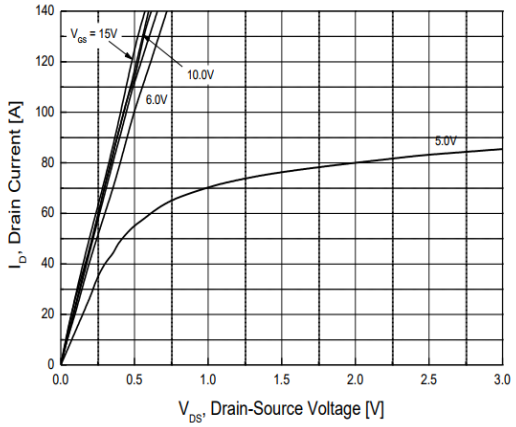


Figure 1. On-Region Characteristics

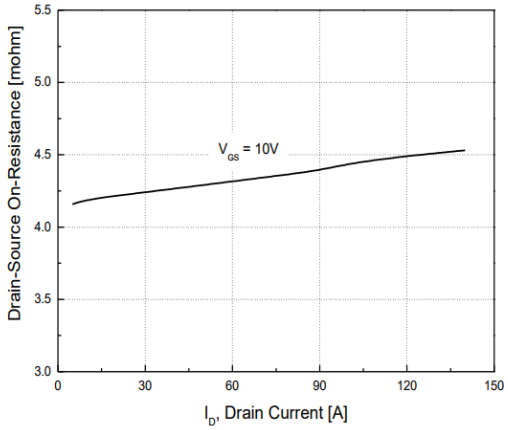


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage

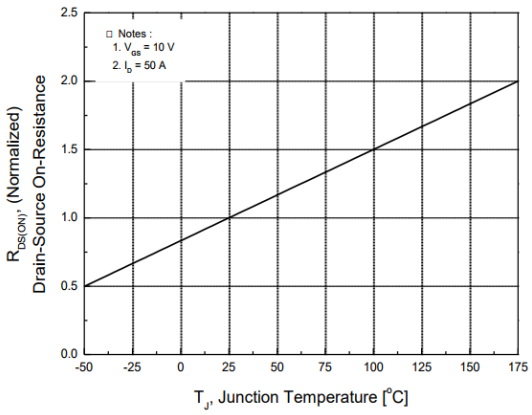


Figure 3. On Resistance Variation with Temperature

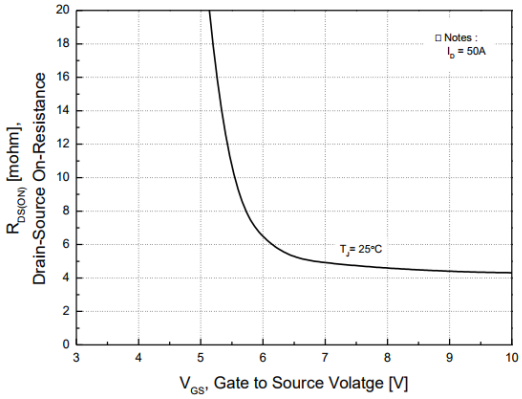


Figure 4. On-Resistance Variation with Gate to Source Voltage

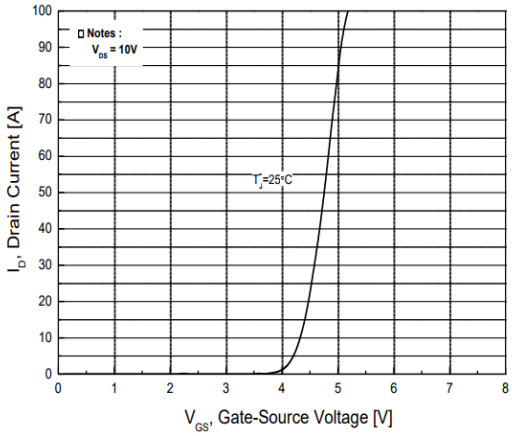


Figure 5. Transfer Characteristics

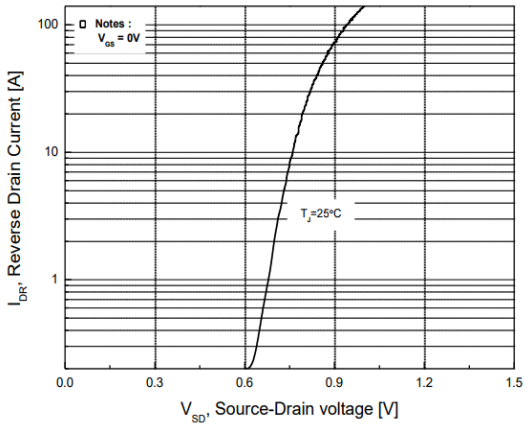


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

Typical Characteristics

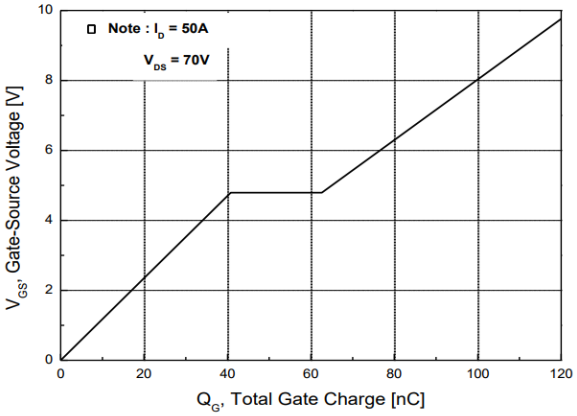


Figure 7. Gate Charge Characteristics

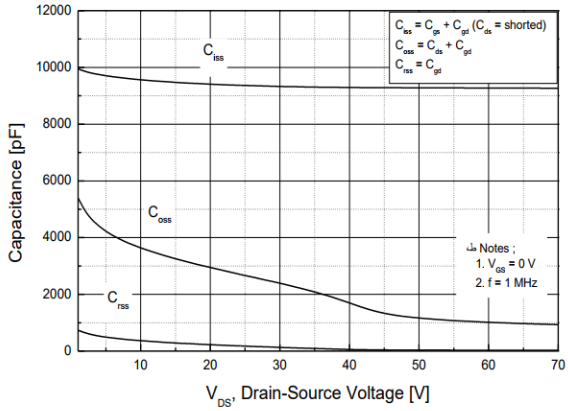


Figure 8. Capacitance Characteristics

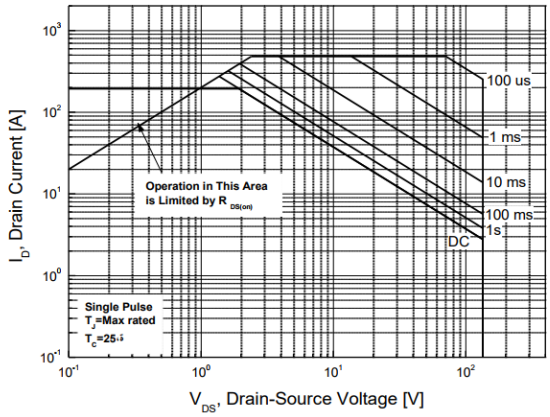


Figure 9. Maximum Safe Operating Area

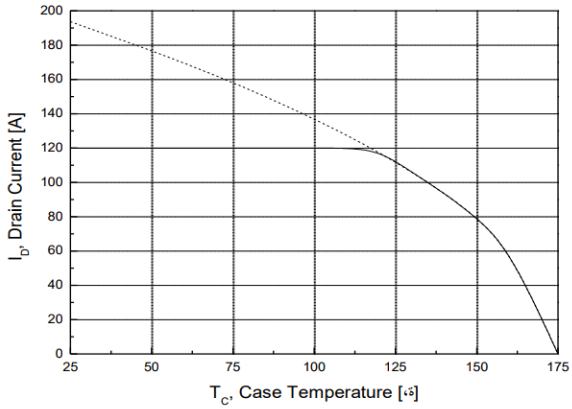


Figure 10. Maximum Drain Current vs. Case Temperature

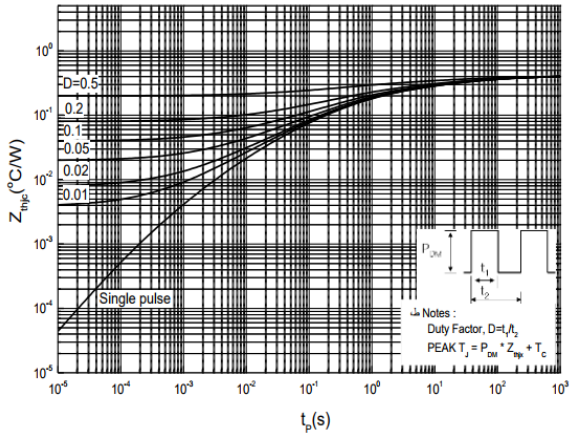


Figure 11. Transient Thermal Response Curve

Package Outline

Unit : mm