N-Channel Enhancement Mode Power MOSFET

Description

The PE8425DM uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

General Features

- V_{DS} = 40V, I_D = 25A

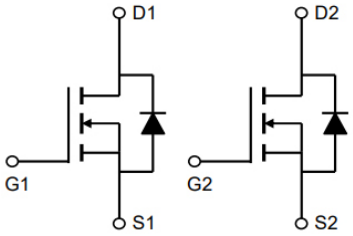
  $R_{DS(ON)}$ < 16mΩ @ V_{GS}=10V

  $R_{DS(ON)}$ < 25mΩ @ V_{GS}=4.5V

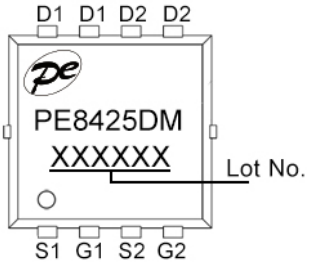
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

Application

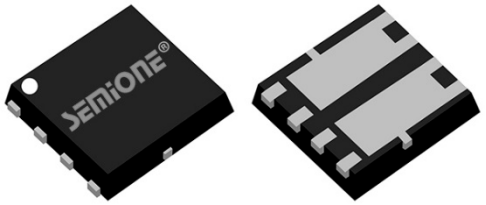
- PWM applications
- Load switch
- Power management



Schematic diagram



Marking and pin assignment



PDFN3.3x3.3-8L

Absolute Maximum Ratings (TC=25℃ unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	25	A
Drain Current-Continuous (T_C=100℃)	I_D	17	A
Pulsed Drain Current (Note 1)	I_{DM}	100	A
Maximum Power Dissipation	P_D	17	W
Avalanche Current	I_{AS}	33	A
Avalanche Energy (L=0.1mH)	E_{AS}	54	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance, Junction-to-Case (Note 2)	$R_{\theta JC}$	7.5	℃/W

Electrical Characteristics (TC=25℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V,I_D=250μA	40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=40V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1	1.6	2.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V,I_D=10A	-	13	16	mΩ
		V_{GS}=4.5V,I_D=8A	-	17	25	mΩ
Forward Transconductance	g_{FS}	V_{DS}=10V,I_D=16A	-	35	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	V_{DS}=20V,V_{GS}=0V, F=1.0MHz	-	1160	-	pF
Output Capacitance	C_{oss}		-	110	-	pF
Reverse Transfer Capacitance (Note 4)	C_{rss}		-	100	-	pF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=20V,I_D=2A,R_L=1Ω, V_{GS}=10V,R_G=3Ω	-	5.5	-	nS
Turn-on Rise Time	t_r		-	14	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	22	-	nS
Turn-Off Fall Time	t_f		-	9	-	nS
Total Gate Charge	Q_g	V_{DS}=20V,I_D=10A,V_{GS}=10V	-	23	-	nC
Gate-Source Charge	Q_{gs}		-	3.5	-	nC
Gate-Drain Charge	Q_{gd}		-	5.3	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=1A	-	-	1.2	V
Diode Continuous Forward Current	I_S		-	-	25	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to product.

Typical Electrical and Thermal Characteristics

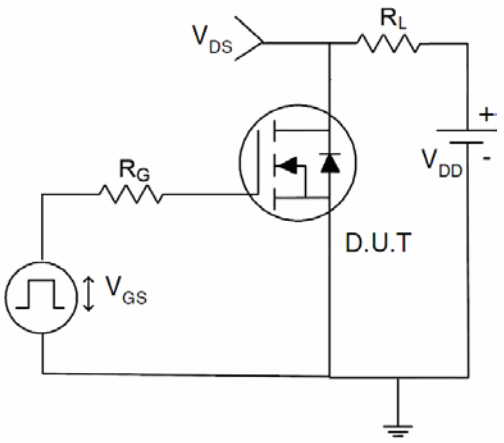


Figure 1 Switching Test Circuit

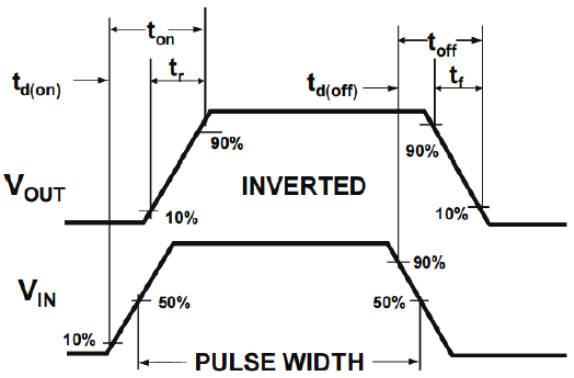


Figure 2 Switching Waveform

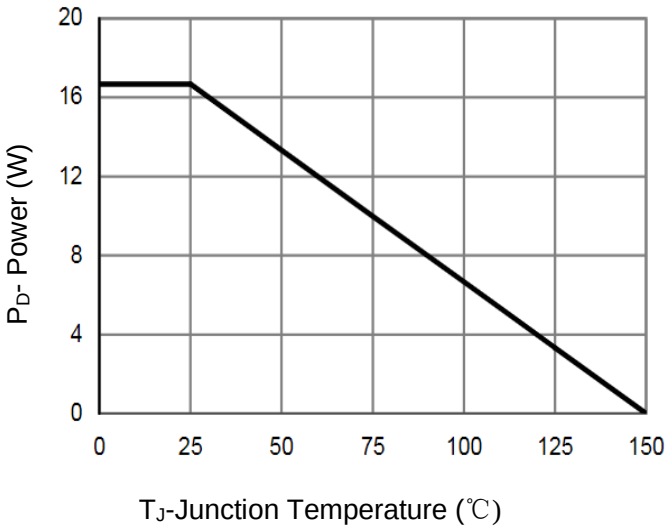


Figure 3 Power De-rating

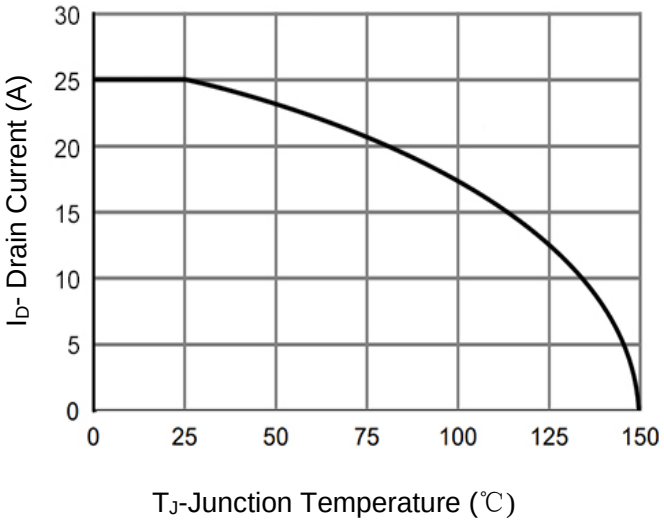


Figure 4 Drain Current

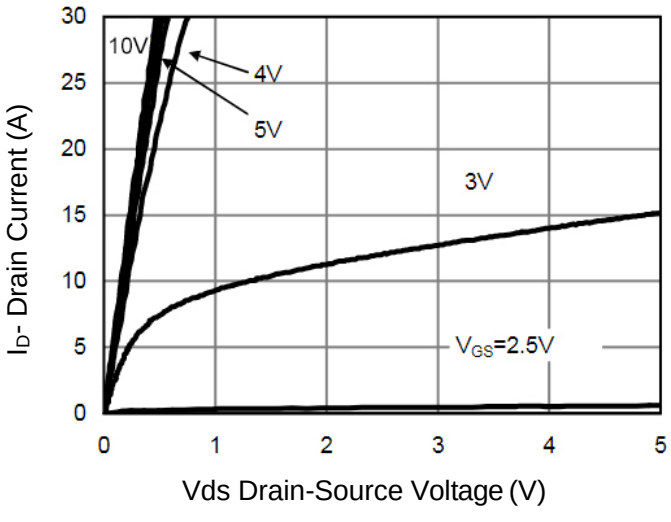


Figure 5 Output Characteristics

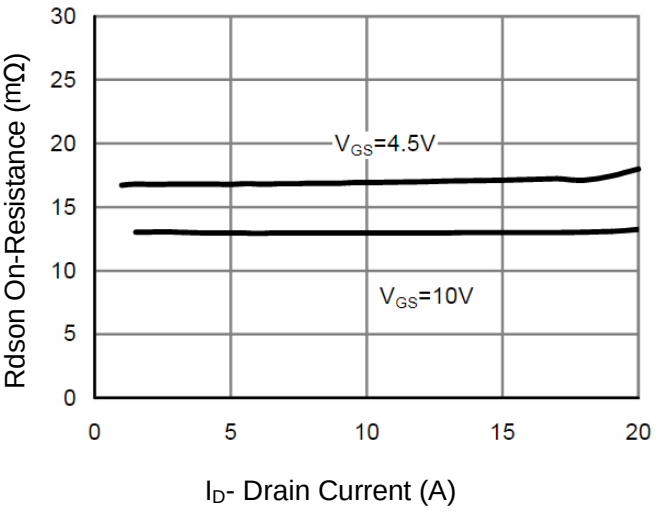


Figure 6 Rdson vs Drain Current

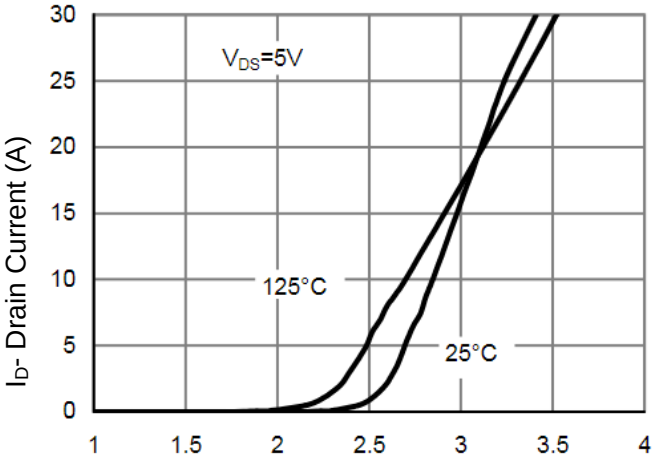


Figure 7 Transfer Characteristics

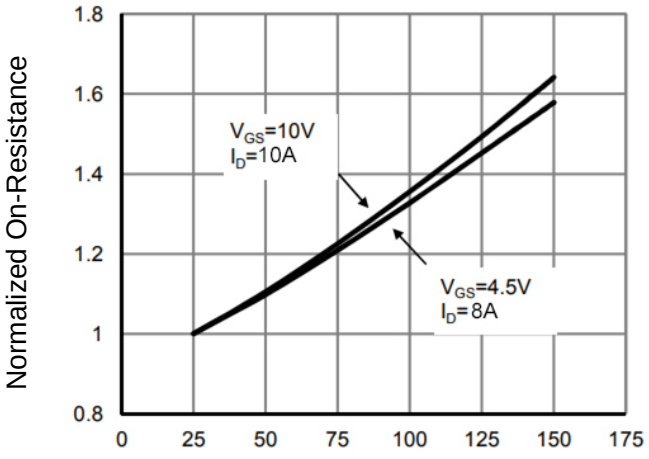


Figure 8 Rdson vs Junction Temperature

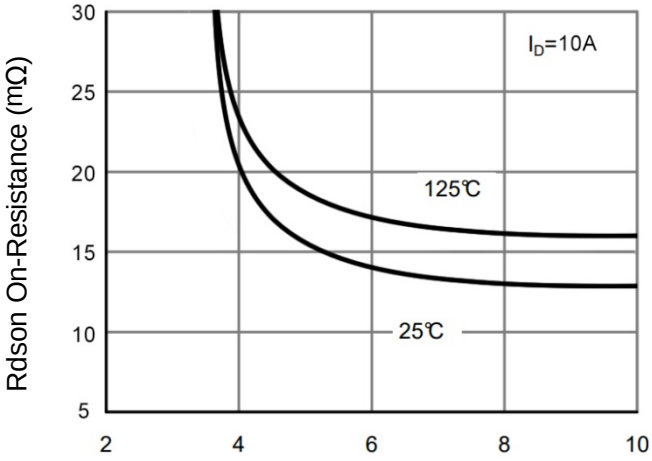


Figure 9 Rdson vs Vgs

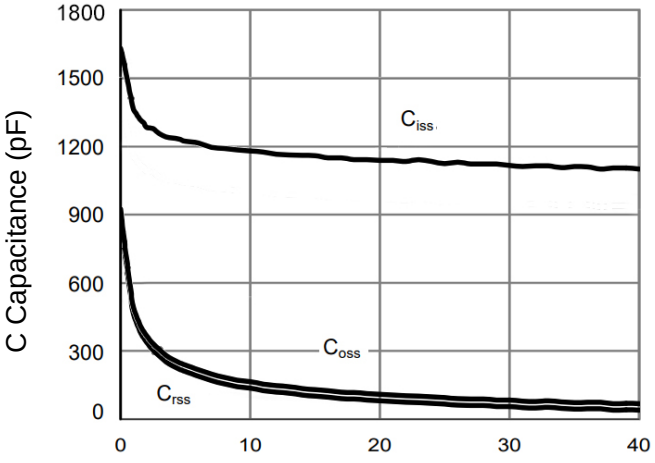


Figure 10 Capacitance vs Vds

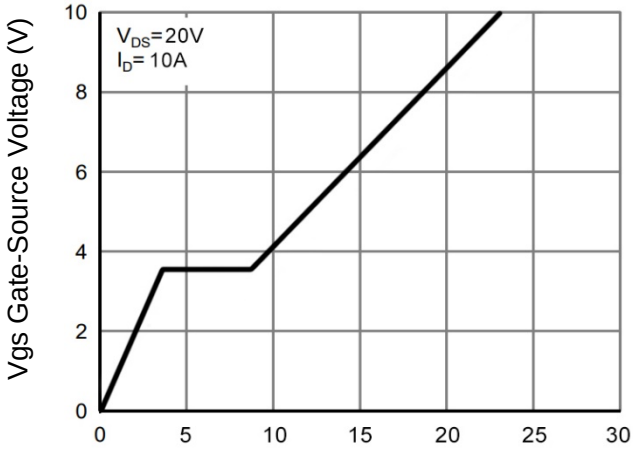


Figure 11 Gate Charge

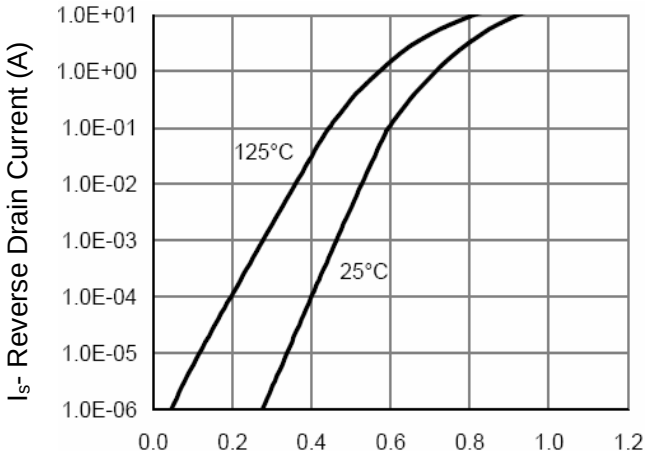


Figure 12 Source- Drain Diode Forward

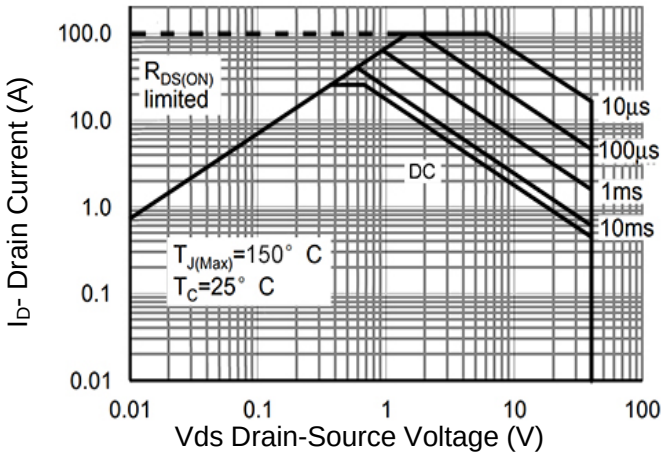


Figure 13 Safe Operation Area

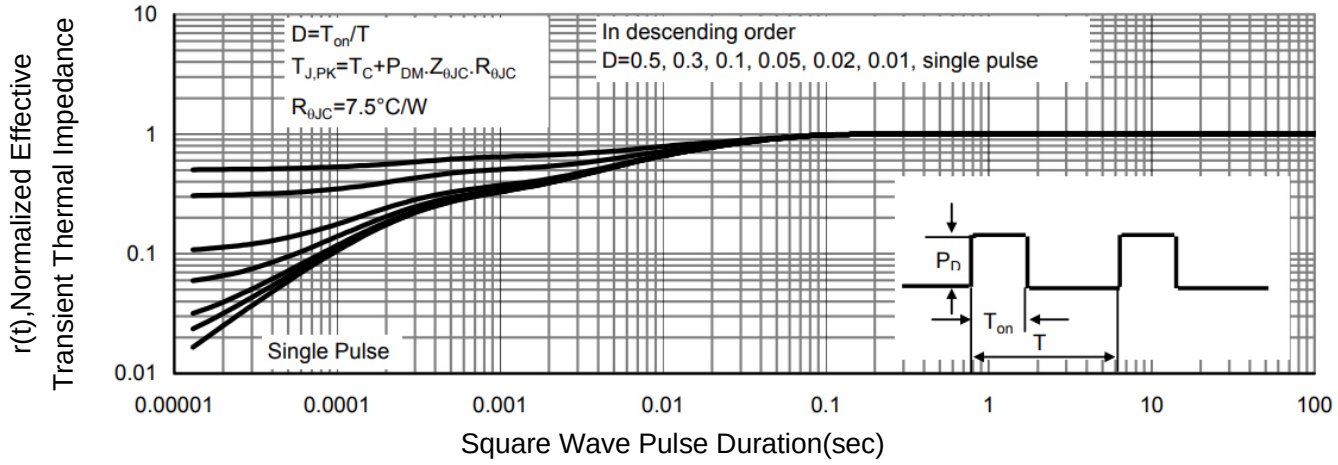
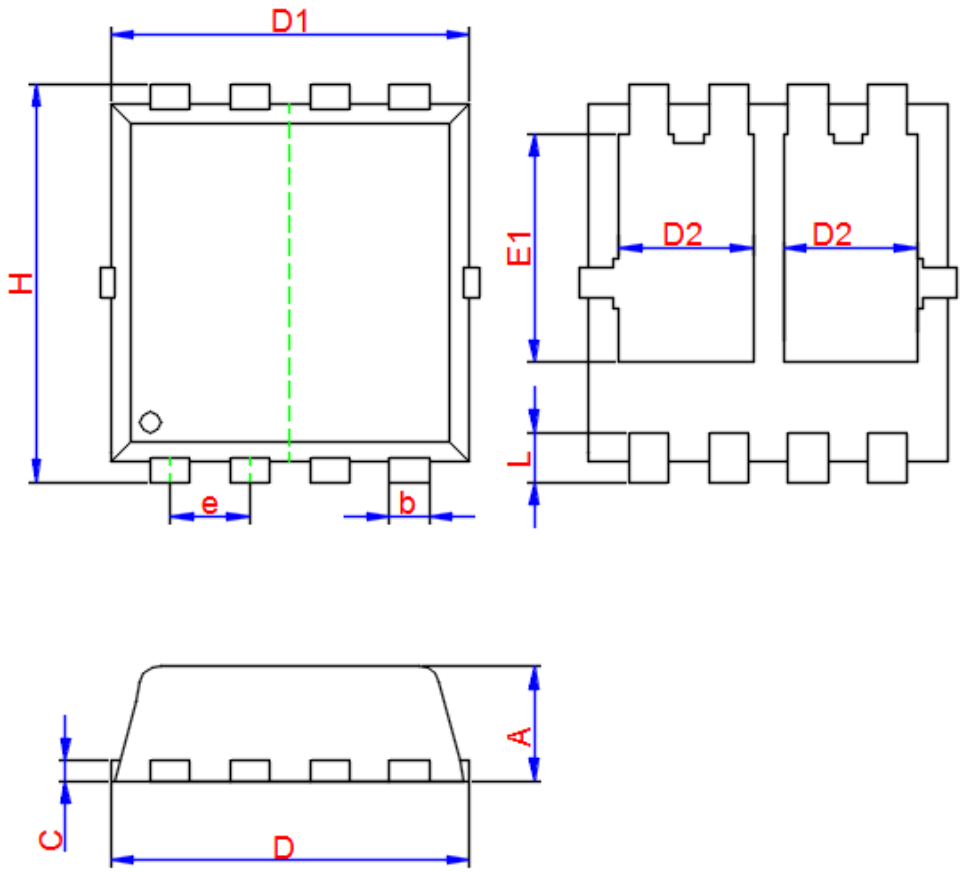


Figure 14 Normalized Maximum Transient Thermal Impedance

PDFN3.3x3.3-8L Package Information



Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	0.675	0.775	0.875
b	0.300TYP.		
C	0.152TYP.		
D	3.100	3.300	3.500
D1	3.050	3.150	3.250
D2	0.835	1.035	1.235
e	0.650TYP.		
E1	1.530	1.730	1.930
H	3.150	3.350	3.550
L	0.280	0.380	0.480