

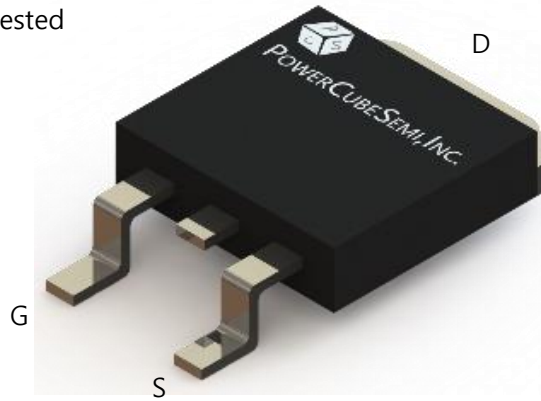
# PM003N060DG

60V 223A 3.0mΩ Si Single N-ch Enhancement Mode MOSFET with Normal Diode

## Features

### Si N-Ch Enhancement Mode Power MOSFET

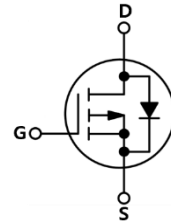
- Rated to 60V at 223Amps @ $T_j = 25^\circ\text{C}$
- Max  $R_{DS(on)} = 3.0\text{ m}\Omega$
- Typ  $R_{DS(on)} = 2.4\text{ m}\Omega$
- Gate Charge(Typ.  $Q_g=101\text{ nC}$ )
- 100% Avalanche Tested



PKG type : TO-263 (D2PAK)

## Application

- Power switch
- DC/DC converters



## Description

The PM003N060DG 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	$T_c=25^\circ\text{C}$	223	A
$I_{DM}$	Drain current	Pulse width limited by junction temperature	892	A
$V_{GS}$	Gate-source voltage		$\pm 20$	V
$E_{AS}$	Single pulsed avalanche energy	$V_{GS}=10V, R_G=25\Omega$ $V_{DD}=50V, L=0.5mH$	441	mJ
$P_d$	Power dissipation	$T_c=25^\circ\text{C}$	240	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
PM003N060DG	PM003N060	TO-263	REEL	-	800

## 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	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	1.7	2.5	V
$R_{DS(ON)}$	Static drain-source on state resistance	$V_{GS} = 10V, I_D = 30A$	-	2.4	3.0	m $\Omega$
$g_{FS}$	Forward transconductance	$V_{DS} = 5V, I_D = 30A$	-	71	-	S
$t_{d(on)}$	Turn-on Delay time	$V_{DD} = 30V, I_D = 30A, R_G = 2.1\Omega$	-	73	-	ns
$t_r$	Turn-on Rise time		-	244	-	
$t_{d(off)}$	Turn-off Delay time		-	122	-	
$t_f$	Turn-off Fall time		-	122	-	



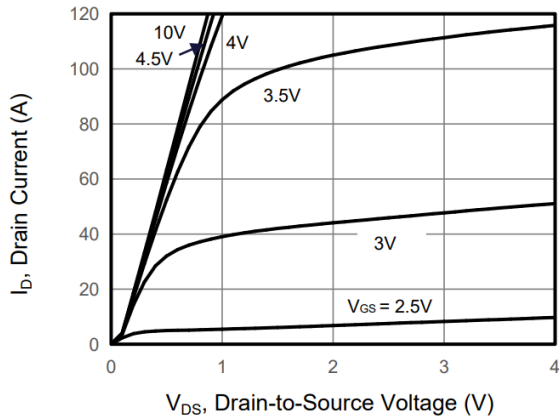
## Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
$R_{\theta JC}$	Thermal resistance, Junction to case		0.52	-	$^{\circ}\text{C}/\text{W}$
$C_{iss}$	Input capacitance	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V},$ $f = 1.0\text{MHz}$	12432	-	pF
$C_{oss}$	Output capacitance		819	-	
$C_{rss}$	Reverse transfer capacitance		752	-	
$Q_{g(\text{tot})}$	Total gate charge at 10V	$V_{DD} = 30\text{V}, I_D = 30\text{A}$ $V_{GS} = 4.5\text{V}$	101	-	nC
$Q_{gs}$	Gate to source gate charge		34	-	
$Q_{gd}$	Gate to drain "Miller" charge		57	-	

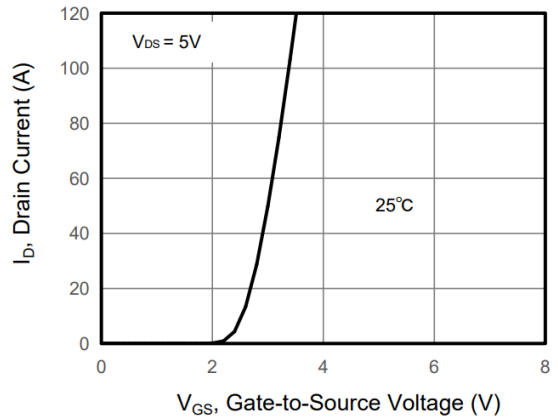
## Electrical Characteristics of Si Diode

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
$I_S$	Maximum continuous drain to source diode forward current	$T_c = 25^{\circ}\text{C}$	-	223	A
$V_{SD}$	Drain to source diode forward voltage	$I_{SD} = 30\text{A}, V_{GS} = 0\text{V}$	-	1.2	V
$T_{rr}$	Reverse recovery time	$I_F = 30\text{A}, V_{GS} = 0\text{V},$ $di_F/dt = 100\text{A}/\mu\text{s}$	69	-	ns
$Q_{rr}$	Reverse recovery charge		344	-	nC

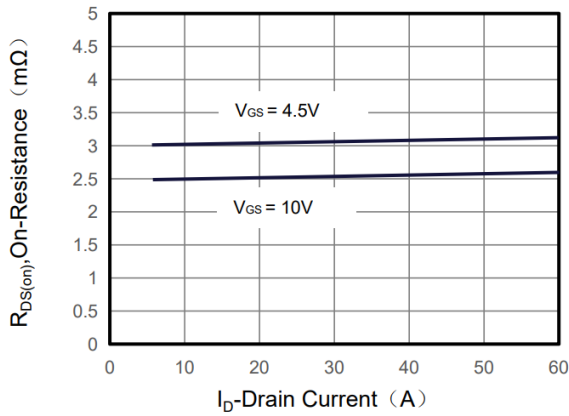
# Typical Characteristics



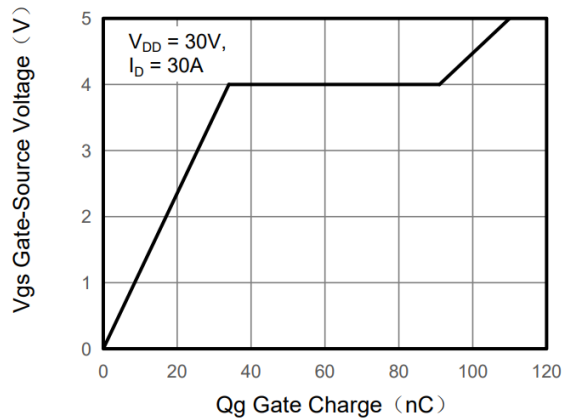
**Figure 1. Output Characteristics**



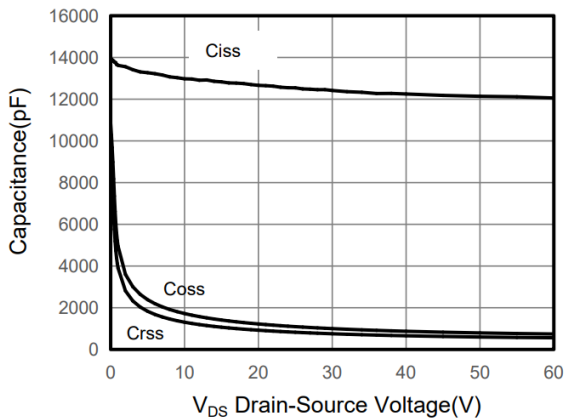
**Figure 2. Transfer Characteristics**



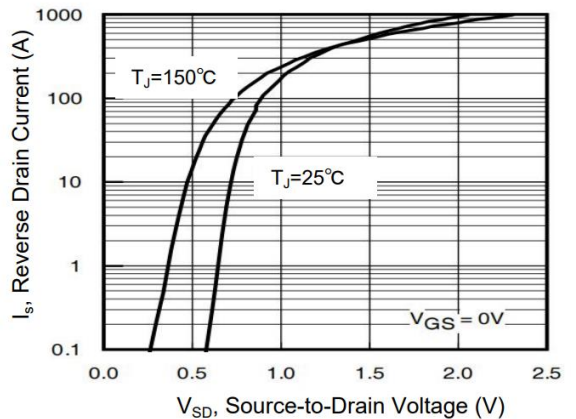
**Figure 3. Drain to Source On-Resistance**



**Figure 4. Gate Charge**



**Figure 5. Capacitance Characteristics**



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

# Typical Characteristics

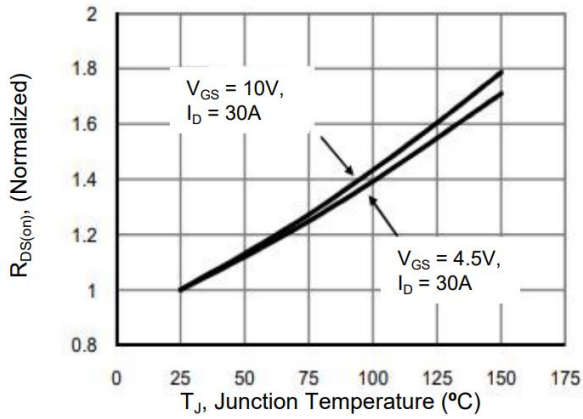


Figure 7. Drain to Source On-Resistance

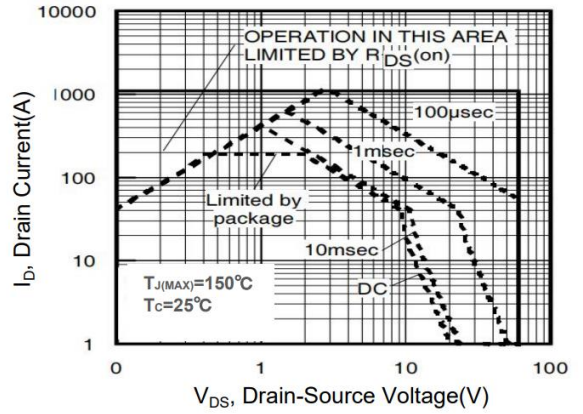


Figure 8. Safe Operation Area

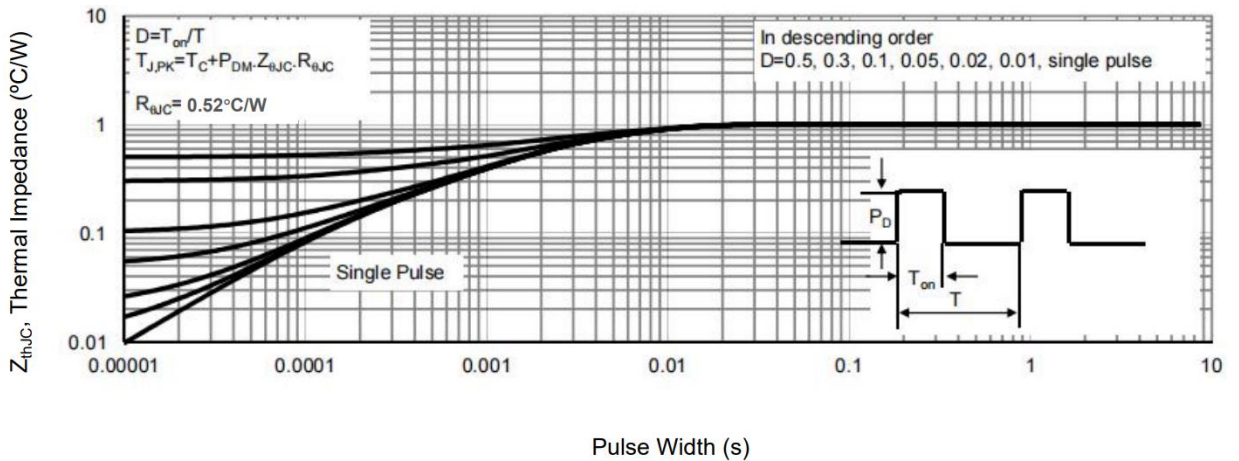
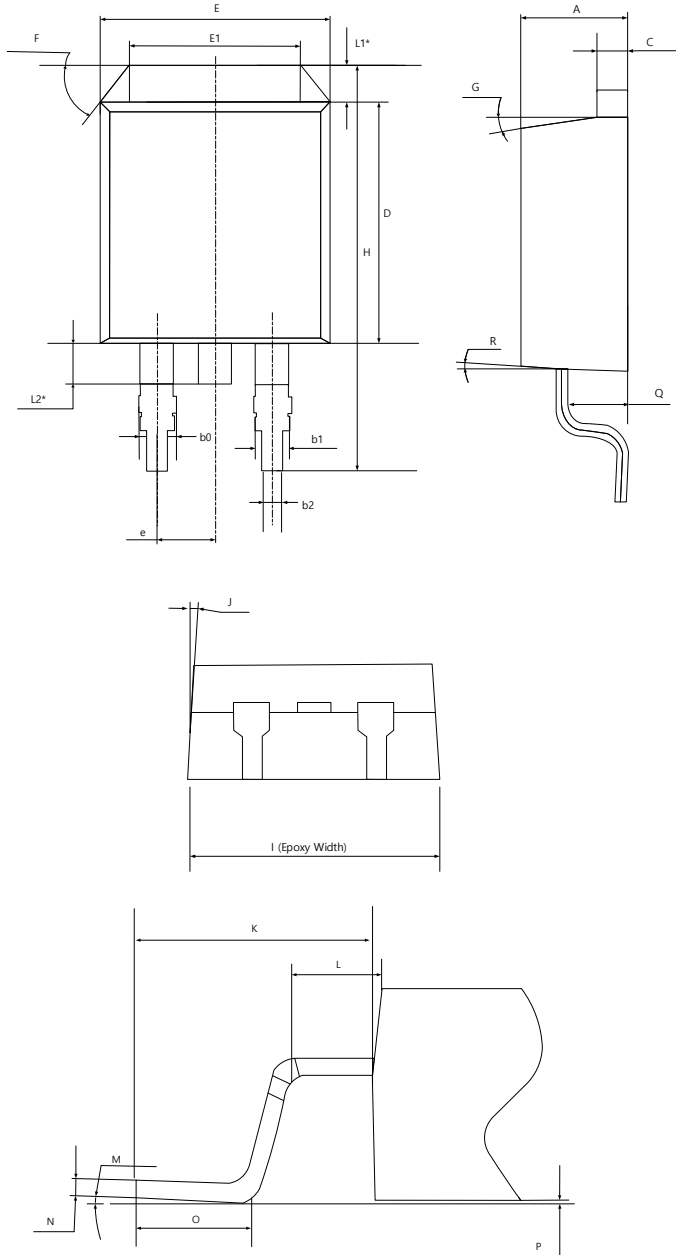


Figure 9. Normalized Maximum Transient Thermal Impedance

## Package Outline

Unit : mm



SYMBOL	DIMENSIONS		
	MIN	NOM	MAX
<b>A</b>	4.40	4.60	4.80
<b>b0</b>	1.17	1.37	1.57
<b>b1</b>	1.17	1.27	1.37
<b>b2</b>	0.70	0.80	0.90
<b>C</b>	1.17	1.27	1.37
<b>D</b>	8.50	8.70	8.90
<b>E</b>	9.80	10.00	10.20
<b>E1</b>	6.50	-	-
<b>e</b>	2.44	2.54	2.64
<b>F</b>	-	30° (Ref)	-
<b>G</b>	-	7.0°	-
<b>H</b>	15.00	15.30	15.60
<b>I</b>	9.80	10.00	10.20
<b>J</b>	-	3.0°	-
<b>K</b>	5.00	5.30	5.60
<b>L</b>	1.80	2.00	2.20
<b>L1</b>	1.07	1.27	1.47
<b>L2</b>	1.20	1.50	1.80
<b>M</b>	0.0°	-	8.0°
<b>N</b>	0.30	0.45	0.60
<b>O</b>	2.34	2.54	2.74
<b>P</b>	0	-	0.25
<b>Q</b>	2.37	2.67	2.97
<b>R</b>	-	7.0°	-