

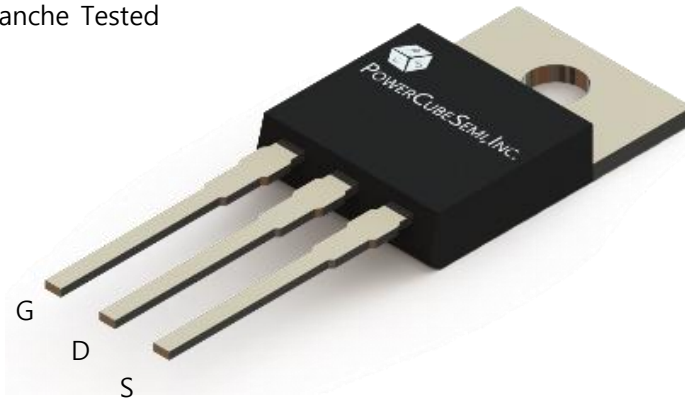
# PM004P060AG

-60V -160A 4.5mΩ Si Single P-ch Enhancement Mode MOSFET with Normal Diode

## Features

### Si P-Ch Enhancement Mode Power MOSFET

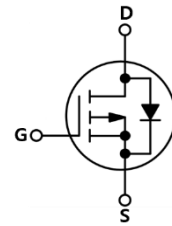
- Rated to -60V at -160Amps @ $T_j = 25^\circ\text{C}$
- Max  $R_{DS(on)} = 4.5\text{ m}\Omega$
- Typ  $R_{DS(on)} = 3.7\text{ m}\Omega$
- Gate Charge(Typ.  $Q_g=305\text{ nC}$ )
- 100% Avalanche Tested



PKG type : TO-220

## Application

- Power switch
- DC/DC converters



## Description

The PM004P060AG 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	$V_{GS}=0V, I_D=-250\mu A$	-60	V
$I_D$	Drain current	$T_c=25^\circ\text{C}$	-160	A
$I_{DM}$	Drain current	Pulse width limited by junction temperature	-640	A
$V_{GS}$	Gate-source voltage		$\pm 20$	V
$E_{AS}$	Single pulsed avalanche energy	$V_{GS}=-10V, R_G=25\Omega$ $V_{DD}=-50V, L=0.5mH$	900	mJ
$P_d$	Power dissipation	$T_c=25^\circ\text{C}$	280	W
$T_j$	Operating junction		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
PM004P060AG	PM004P060	TO-220	TUBE	-	50

## Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical			Unit
			Min	Typ.	Max.	
$BV_{DSS}$	Drain-source breakdown voltage	$V_{GS} = 0V, I_D = -250\mu A, T_J = 25^\circ C$	-60	-	-	V
$I_{DSS}$	Zero gate voltage drain current	$V_{DS} = -60V, V_{GS} = 0V$	-	-	-1	$\mu A$
$I_{GSS}$	Gate-source leakage current	$V_{GS} = \pm 20V$	-	-	$\pm 100$	nA
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1.3	-2.3	-2.5	V
$R_{DS(on)}$	Static drain-source on state resistance	$V_{GS} = -10V, I_D = -15A$	-	3.7	4.5	m $\Omega$
		$V_{GS} = -4.5V, I_D = -15A$	-	5.5	7.0	
$g_{FS}$	Forward transconductance	$V_{DS} = -5V, I_D = -15A$	-	42	-	S
$t_{d(on)}$	Turn-on Delay time	$V_{DD} = -30V, I_D = -15A, R_G = 1.6\Omega$	-	24	-	ns
$t_r$	Turn-on Rise time		-	36	-	
$t_{d(off)}$	Turn-off Delay time		-	301	-	
$t_f$	Turn-off Fall time		-	80	-	



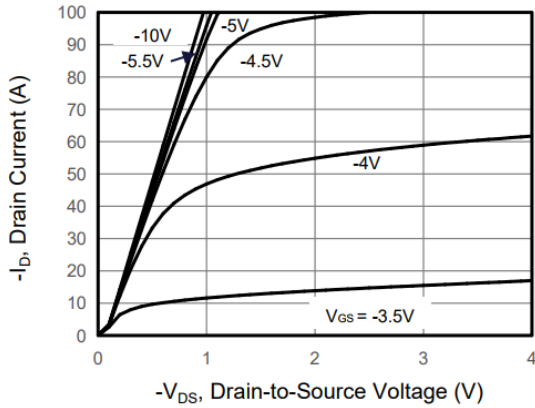
## Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
$R_{\theta JC}$	Thermal resistance, Junction to case		0.45	-	$^{\circ}\text{C}/\text{W}$
$C_{iss}$	Input capacitance	$V_{DS} = -30\text{V}, V_{GS} = 0\text{V},$ $f = 1.0\text{MHz}$	9151	-	pF
$C_{oss}$	Output capacitance		1468	-	
$C_{rss}$	Reverse transfer capacitance		365	-	
$Q_{g(\text{tot})}$	Total gate charge at 10V	$V_{DD} = -30\text{V}, I_D = -15\text{A}$ $V_{GS} = -10\text{V}$	305	-	nC
$Q_{gs}$	Gate to source gate charge		33	-	
$Q_{gd}$	Gate to drain "Miller" charge		82	-	

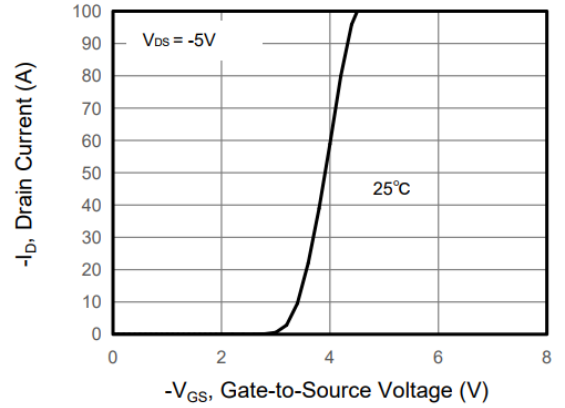
## Electrical Characteristics of Si Diode

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
$I_S$	Maximum continuous drain to source diode forward current	$T_c = 25^{\circ}\text{C}$	-	-160	A
$V_{SD}$	Drain to source diode forward voltage	$I_{SD} = -15\text{A}, V_{GS} = 0\text{V}$	-	-1.2	V
$T_{rr}$	Reverse recovery time	$I_F = -15\text{A}, V_{GS} = 0\text{V},$ $di_F/dt = -100\text{A}/\mu\text{s}$	95	-	ns
$Q_{rr}$	Reverse recovery charge		352	-	nC

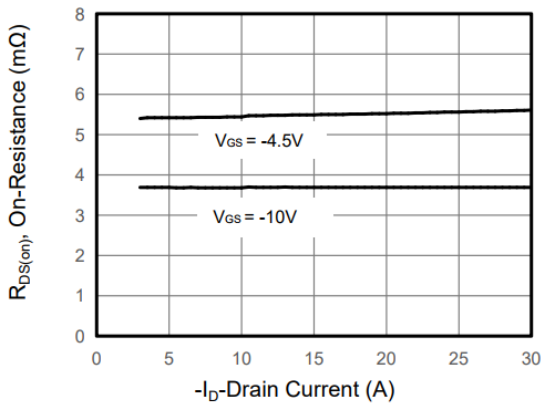
# Typical Characteristics



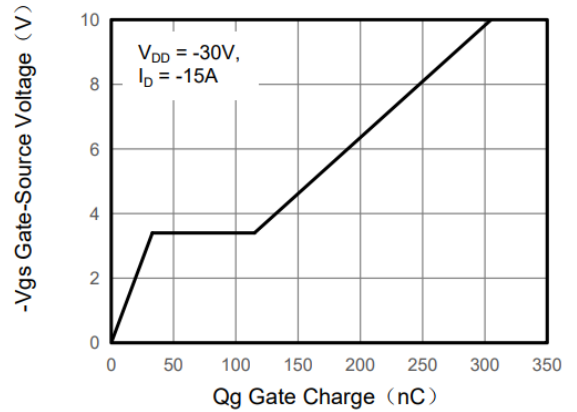
**Figure 1. Output Characteristics**



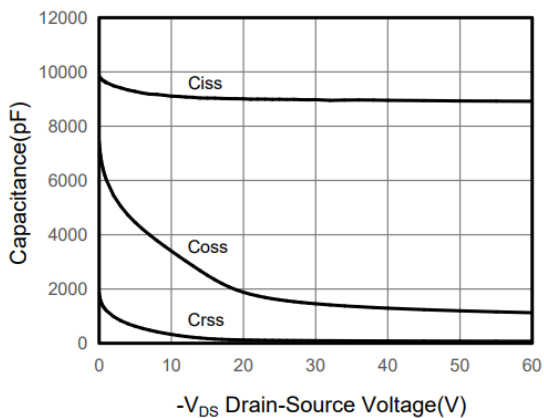
**Figure 2. Transfer Characteristics**



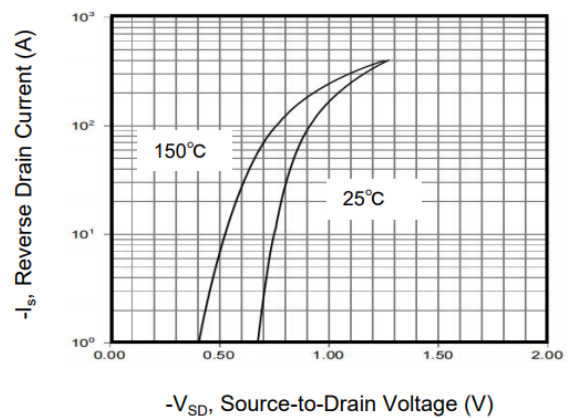
**Figure 3. Drain Source On Resistance**



**Figure 4. Gate Charge**



**Figure 5. Capacitance**



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

# Typical Characteristics

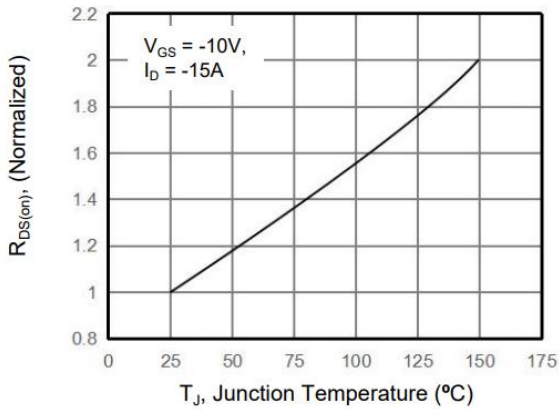


Figure 7. Drain-Source On-Resistance

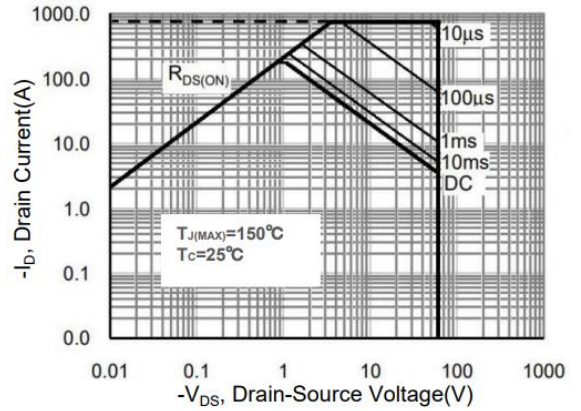


Figure 8. Safe Operation Area

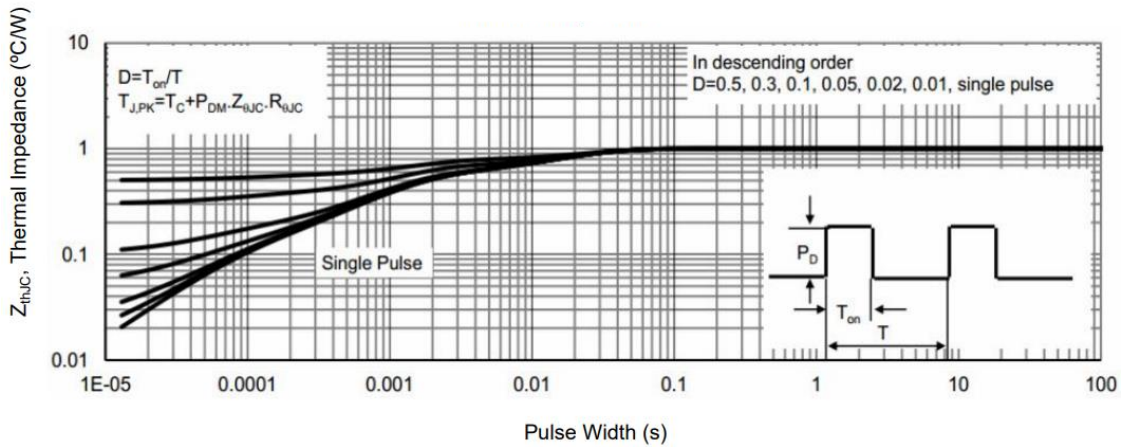


Figure 9. Normalized Maximum Transient Thermal Impedance



### Package Outline

Unit : mm

