

# PM006N040AG

40V 100A 6.5mΩ Si Single N-ch Enhancement Mode Power MOSFET with Normal Diode

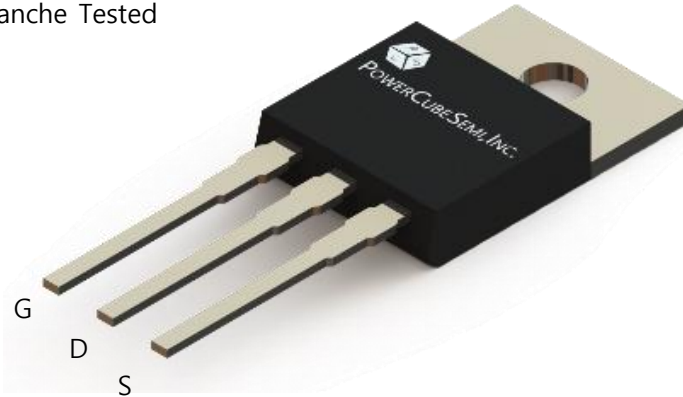
## Features

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

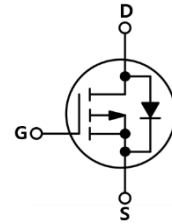
- Rated to 40V at 100Amps @ $T_J = 25^{\circ}\text{C}$
- Max  $R_{DS(on)} = 6.5\text{ m}\Omega$
- Typ  $R_{DS(on)} = 5.2\text{ m}\Omega$
- Gate Charge(Typ.  $Q_g=50\text{ nC}$ )
- 100% Avalanche Tested

## Application

- PWM
- Load Switching



PKG type : TO-220



## Description

The PM006N040AG 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	$T_c=25^{\circ}\text{C}$	100	A
$I_{DM}$	Pulsed Drain Current	Pulse width limited by junction temperature	350	A
$V_{GS}$	Gate-Source Voltage		$\pm 20$	V
$E_{AS}$	Single Pulsed Avalanche Energy	$V_{DD}=20V, V_{GS}=10V, L=1.0mH, R_G=25\Omega$	670	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
PM006N040AG	PM006N040	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	45	-	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	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.2	1.5	1.9	V
$R_{DS(ON)}$	Static Drain-Source on state resistance	$V_{GS} = 10V, I_D = 20A$	-	5.2	6.5	m $\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS} = 10V, I_D = 20A$	15	-	-	S
$t_{d(on)}$	Turn-on Delay time	$V_{DD} = 20V, R_L = 1\Omega, V_{GS} = 10V, R_G = 3\Omega$	-	11	-	ns
$T_r$	Turn-on Rise time		-	10	-	
$t_{d(off)}$	Turn-off Delay time		-	38	-	
$T_f$	Turn-off Fall time		-	11	-	



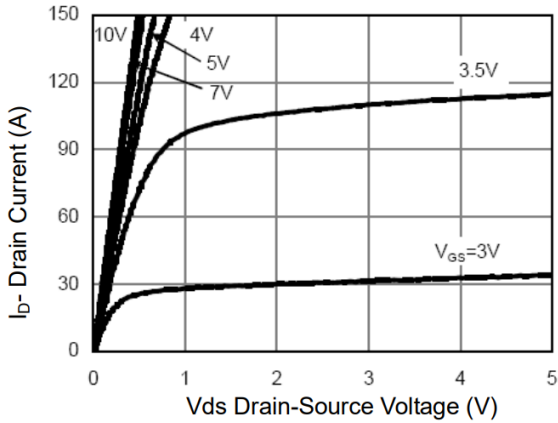
## Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
$R_{\theta JC}$	Thermal Resistance, Junction to Case		1.67	-	$^{\circ}\text{C}/\text{W}$
$C_{iss}$	Input Capacitance	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V},$ $f = 1.0\text{MHz}$	4010	-	pF
$C_{oss}$	Output Capacitance		750	-	
$C_{rss}$	Reverse Transfer Capacitance		390	-	
$Q_{g(\text{tot})}$	Total Gate Charge at 10V	$V_{DD} = 20\text{V}, I_D = 20\text{A}$ $V_{GS(\text{on})} = 10\text{V}$	50	-	nC
$Q_{gs}$	Gate to Source Gate Charge		12	-	
$Q_{gd}$	Gate to Drain "Miller" Charge		13	-	

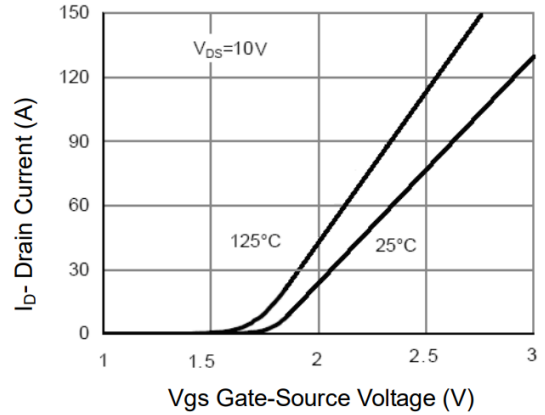
## Electrical Characteristics of Si Diode

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
$I_S$	Maximum Continuous Drain to Source Diode Forward Current		-	80	A
$V_{SD}$	Drain to Source Diode Forward Voltage	$I_S = 10\text{A}, V_{GS} = 0\text{V}$	-	1.2	V
$T_{rr}$	Reverse Recovery Time	$I_F = 20\text{A}, V_{GS} = 0\text{V},$ $dI_F/dt = 100\text{A}/\mu\text{s}$	33	-	ns
$Q_{rr}$	Reverse Recovery Charge		34	-	nC

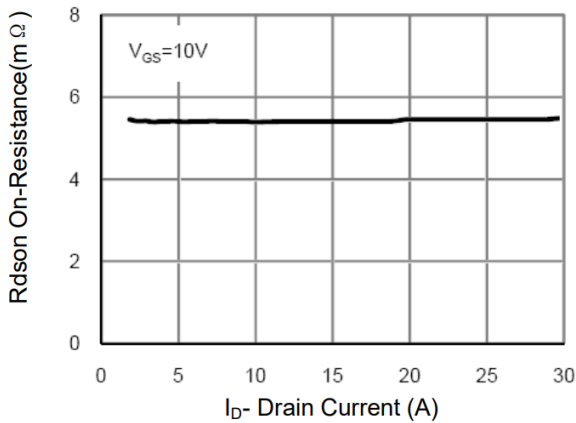
# Typical Characteristics



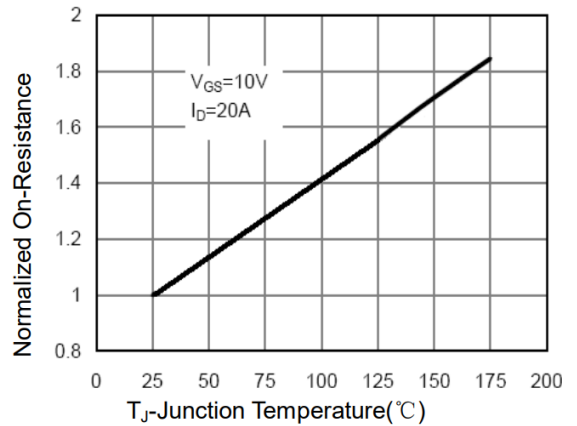
**Figure 1. Output Characteristics**



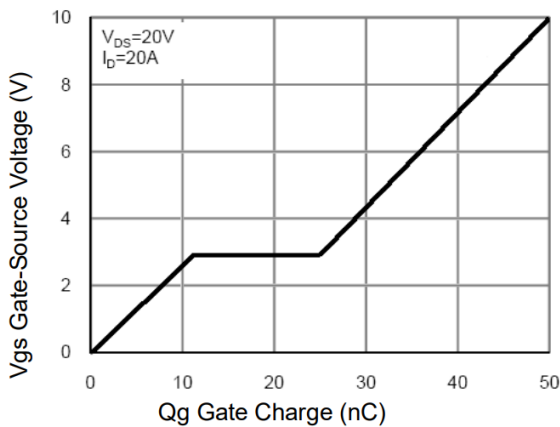
**Figure 2. Transfer Characteristics**



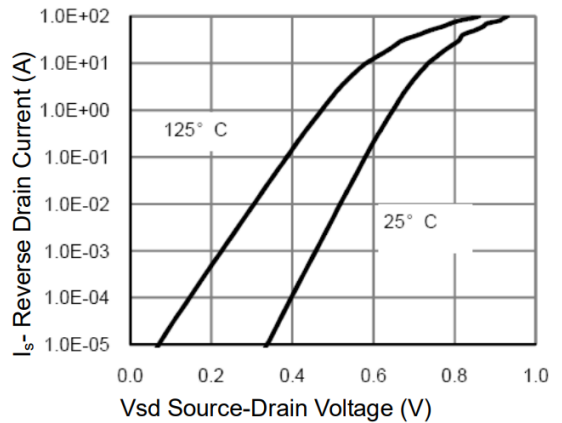
**Figure 3.  $R_{DS(ON)}$  vs. Drain Current**



**Figure 4.  $R_{DS(ON)}$  vs.  $T_j$**



**Figure 5. Gate Charge**



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

# Typical Characteristics

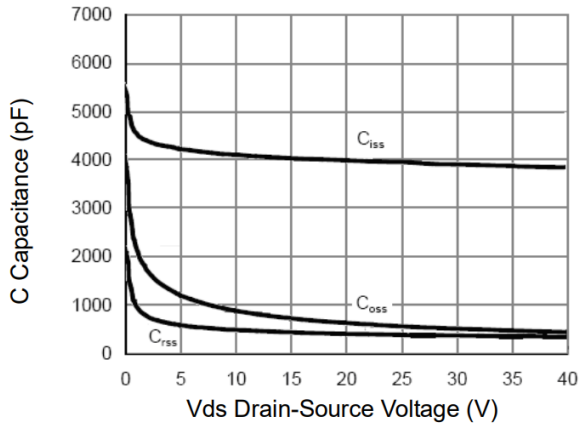


Figure 7. Capacitance characteristics

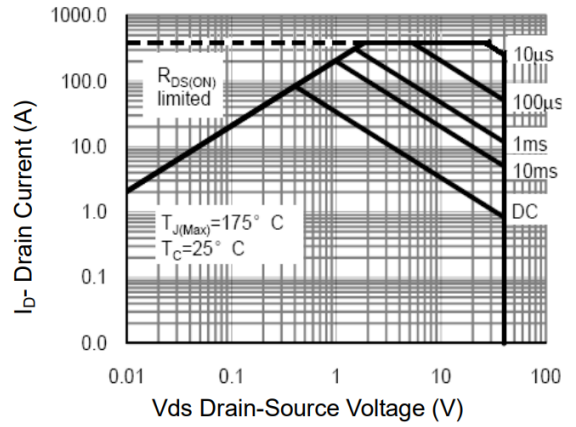


Figure 8. Safe Operation Area

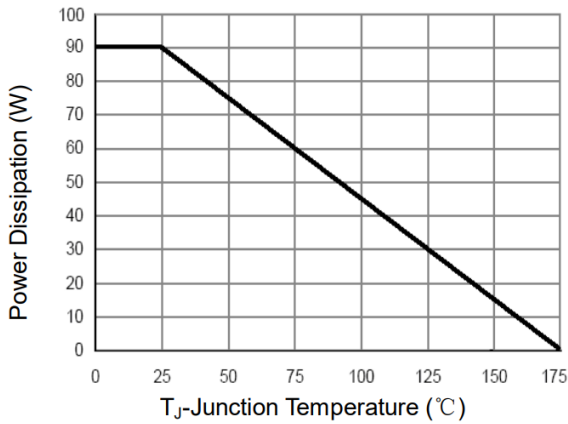


Figure 9. Power Derating

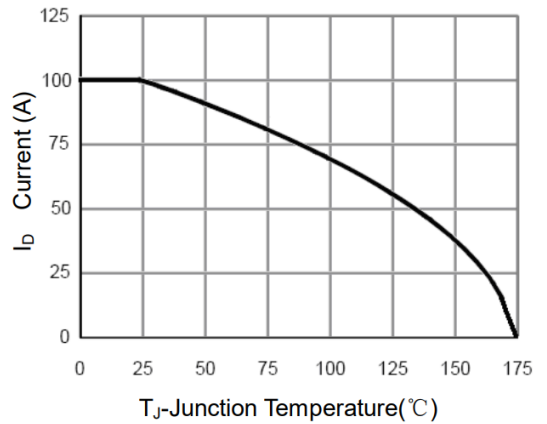


Figure 10. Drain Current vs.  $T_J$

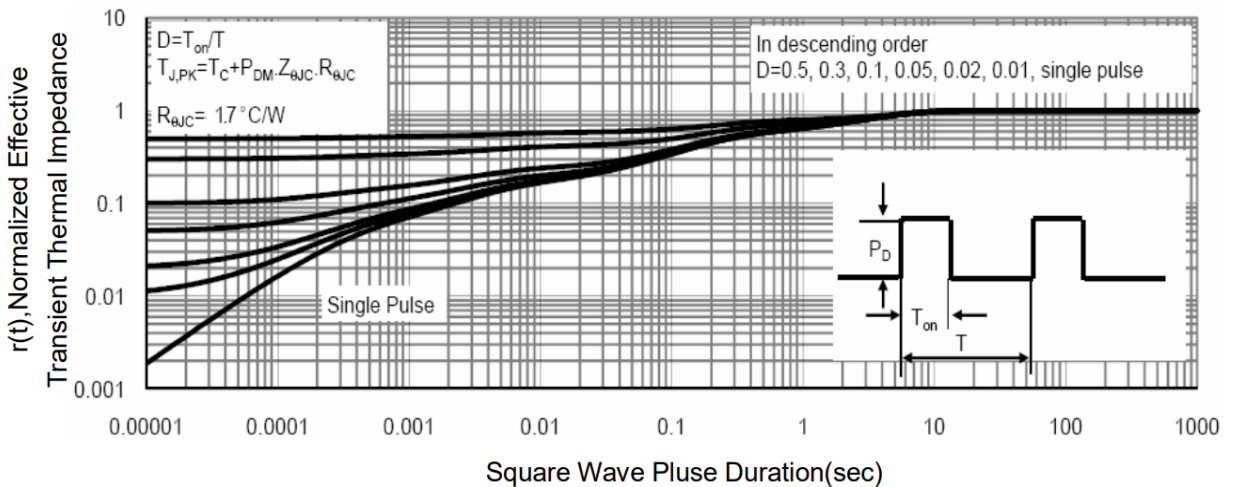


Figure 11. Normalized Maximum Transient Thermal Impedance



### Package Outline

Unit : mm

