

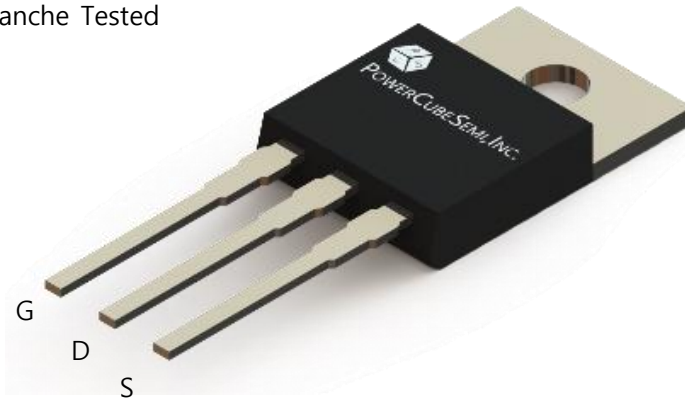
# PM002N040AG

40V 220A 2.5mΩ Si Single N-ch Enhancement Mode Power MOSFET with Normal Diode

## Features

### Si Single N-ch Enhancement Mode Power MOSFET

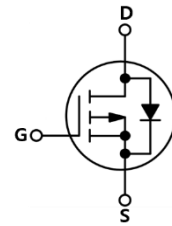
- Rated to 40V at 220Amps @ $T_J = 25^{\circ}\text{C}$
- Max  $R_{DS(on)} = 2.5\text{ m}\Omega$
- Typ  $R_{DS(on)} = 2.0\text{ m}\Omega$
- Gate Charge(Typ.  $Q_g=50\text{ nC}$ )
- 100% Avalanche Tested



PKG type : TO-220

## Application

- Power switch
- DC/DC Converter



## Description

The PM002N040AG 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	$V_{GS}=0V, I_D=250\mu A$	40	V
$I_D$	Drain Current	$T_c=25^{\circ}\text{C}$	220	A
$I_{DM}$	Pulsed Drain Current	Pulse width limited by junction temperature	550	A
$V_{GS}$	Gate-Source Voltage		$\pm 20$	V
$E_{AS}$	Single Pulsed Avalanche Energy	$V_{DD}=40V, V_{GS}=10V, L=0.5mH, R_G=25\Omega$	210	mJ
$P_d$	Power Dissipation	$T_c=25^{\circ}\text{C}$	90	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
PM002N040AG	PM002N040	TO-220	TUBE	-	50

## Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical			Unit
			Min	Typ.	Max.	
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A, T_J = 25^\circ C$	40	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 40V, V_{GS} = 0V$	-	-	1	$\mu A$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	$\pm 100$	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	3.0	5.0	V
$R_{DS(ON)}$	Static Drain-Source on state resistance	$V_{GS} = 10V, I_D = 30A$	-	2.0	2.5	m $\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS} = 5V, I_D = 30A$	-	53	-	S
$t_{d(on)}$	Turn-on Delay time	$V_{DS} = 20V, I_D = 30A, R_G = 3\Omega$	-	11	-	ns
$T_r$	Turn-on Rise time		-	3.5	-	
$t_{d(off)}$	Turn-off Delay time		-	36	-	
$T_f$	Turn-off Fall time		-	3	-	



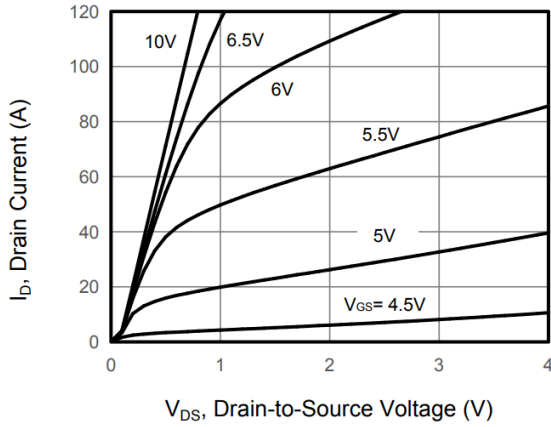
## Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
$R_{\theta JC}$	Thermal Resistance, Junction to Case		1.39	-	$^{\circ}\text{C}/\text{W}$
$C_{iss}$	Input Capacitance	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V},$ $f = 1.0\text{MHz}$	3986	-	pF
$C_{oss}$	Output Capacitance		873	-	
$C_{rss}$	Reverse Transfer Capacitance		835	-	
$Q_{g(\text{tot})}$	Total Gate Charge at 10V	$V_{DS} = 20\text{V}, I_D = 30\text{A}$ $V_{GS(\text{on})} = 10\text{V}$	50	-	nC
$Q_{gs}$	Gate to Source Gate Charge		11.5	-	
$Q_{gd}$	Gate to Drain "Miller" Charge		4	-	

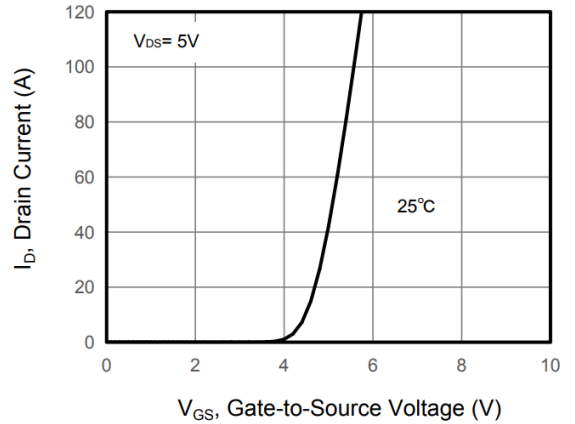
## Electrical Characteristics of Si Diode

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
$I_S$	Maximum Continuous Drain to Source Diode Forward Current		-	220	A
$V_{SD}$	Drain to Source Diode Forward Voltage	$I_S = 30\text{A}, V_{GS} = 0\text{V}$	-	1.2	V
$T_{rr}$	Reverse Recovery Time	$I_F = 30\text{A}, V_{GS} = 0\text{V},$ $di_F/dt = 500\text{A}/\mu\text{s}$	17	-	ns
$Q_{rr}$	Reverse Recovery Charge		45	-	nC

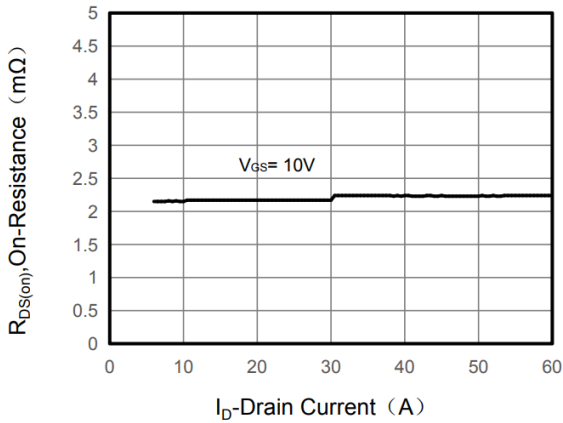
# Typical Characteristics



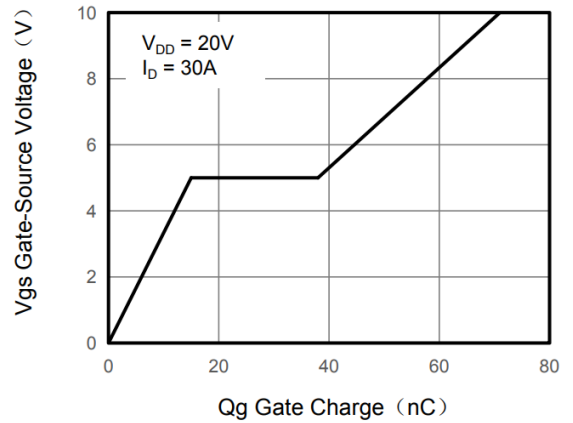
**Figure 1. Output Characteristics**



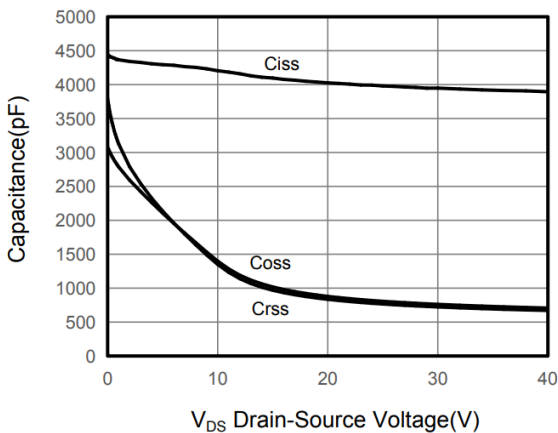
**Figure 2. Transfer Characteristics**



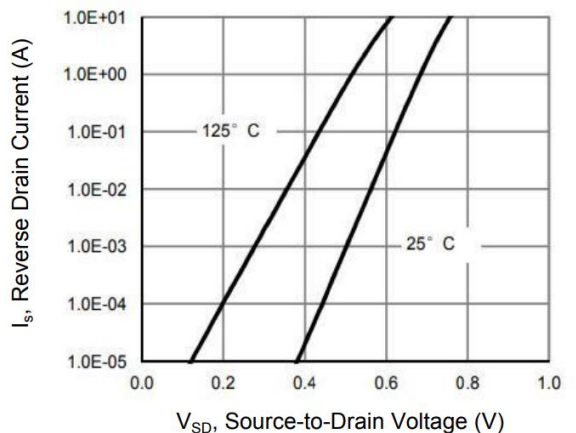
**Figure 3. Drain to Source On-Resistance**



**Figure 4. Gate Charge**



**Figure 5. Capacitance Characteristics**



**Figure 6. Source to Drain Diode Forward**

# Typical Characteristics

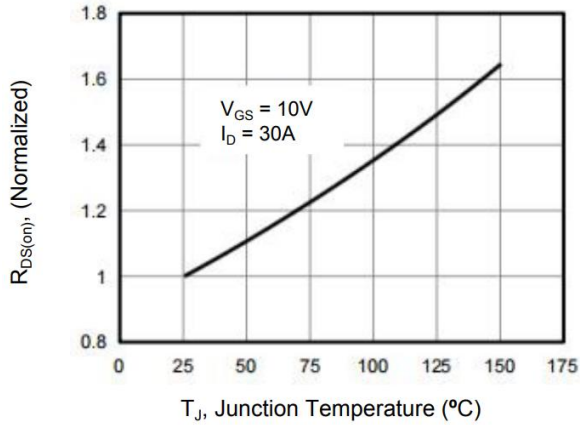


Figure 7. Drain to Source On-Resistance

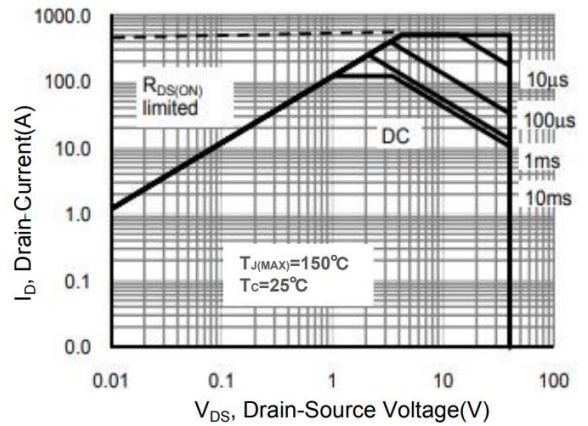


Figure 8. Safe Operation Area

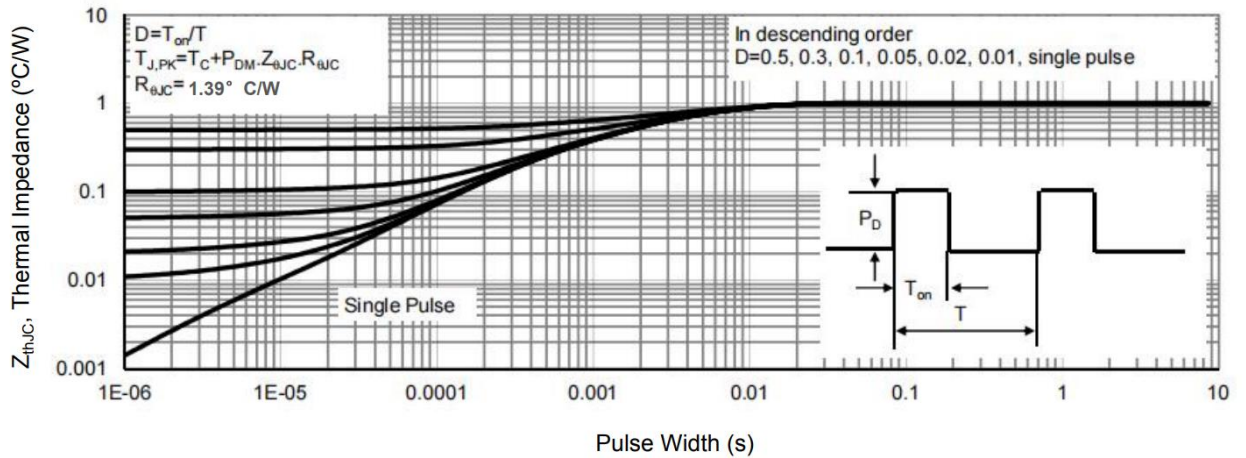


Figure 9. Normalized Maximum Transient Thermal Impedance



### Package Outline

Unit : mm

