PM004N040AG

POWERCUBESEMI, INC.
Potential · Convergence · Smart

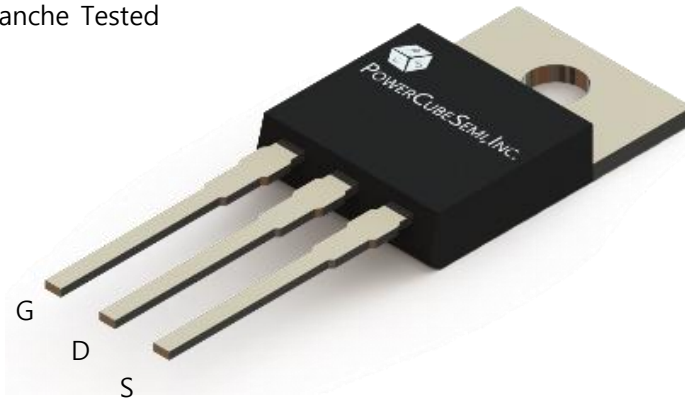**40V 110A 4mΩ Si Single N-ch Enhancement Mode Power MOSFET with Normal Diode**

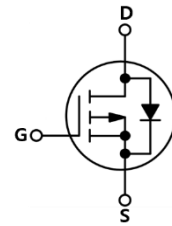## Features

Si Single N-ch Enhancement Mode Power MOSFET

- Rated to 40V at 110Amps @T_J = 25℃
- Max $R_{DS(on)}$ = 4.0 mΩ
- Typ $R_{DS(on)}$ = 2.5 mΩ
- Gate Charge(Typ. Q_g=50 nC)
- 100% Avalanche Tested

Application

- Power switch
- DC/DC Converter

PKG type : TO-220

Halogen-Free

RoHS

Description

The PM004N040AG uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. it can be used in a wide variety of applications.

Absolute Maximum Ratings

Symbol	Parameter	Test Condition	Value	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	40	V
I_D	Drain Current	T_c=25℃	110	A
I_{DM}	Pulsed Drain Current	Pulse width limited by junction temperature	440	A
V_{GS}	Gate-Source Voltage		±20	V
E_{AS}	Single Pulsed Avalanche Energy	V_{DD}=40V, V_{GS}=10V, L=0.5mH, R_G=25Ω	90	mJ
P_d	Power Dissipation	T_C=25℃	160	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
PM004N040AG	PM004N040	TO-220	TUBE	-	50

Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical			Unit
			Min	Typ.	Max.	
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V$, $I_D = 250\mu A$, $T_J = 25°C$	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 40V$, $V_{GS} = 0V$	-	-	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS} = \pm20V$, $V_{DS} = 0V$	-	-	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = 250\mu A$	1.0	1.5	2.5	V
$R_{DS(ON)}$	Static Drain-Source on state resistance	$V_{GS} = 10V$, $I_D = 10A$	-	2.5	4.0	$m\Omega$
g_{FS}	Forward Transconductance	$V_{DS} = 5V$, $I_D = 10A$	-	28	-	S
$t_{d(on)}$	Turn-on Delay time	$V_{DD} = 20$ V, $I_D = 10A$, $R_G = 6\Omega$	-	20	-	ns
T_r	Turn-on Rise time		-	9	-	
$t_{d(off)}$	Turn-off Delay time		-	30	-	
T_f	Turn-off Fall time		-	12	-	

Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
$R_{\theta JC}$	Thermal Resistance, Junction to Case		0.78	-	℃/W
C_{iss}	Input Capacitance	V_{DS} = 20V, V_{GS} = 0V, f = 1.0㎒	2303	-	pF
C_{oss}	Output Capacitance		435	-	
C_{rss}	Reverse Transfer Capacitance		427	-	
$Q_{g(tot)}$	Total Gate Charge at 10V	V_{DD} = 20V, I_D = 10A $V_{GS(on)}$ = 10V	50	-	nC
Q_{gs}	Gate to Source Gate Charge		6	-	
Q_{gd}	Gate to Drain "Miller" Charge		13	-	

Electrical Characteristics of Si Diode

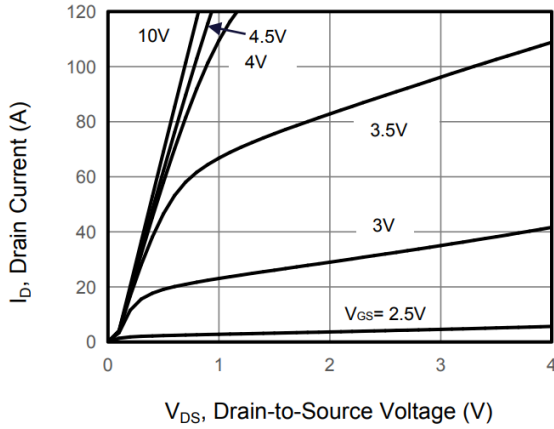| Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	110	A
V_{SD}	Drain to Source Diode Forward Voltage	I_S = 10A, V_{GS} = 0V	-	1.2	V
T_{rr}	Reverse Recovery Time	I_F = 10A, V_{GS} = 0V, dI_F/dt=100A/㎲	75	-	ns
Q_{rr}	Reverse Recovery Charge		50	-	nC

Typical Characteristics
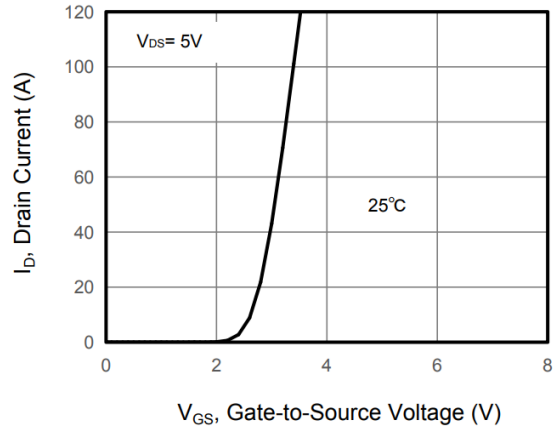

Figure 1. Output Characteristics

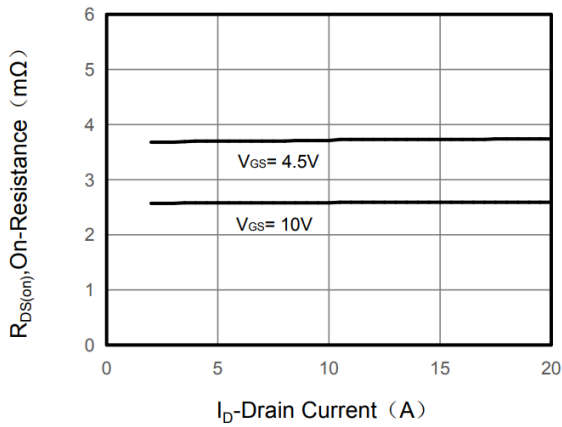Figure 2. Transfer Characteristics

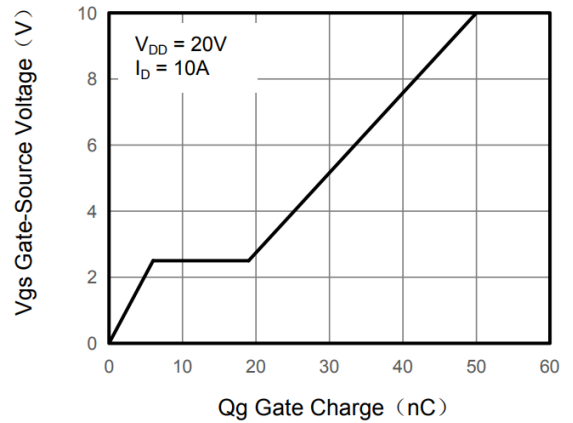Figure 3. Drain to Source On-Resistance
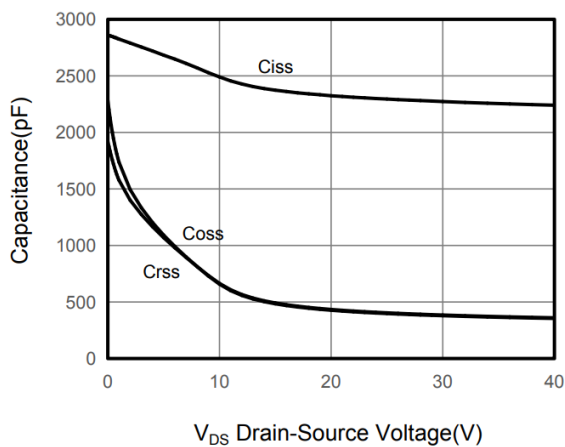

Figure 4. Gate Charge

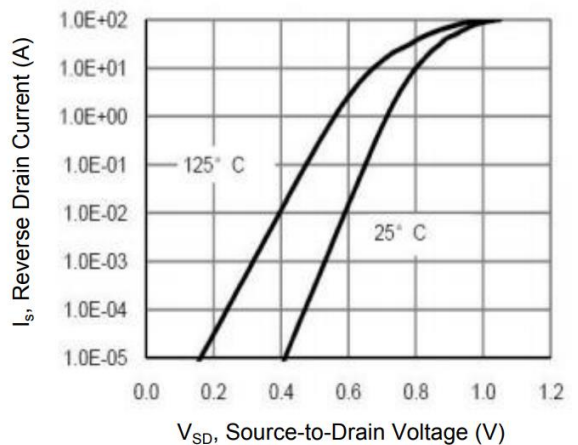

Figure 5. Capacitance Characteristics

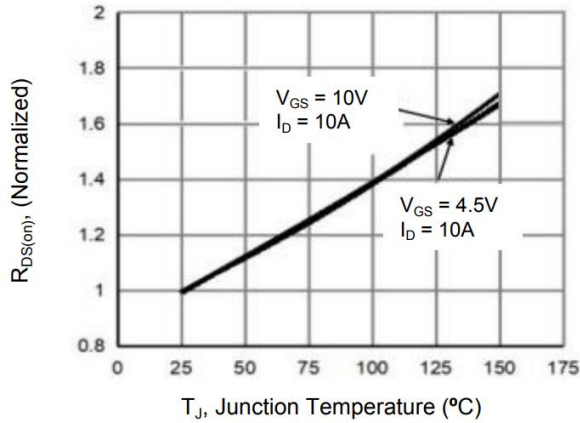Figure 6. Source to Drain Diode Forward

Typical Characteristics

Figure 7. Drain to Source On-Resistance
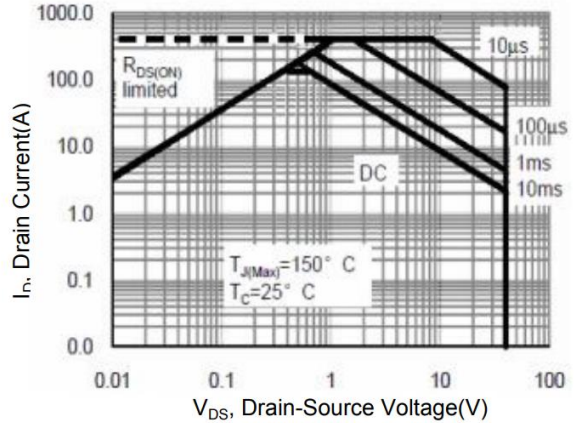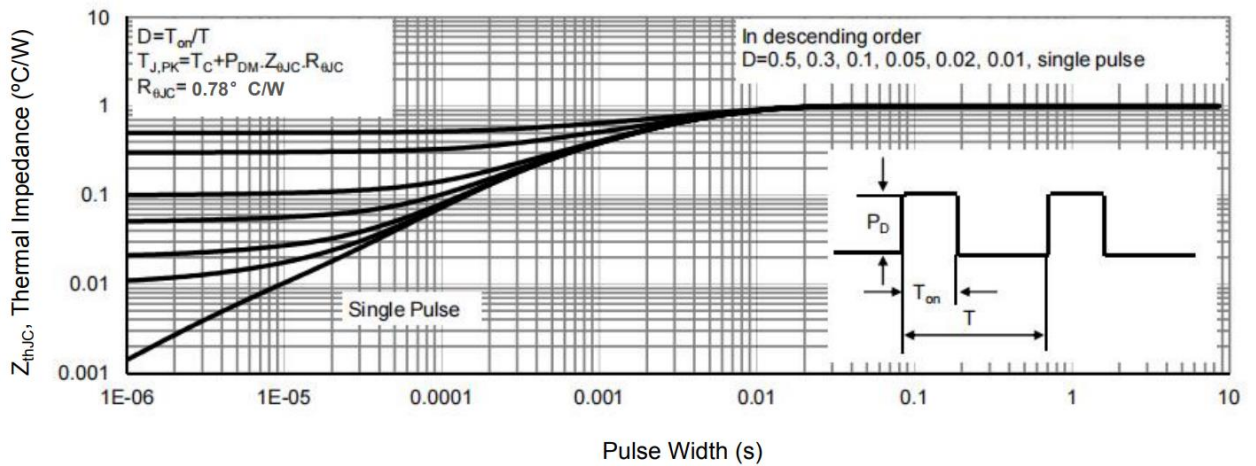

Figure 8. Safe Operation Area

Figure 9. Normalized Maximum Transient Thermal Impedance

Package Outline

Unit : mm