

PM003P040DG

-40V -222A 3.5mΩ Si Single P-ch Enhancement Mode MOSFET with Normal Diode

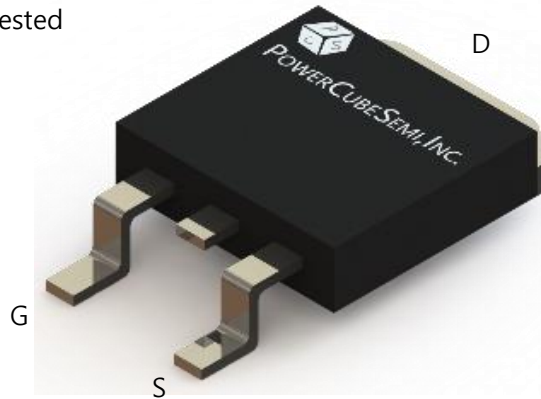
Features

Si P-Ch Enhancement Mode Power MOSFET

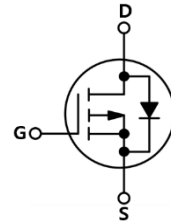
- Rated to -40V at -222Amps @ $T_j = 25^\circ\text{C}$
- Max $R_{DS(on)} = 3.5\text{ m}\Omega$
- Typ $R_{DS(on)} = 2.9\text{ m}\Omega$
- Gate Charge(Typ. $Q_g=206\text{ nC}$)
- 100% Avalanche Tested

Application

- Power switch
- DC/DC converters



PKG type : TO-263 (D2PAK)



Description

The PM003P040DG 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	$T_c=25^\circ\text{C}$	-222	A
I_{DM}	Drain current	Pulse width limited by junction temperature	-888	A
V_{GS}	Gate-source voltage		± 20	V
E_{AS}	Single pulsed avalanche energy	$V_{GS}=-10V, R_G=25\Omega$ $V_{DD}=-40V, L=0.5mH$	625	mJ
P_d	Power dissipation	$T_c=25^\circ\text{C}$	312	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
PM003P040DG	PM003P040	TO-263	REEL	-	800

Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical			Unit
			Min	Typ.	Max.	
BV_{DSS}	Drain-source breakdown voltage	$V_{GS} = 0V, I_D = -250\mu A, T_J = 25^\circ C$	-40	-	-	V
I_{DSS}	Zero gate voltage drain current	$V_{DS} = -40V, V_{GS} = 0V$	-	-	-1	μA
I_{GSS}	Gate-source leakage current	$V_{GS} = \pm 20V$	-	-	± 100	nA
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1.0	-1.6	-2.5	V
$R_{DS(on)}$	Static drain-source on state resistance	$V_{GS} = -10V, I_D = -15A$	-	2.9	3.5	m Ω
		$V_{GS} = -4.5V, I_D = -15A$	-	3.7	4.5	
g_{FS}	Forward transconductance	$V_{DS} = -5V, I_D = -15A$	-	44	-	S
$t_{d(on)}$	Turn-on Delay time	$V_{DD} = -20V, I_D = -15A, R_G = 1.6\Omega$	-	44	-	ns
t_r	Turn-on Rise time		-	49	-	
$t_{d(off)}$	Turn-off Delay time		-	138	-	
t_f	Turn-off Fall time		-	44	-	



Electrical Characteristics of Si MOSFET

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
$R_{\theta JC}$	Thermal resistance, Junction to case		0.4	-	$^{\circ}\text{C}/\text{W}$
C_{iss}	Input capacitance	$V_{DS} = -20\text{V}, V_{GS} = 0\text{V},$ $f = 1.0\text{MHz}$	14983	-	pF
C_{oss}	Output capacitance		2060	-	
C_{rss}	Reverse transfer capacitance		1391	-	
$Q_{g(\text{tot})}$	Total gate charge at 10V	$V_{DD} = -20\text{V}, I_D = -15\text{A}$ $V_{GS} = -10\text{V}$	206	-	nC
Q_{gs}	Gate to source gate charge		41	-	
Q_{gd}	Gate to drain "Miller" charge		26	-	

Electrical Characteristics of Si Diode

Symbol	Parameter	Test Condition	Numerical		Unit
			Typ.	Max.	
I_S	Maximum continuous drain to source diode forward current	$T_c = 25^{\circ}\text{C}$	-	-222	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	$I_F = -15\text{A}, V_{GS} = 0\text{V},$ $di_F/dt = -100\text{A}/\mu\text{s}$	77	-	ns
Q_{rr}	Reverse recovery charge		198	-	nC

Typical Characteristics

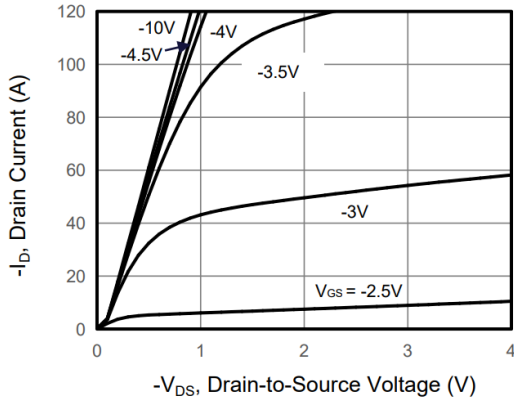


Figure 1. Output Characteristics

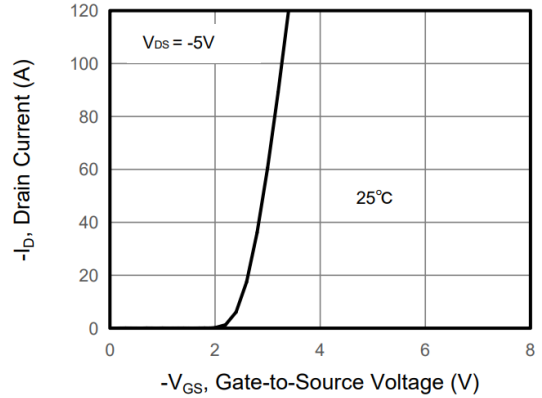


Figure 2. Transfer Characteristics

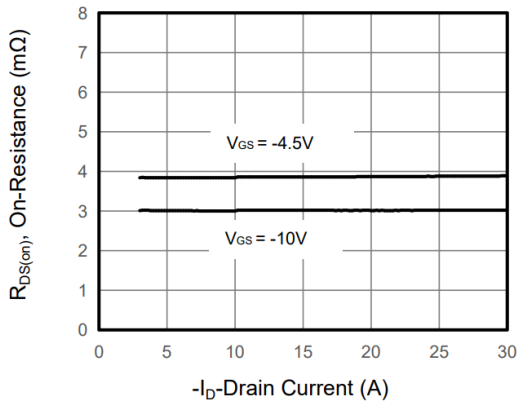


Figure 3. Drain Source On Resistance

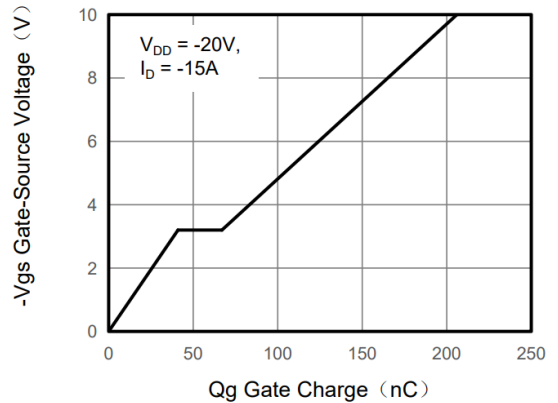


Figure 4. Gate Charge

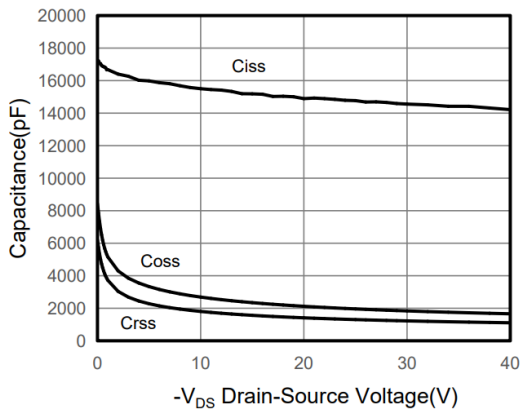


Figure 5. Capacitance

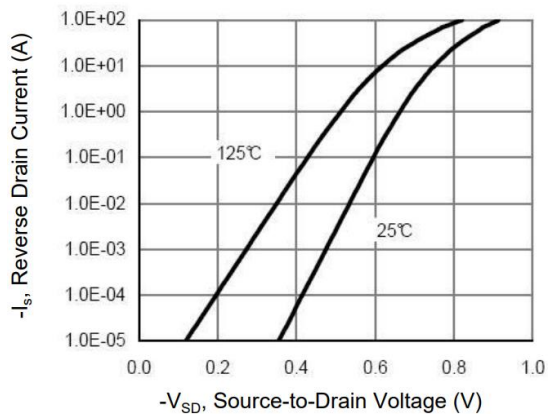


Figure 6. Source-Drain Diode Forward

Typical Characteristics

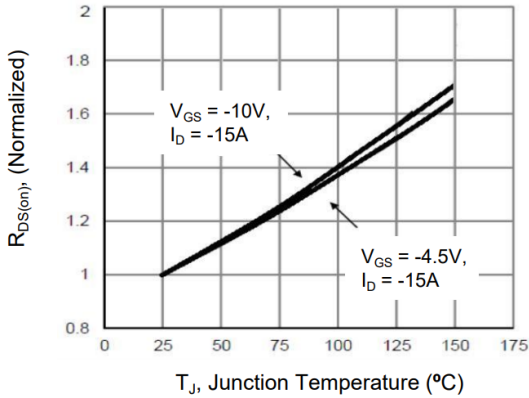


Figure 7. Drain-Source On-Resistance

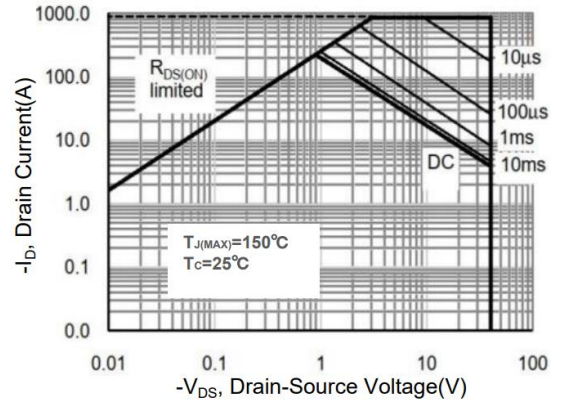


Figure 8. Safe Operation Area

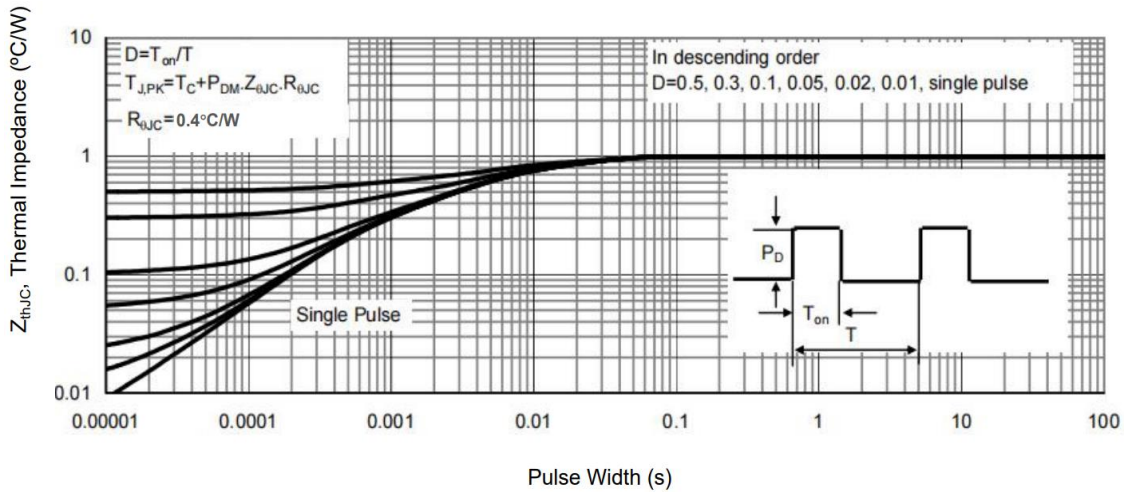
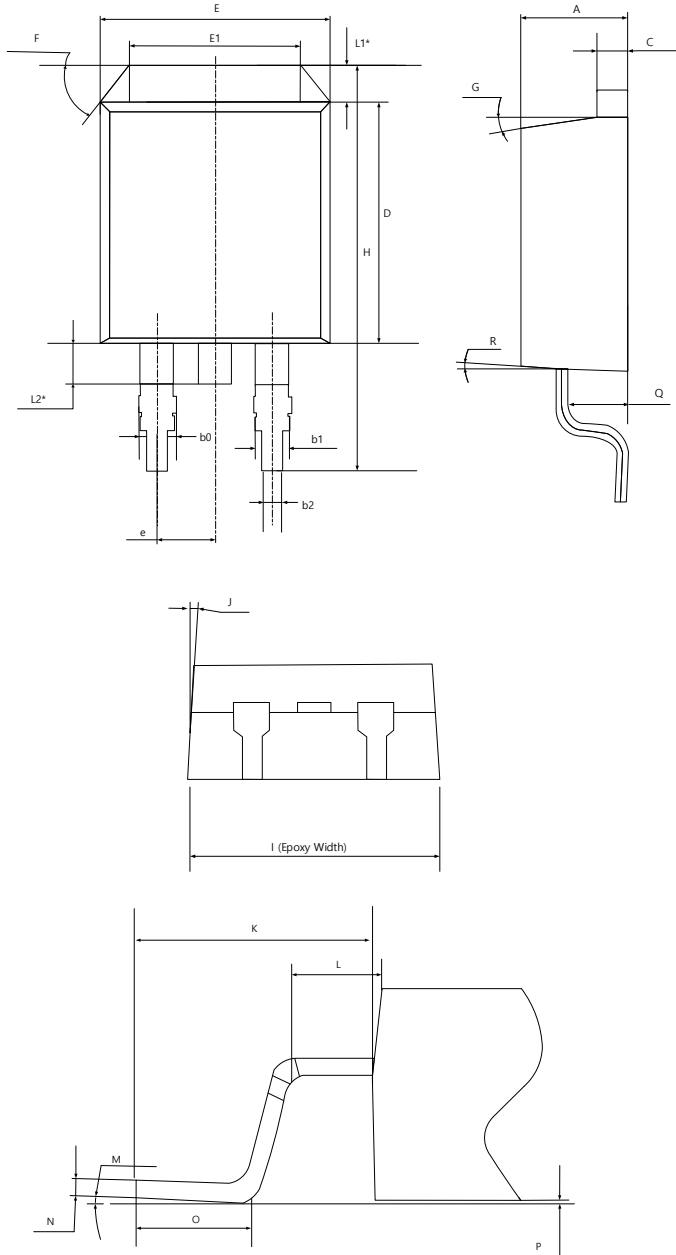


Figure 9. Normalized Maximum Transient Thermal Impedance

Package Outline

Unit : mm



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