

# PM004N100DG

100V 120A 4.5mΩ Si Single N-ch Enhancement Mode Power MOSFET with Normal Diode

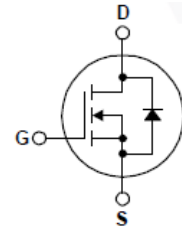
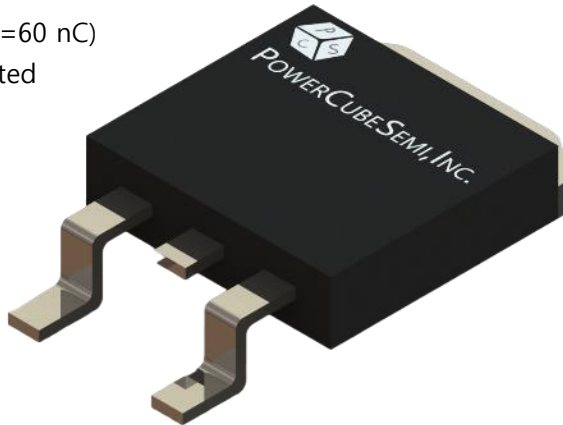
## Features

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

- Rated to 100V at 120Amps @ $T_j = 25^\circ\text{C}$
- Max  $R_{DS(on)}$  = 4.5 mΩ
- Typ  $R_{DS(on)}$  = 3.8 mΩ
- Gate Charge(Typ.  $Q_g=60$  nC)
- 100% Avalanche Tested

## Application

- Power Switch
- DC/DC Converter



PKG type : TO-263 (D2PAK)

## Description

The PM004N100DG 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	$V_{GS}=0V, I_D=250\mu A$	100	V
$I_D$	Drain Current	$T_c=25^\circ\text{C}$	120	A
$I_{DM}$	Pulsed Drain Current	Pulse width limited by junction temperature	480	A
$V_{GS}$	Gate-Source Voltage		$\pm 20$	V
$E_{AS}$	Single Pulsed Avalanche Energy	$V_{DD}=50V, V_{GS}=10V, L=0.5mH, R_G=25\Omega$	240	mJ
$P_d$	Power Dissipation	$T_c=25^\circ\text{C}$	180	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
PM004N100DG	PM004N100	TO-263	REEL	-	800

## Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical			Unit
			Min	Typ.	Max.	
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A, T_J = 25^\circ C$	100	-	-	V
$I_{DSS}$	Zero gate voltage drain current	$V_{DS} = 100V, V_{GS} = 0V$	-	-	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	3	4	V
$R_{DS(ON)}$	Static drain-source on state resistance	$V_{GS} = 10V, I_D = 30A$	-	3.8	4.5	m $\Omega$
$g_{FS}$	Forward transconductance	$V_{DS} = 5V, I_D = 30A$	-	37	-	S
$t_{d(on)}$	Turn-on Delay time	$V_{DD} = 50V, I_D = 30A, R_G = 4.7\Omega$	-	58	-	ns
$T_r$	Turn-on Rise time		-	13	-	
$t_{d(off)}$	Turn-off Delay time		-	39	-	
$T_f$	Turn-off Fall time		-	8	-	



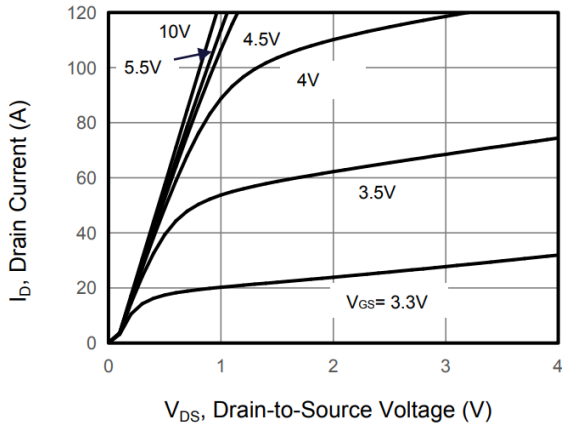
## Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
$R_{\theta JC}$	Thermal resistance, Junction to case		0.69	-	$^{\circ}\text{C}/\text{W}$
$C_{iss}$	Input capacitance	$V_{DS} = 50\text{V}, V_{GS} = 0\text{V},$ $f = 1.0\text{MHz}$	4284	-	pF
$C_{oss}$	Output capacitance		1321	-	
$C_{rss}$	Reverse transfer capacitance		43	-	
$Q_{g(\text{tot})}$	Total gate charge at 10V	$V_{DD} = 50\text{V}, I_D = 30\text{A}$ $V_{GS(\text{on})} = 10\text{V}$	60	-	nC
$Q_{gs}$	Gate to source gate charge		21	-	
$Q_{gd}$	Gate to drain "Miller" charge		11	-	

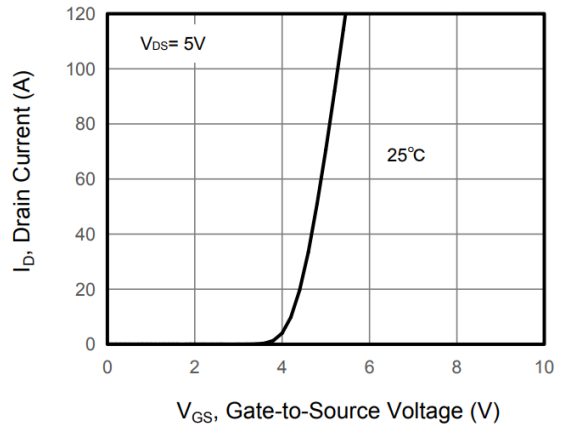
## Electrical Characteristics of Si Diode

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
$I_S$	Maximum continuous drain to source diode forward current		-	120	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	$I_F = 30\text{A}, V_{GS} = 0\text{V},$ $di_F/dt = 100\text{A}/\mu\text{s}$	60	-	ns
$Q_{rr}$	Reverse recovery charge		140	-	nC

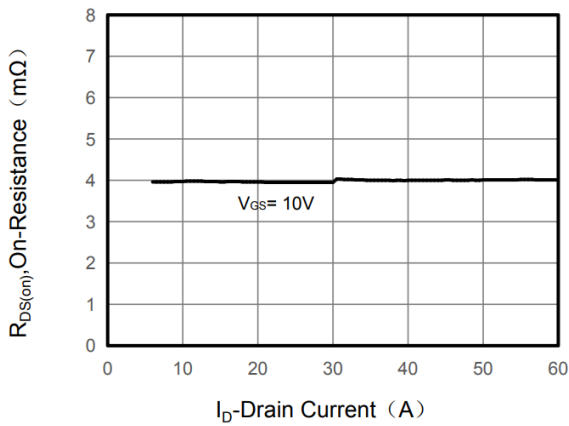
# Typical Characteristics



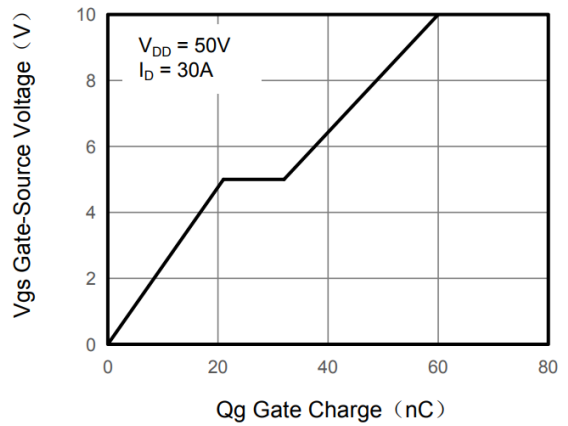
**Figure 1. Output Characteristics**



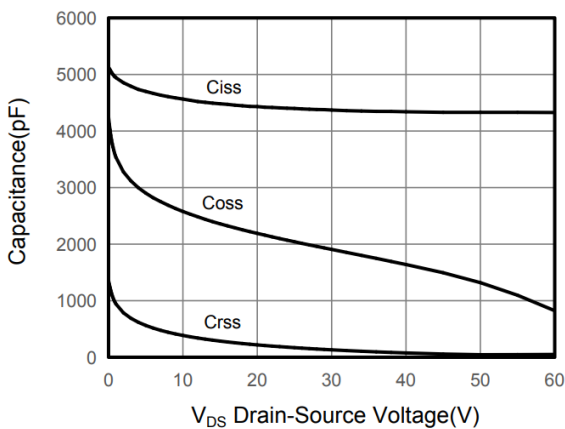
**Figure 2. Transfer Characteristics**



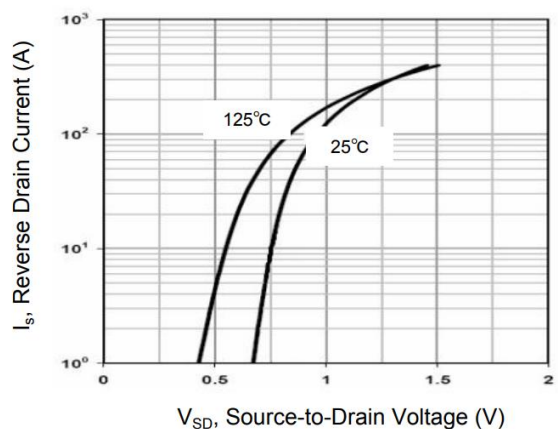
**Figure 3. Drain to Source On-Resistance**



**Figure 4. Gate Charge**

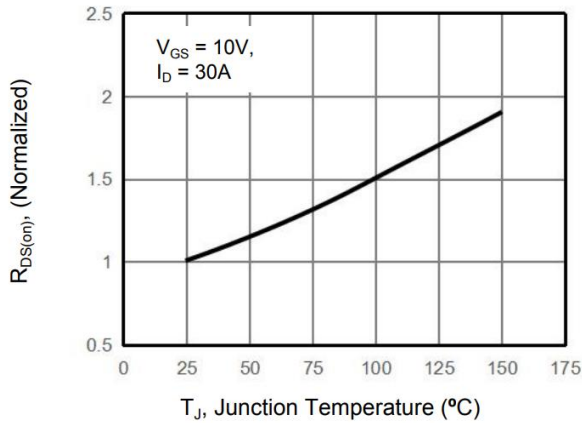


**Figure 5. Capacitance Characteristics**

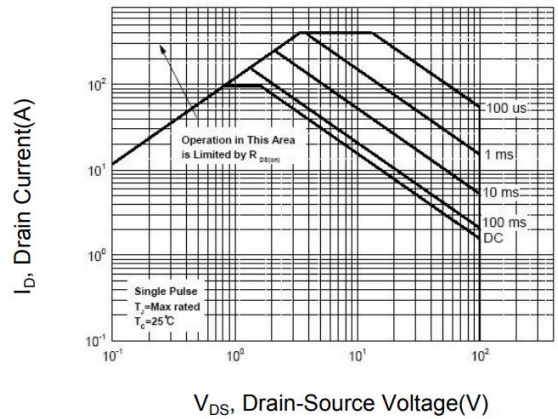


**Figure 6. Source to Drain Diode Forward**

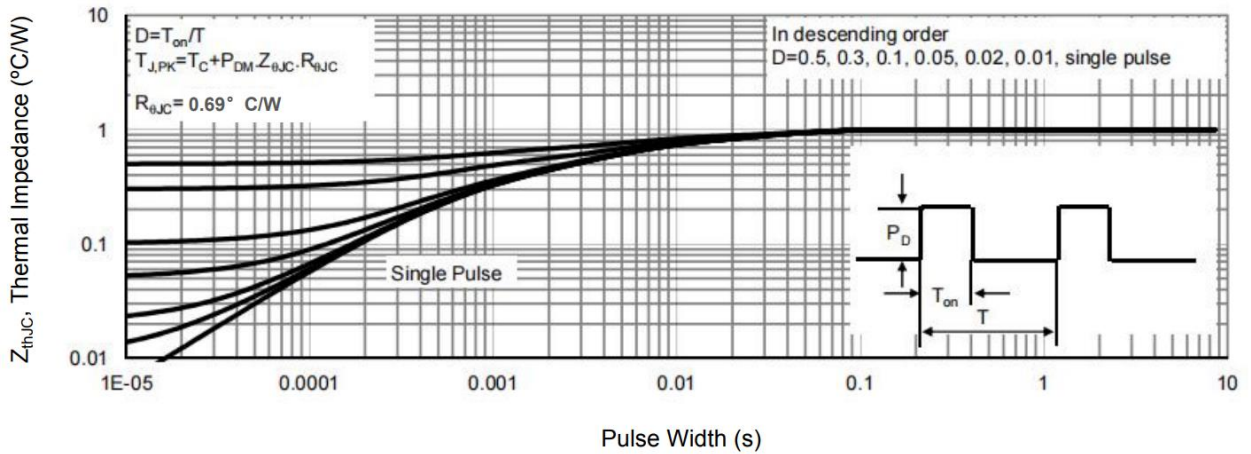
# Typical Characteristics



**Figure 7. Drain to Source On-Resistance**



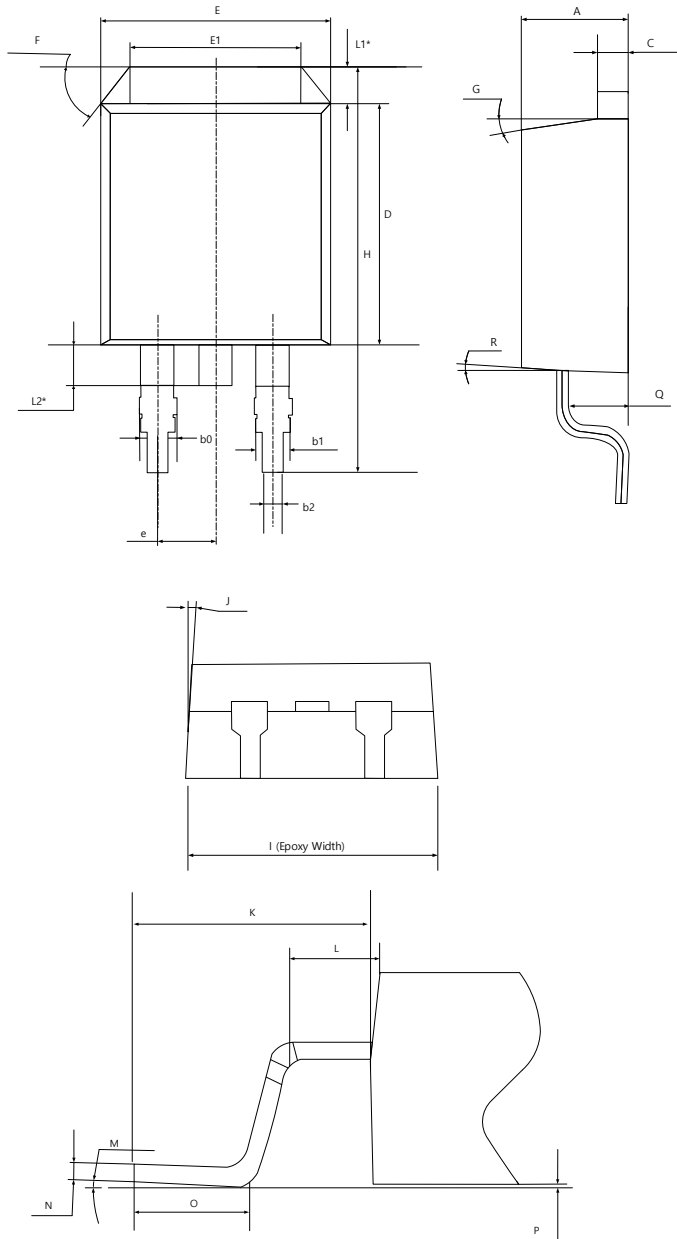
**Figure 8. Safe Operation Area**



**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°	-