

PM004N100DM

100V 120A 4.4mΩ Si Single N-channel Trench MOSFET with Normal Diode

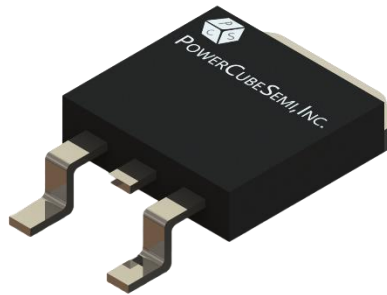
Features

Si Single N-channel Trench MOSFET

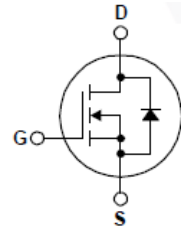
- Rated to 100V at 120Amps @ $T_j = 25^\circ\text{C}$
- Max $R_{DS(on)}$ = 4.4 mΩ
- Typ $R_{DS(on)}$ = 3.7 mΩ
- Gate Charge(Typ. $Q_g=115$ nC)
- 100% UIL Tested

Application

- Electric Vehicles
- DC/DC Converter
- General purpose



PKG type : TO-263(D2PAK)



Description

PM004N100DM uses advanced PowerCubeSemi's MV MOSFET Technology, which provides high performance in on-state resistance, fast switching performance, and excellent quality. These devices can also be utilized in industrial applications such as low power drives of E-bike (E-Vehicles), DC/DC converter, and general purpose applications.

Absolute Maximum Ratings

Symbol	Parameter	Test Condition	Value	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	100	V
I_D	Drain Current	$T_c=25^\circ\text{C}$	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	$I_{AS}=28A, V_{GS}=10V, L=1.0mH$	392	mJ
P_d	Power Dissipation	$T_c=25^\circ\text{C}$	223	W
T_j	Operating Junction Temperature		150	$^\circ\text{C}$
T_{stg}	Storage Temperature		-55 to 150	$^\circ\text{C}$



Package Marking and Ordering Information

Device Marking	Device	Package	Packing Method	Tape width	Quantity
PM004N100DM	PM004N100	TO-263	Reel	-	

Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical			Unit
			Min	Typ.	Max.	
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A, T_J = 25^\circ C$	100	-	-	V
I_{DSS}	Zero gate voltage drain current	$V_{DS} = 80V, V_{GS} = 0V$	-	-	1	μA
I_{GSS}	Gate-source leakage current	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 100	nA
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	2.9	4.0	V
$R_{DS(ON)}$	Static drain-source on state resistance	$V_{GS} = 10V, I_D = 50A$	-	3.7	4.4	m Ω
g_{FS}	Forward transconductance	$V_{DS} = 10V, I_D = 50A$	-	140	-	S
$t_{d(on)}$	Turn-on Delay time	$V_{DS} = 50V, I_D = 50A, V_{GS} = 10V, R_G = 3\Omega$	-	30	-	ns
T_r	Turn-on Rise time		-	20	-	
$t_{d(off)}$	Turn-off Delay time		-	99	-	
T_f	Turn-off Fall time		-	37	-	



Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
$R_{\theta JC}$	Thermal resistance, Junction to case		0.56	-	$^{\circ}C/W$
R_g	Gate resistance	$V_{GS} = 0V, f = 1.0MHz$	2.5	-	Ω
C_{iss}	Input capacitance	$V_{DS} = 4V, V_{GS} = 0V, f = 1.0MHz$	7300	-	pF
C_{oss}	Output capacitance		1360	-	
C_{rss}	Reverse transfer capacitance		50	-	
$Q_{g(tot)}$	Total gate charge at 10V	$V_{DS} = 50V, I_D = 50A, V_{GS(on)} = 10V$	115	-	nC
Q_{gs}	Gate to source gate charge		28	-	
Q_{gd}	Gate to drain "Miller" charge		26	-	

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	$I_F = 50A, V_{GS} = 0V, di_F/dt = 100A/\mu s$	73	-	ns
Q_{rr}	Reverse recovery charge		150	-	nC

Typical Characteristics

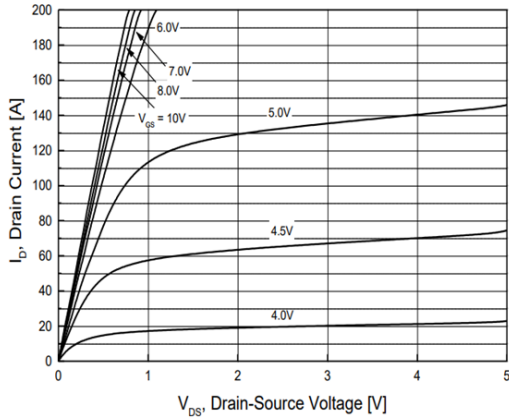


Figure 1. On-Region Characteristics

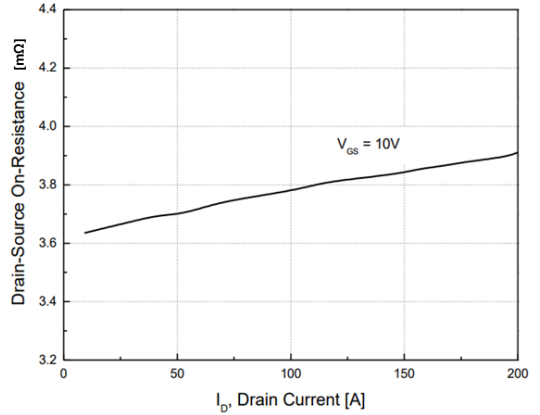


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage

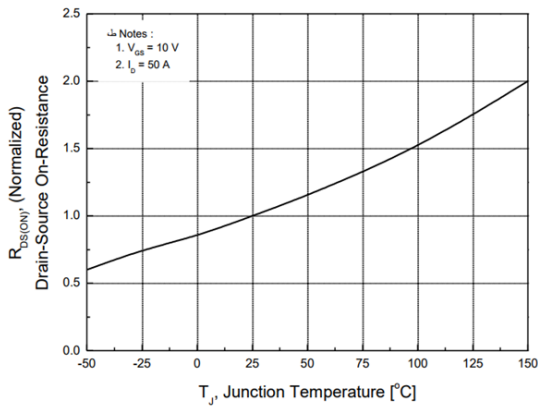


Figure 3. On Resistance Variation with Temperature

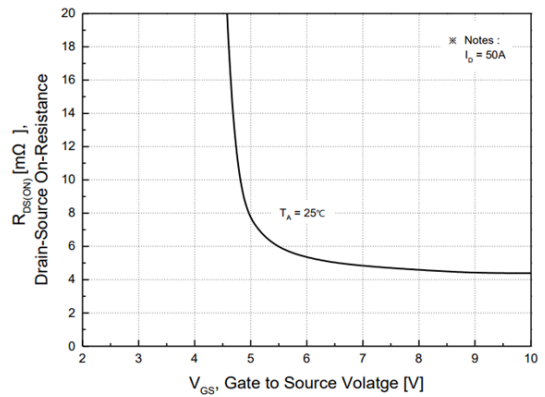


Figure 4. On-Resistance Variation with Gate to Source Voltage

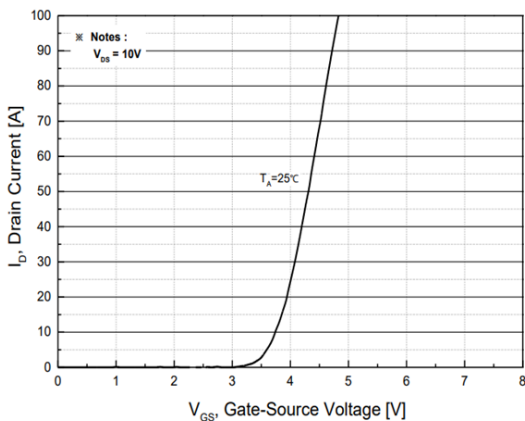


Figure 5. Transfer Characteristics

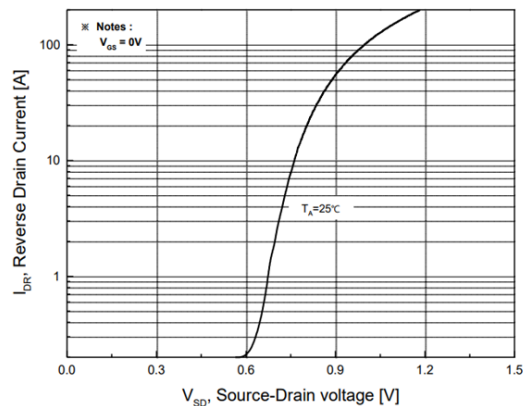


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

Typical Characteristics

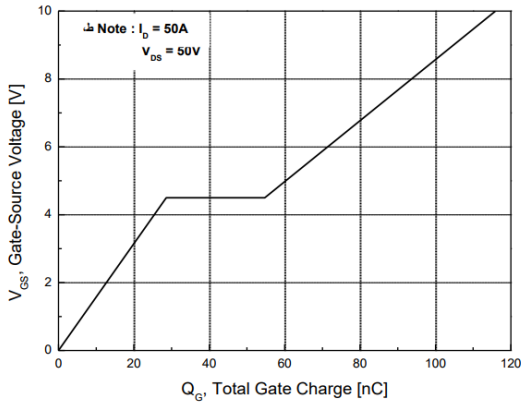


Figure 7. Gate Charge Characteristics

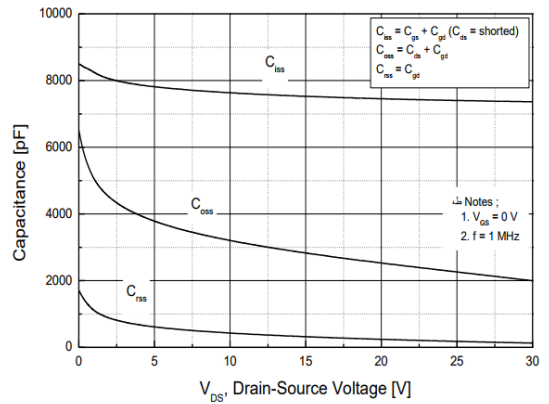


Figure 8. Capacitance Characteristics

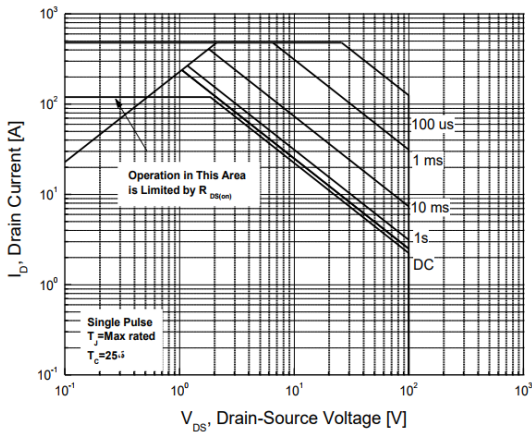


Figure 9. Maximum Safe Operating Area

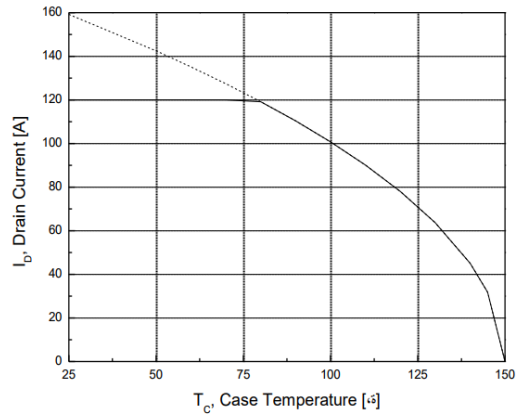


Figure 10. Maximum Drain Current vs. Case Temperature

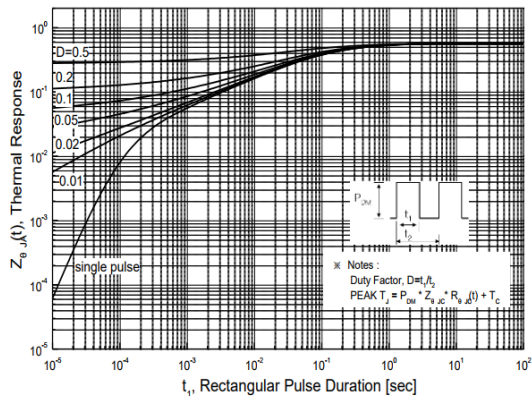
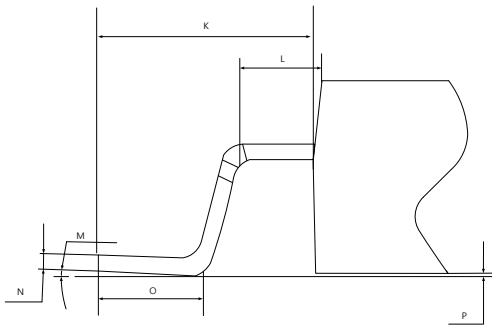
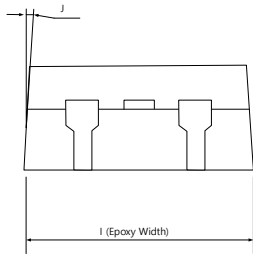
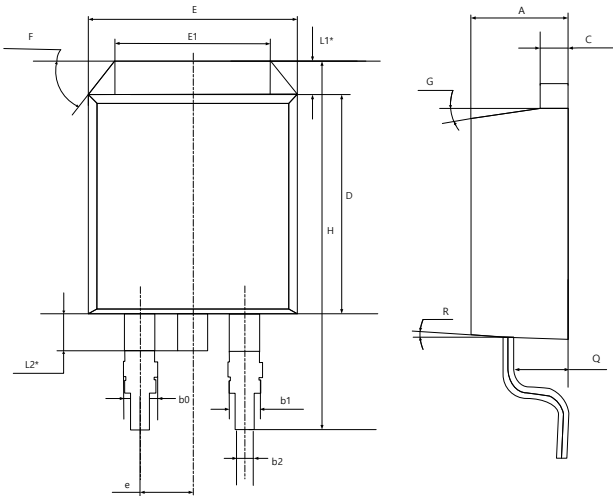


Figure 11. Transient Thermal Response Curve

Package Outline

Unit : mm



SYMBOL	DIMENSIONS			NOTES
	MIN	NOM	MAX	
A	4.40	4.60	4.80	
b0	1.17	1.37	1.57	
b1	1.17	1.27	1.37	
b2	0.70	0.80	0.90	
C	1.17	1.27	1.37	
D	8.50	8.70	8.90	
E	9.80	10.00	10.20	
E1	6.50	-	-	
e	2.44	2.54	2.64	
F	-	30° (Ref)	-	
G	-	7.0°	-	
H	15.00	15.30	15.60	
I	9.80	10.00	10.20	
J	-	3.0°	-	
K	5.00	5.30	5.60	
L	1.80	2.00	2.20	
L1	1.07	1.27	1.47	
L2	1.20	1.50	1.80	
M	0.0°	-	8.0°	
N	0.30	0.45	0.60	
O	2.34	2.54	2.74	
P	0	-	0.25	
Q	2.37	2.67	2.97	
R	-	7.0°	-	