

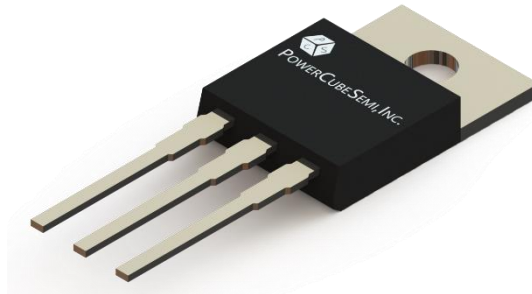
PM002N040AM

40V 120A 2.3mΩ Si Single N-Channel Trench MOSFET with Normal Diode

Features

Si Single N-channel Trench MOSFET

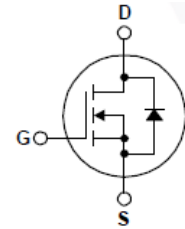
- Rated to 40V at 120Amps @ $T_J = 25^\circ\text{C}$
- Max $R_{DS(on)} = 2.3\text{ m}\Omega$
- Typ $R_{DS(on)} = 1.9\text{ m}\Omega$
- Gate Charge(Typ. $Q_g = 88.3\text{ nC}$)
- 100% UIL Tested
- 100% Rg Tested



PKG type : TO-220

Application

- Server
- General Purpose



Description

PM002N040AM uses advanced PowerCubeSemi's MOSFET technology, which provides high performance in on-state resistance, fast switching performance and excellent quality. PM002N040AM is suitable device for Synchronous Rectification for Server and general purpose applications.

Absolute Maximum Ratings

Symbol	Parameter	Test Condition	Value	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	40	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	$I_{AS}=18A, V_{GS}=10V, L=1.0mH, T_J=25^\circ\text{C}$	162	mJ
P_d	Power Dissipation	$T_c=25^\circ\text{C}$	138.9	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
PM002N040AM	PM002N040	TO-220	Tube	-	50 unit

Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical			Unit
			Min	Typ.	Max.	
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A, T_J = 25^\circ C$	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 32V, V_{GS} = 0V$	-	-	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	-	4	V
$R_{DS(ON)}$	Static Drain-Source on state resistance	$V_{GS} = 10V, I_D = 50A$	-	1.9	2.3	m Ω
g_{FS}	Forward Transconductance	$V_{DS} = 10V, I_D = 50A$	-	111	-	S
$t_{d(on)}$	Turn-on Delay time	$V_{DS} = 20V, I_D = 50A, V_{GS} = 10V, R_G = 3\Omega$	-	24.3	-	ns
T_r	Turn-on Rise time		-	14.7	-	
$t_{d(off)}$	Turn-off Delay time		-	84.8	-	
T_f	Turn-off Fall time		-	42.7	-	



Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
$R_{\theta JC}$	Thermal resistance, Junction to case		0.9	-	$^{\circ}\text{C}/\text{W}$
R_g	Gate resistance	$V_{GS} = 0\text{V}, f = 1.0\text{MHz}$	3.0	-	Ω
C_{iss}	Input capacitance	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$	5755	-	pF
C_{oss}	Output capacitance		1830	-	
C_{rss}	Reverse transfer capacitance		203.3	-	
$Q_{g(\text{tot})}$	Total gate charge at 10V	$V_{DS} = 20\text{V}, I_D = 50\text{A}$ $V_{GS(\text{on})} = 10\text{V}$	88.3	-	nC
Q_{gs}	Gate to source gate charge		22.9	-	
Q_{gd}	Gate to drain "Miller" charge		16.5	-	

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	$I_{SD} = 50\text{A}, V_{GS} = 0\text{V}$	0.9	1.2	V
T_{rr}	Reverse recovery time	$I_F = 50\text{A}, dl/dt = 100\text{A}/\mu\text{s}$	55.7	-	ns
Q_{rr}	Reverse recovery charge		82	-	nC

Typical Characteristics

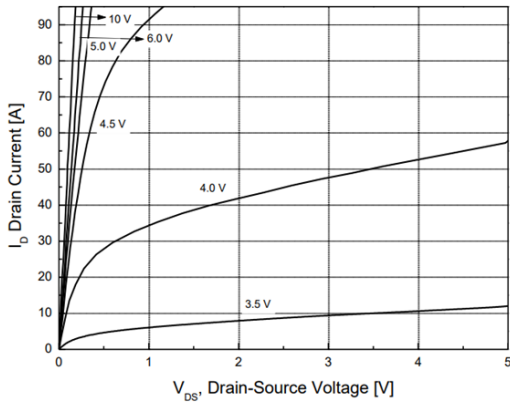


Figure 1. On-Region Characteristics

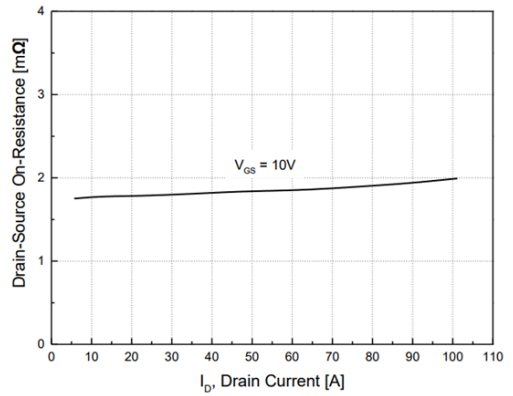


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage

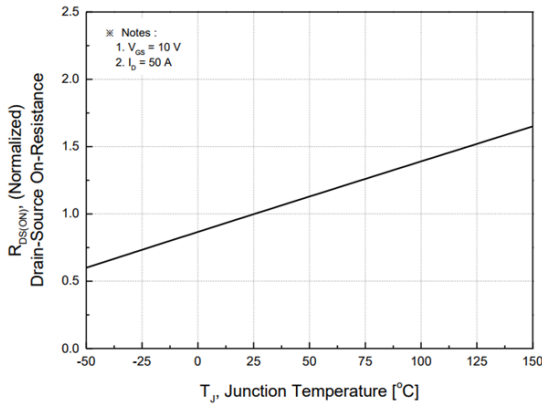


Figure 3. On-Resistance Variation with Temperature

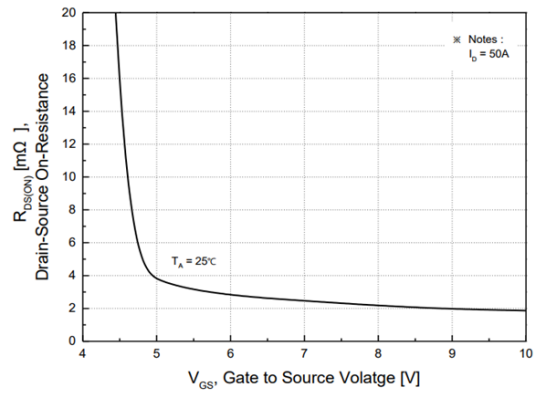


Figure 4. On-Resistance Variation with Gate to Source Voltage

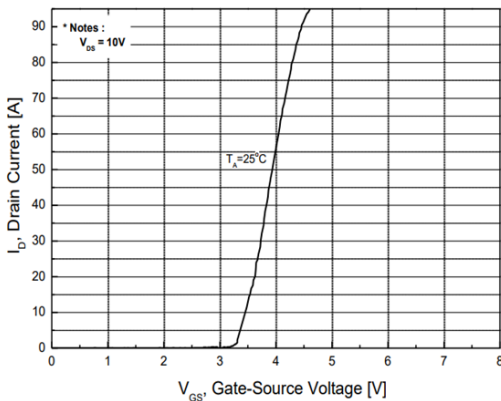


Figure 5. Transfer Characteristics

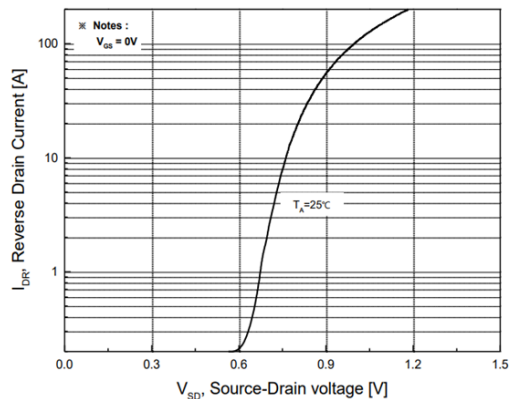


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

Typical Characteristics

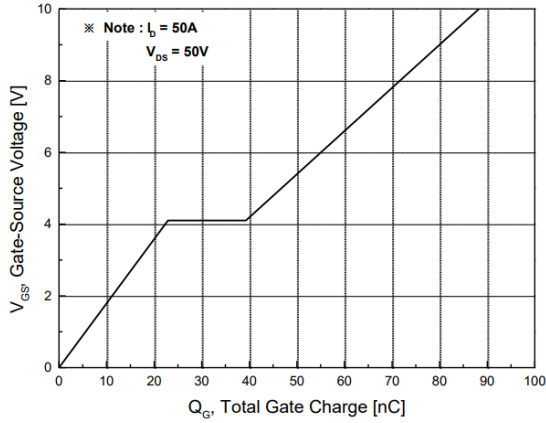


Figure 7. Gate Charge Characteristics

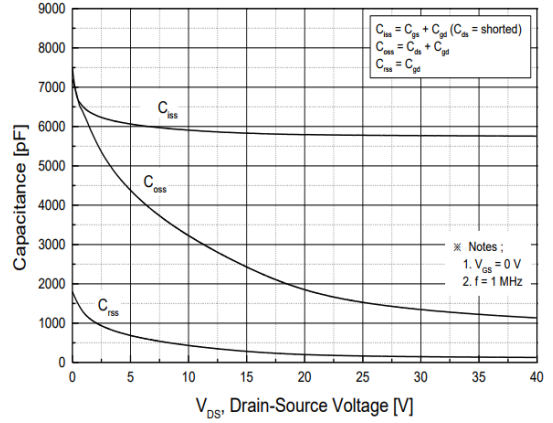


Figure 8. Capacitance Characteristics

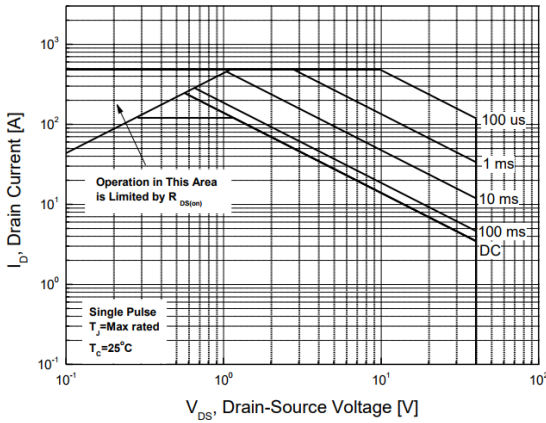


Figure 9. Maximum Safe Operating Area

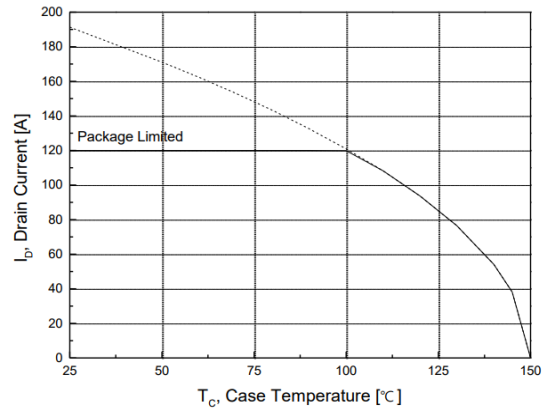


Figure 10. Maximum Drain Current vs. Case Temperature

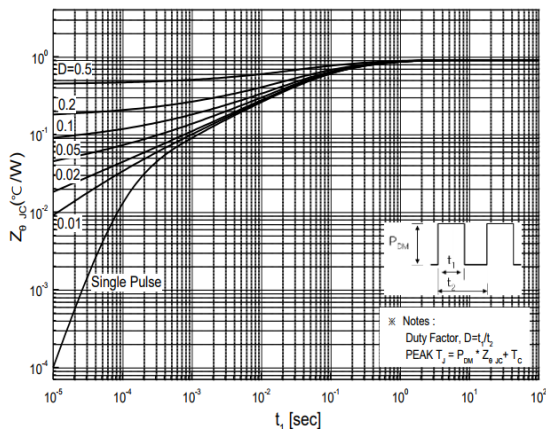


Figure 11. Transient Thermal Response Curve



Package Outline

Unit : mm

