



## N-Channel Enhancement Mode Power MOSFET

### Description

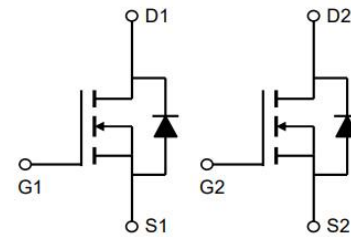
The PE8325DM uses advanced trench technology to provide excellent  $R_{DS(ON)}$  and low gate charge. It can be used in a wide variety of applications.

### General Features

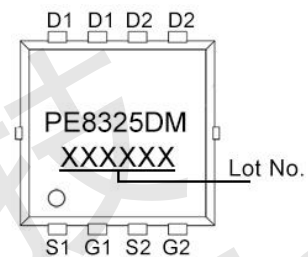
- $V_{DS} = 30V$ ,  $I_D = 14A$
- $R_{DS(ON)} < 10m\Omega$  @  $V_{GS}=10V$
- $R_{DS(ON)} < 17m\Omega$  @  $V_{GS}=4.5V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

### Application

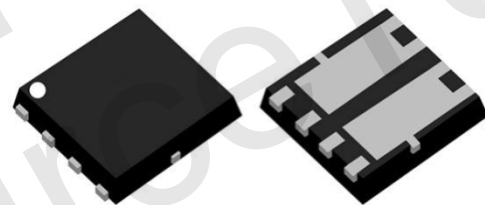
- PWM applications
- Load switch
- Power management



Schematic diagram



Marking and pin assignment



PDFN3.3x3.3-8L

### Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	14	A
Drain Current-Continuous (TC=100°C)	$I_D$	9.6	A
Pulsed Drain Current (Note 1)	$I_{DM}$	42	A
Maximum Power Dissipation	$P_D$	20.5	W
Avalanche Current	$I_{AS}$	20	A
Avalanche Energy (L=0.5mH)	$E_{AS}$	100	mJ
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	°C

### Thermal Characteristic

Thermal Resistance, Junction-to-Case <sup>(Note 2)</sup>	$R_{\theta JC}$	6	°C/W
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Electrical Characteristics (TC=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=30V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.6	2.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=10A$	-	8.5	10	m $\Omega$
		$V_{GS}=4.5V, I_D=8A$	-	13	17	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=10A$	-	32	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0MHz$	-	1300	-	pF
Output Capacitance	$C_{oss}$		-	175	-	pF
Reverse Transfer Capacitance (Note 4)	$C_{rss}$		-	121	-	pF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=15V, R_L=1\Omega,$ $V_{GS}=10V, R_G=3\Omega$	-	4.2	-	nS
Turn-on Rise Time	$t_r$		-	8.2	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	31	-	nS
Turn-Off Fall Time	$t_f$		-	4	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=15V, I_D=10A,$ $V_{GS}=10V$	-	28	-	nC
Gate-Source Charge	$Q_{gs}$		-	3.5	-	nC
Gate-Drain Charge	$Q_{gd}$		-	7	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=1A$	-	-	1.2	V
Diode Forward Current (Note 2)	$I_S$		-	-	7	A

Notes:

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



## Typical Electrical and Thermal Characteristics

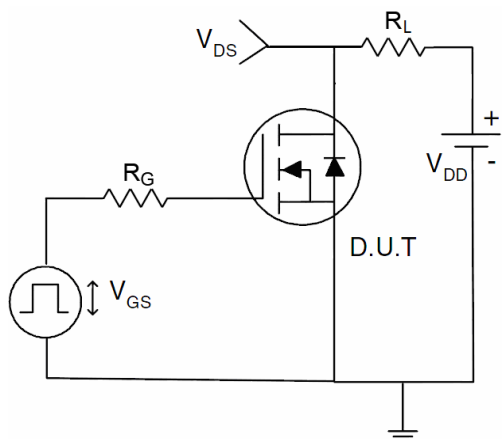


Figure 1 Switching Test Circuit

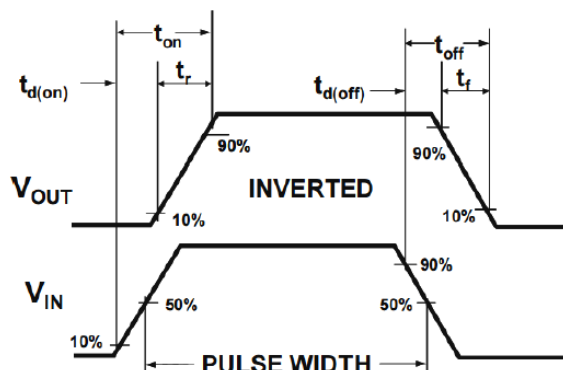
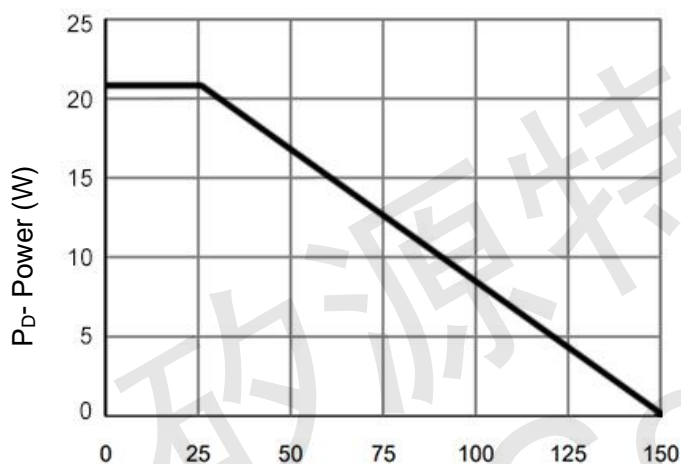
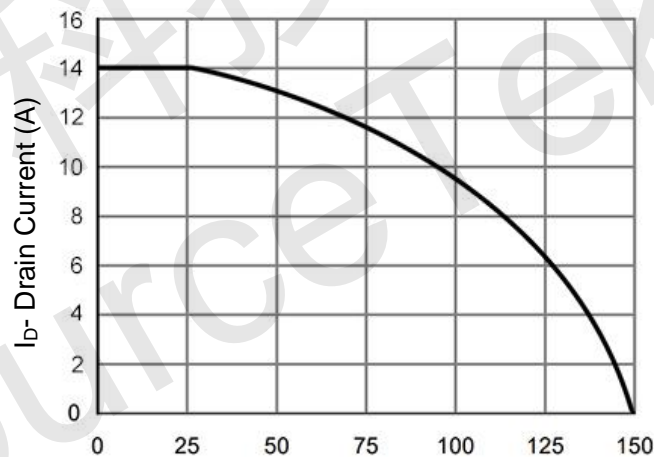


Figure 2 Switching Waveform



$T_J$ -Junction Temperature ( $^{\circ}\text{C}$ )

Figure 3 Power De-rating



$T_J$ -Junction Temperature ( $^{\circ}\text{C}$ )

Figure 4 Drain Current

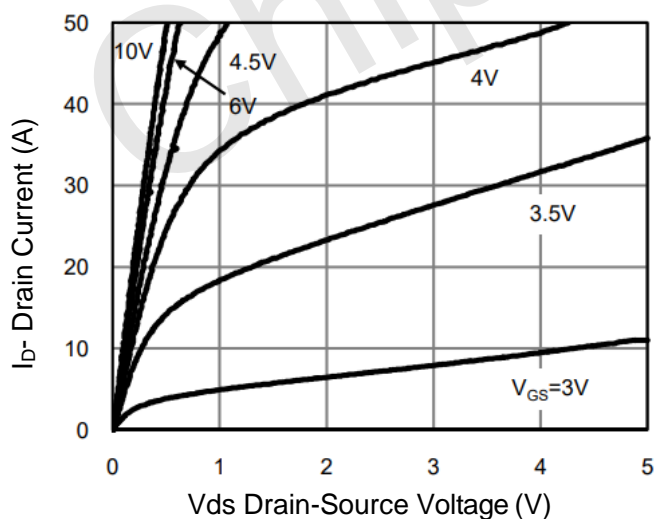


Figure 5 Output Characteristics

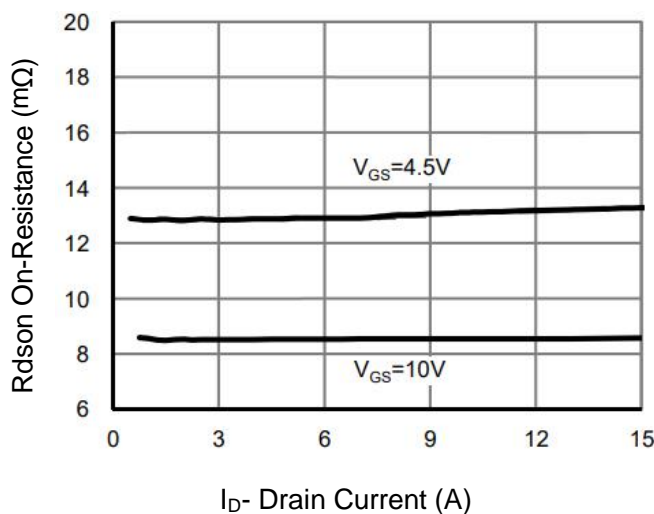


Figure 6 Rdson vs Drain Current

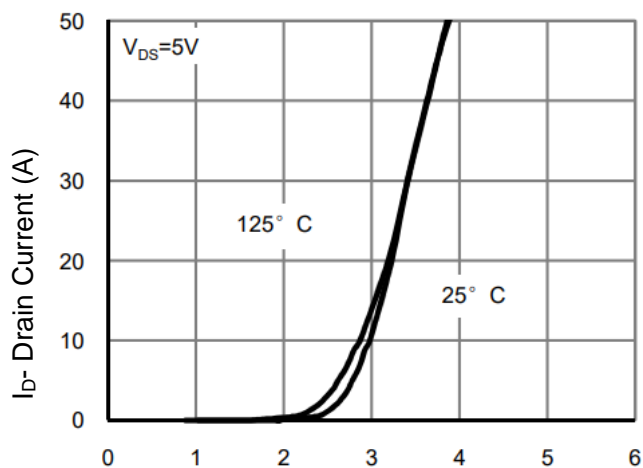


Figure 7 Transfer Characteristics

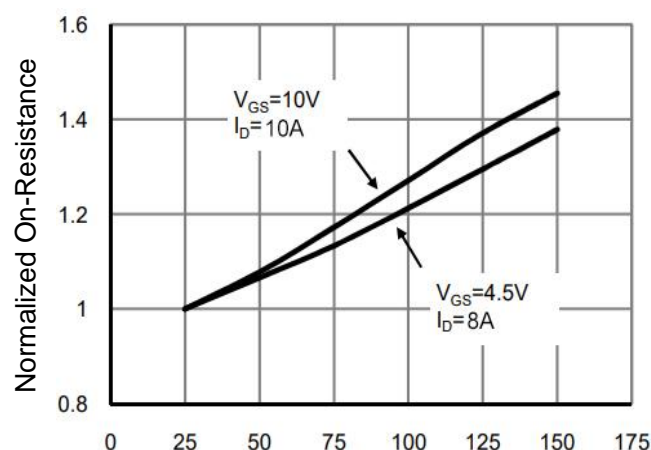


Figure 8  $R_{DS(on)}$  vs Junction Temperature

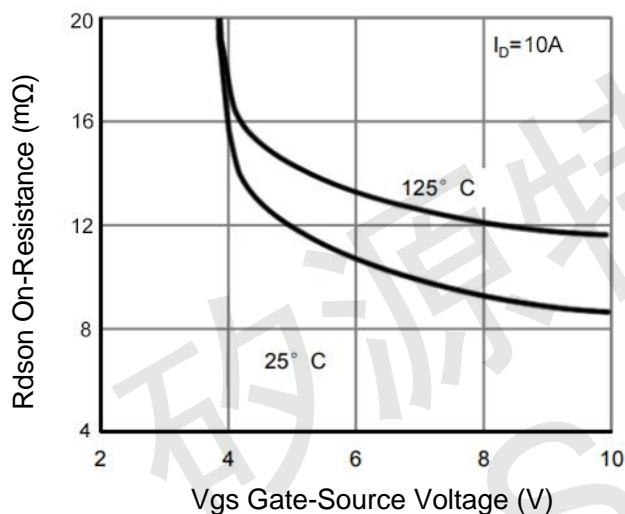


Figure 9  $R_{DS(on)}$  vs  $V_{GS}$

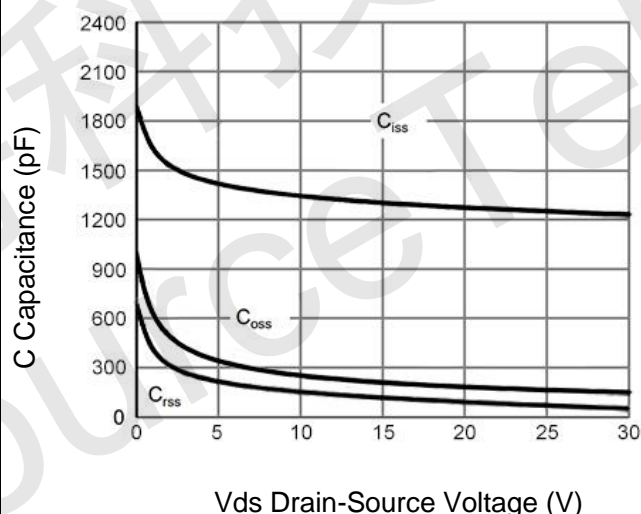


Figure 10 Capacitance vs  $V_{DS}$

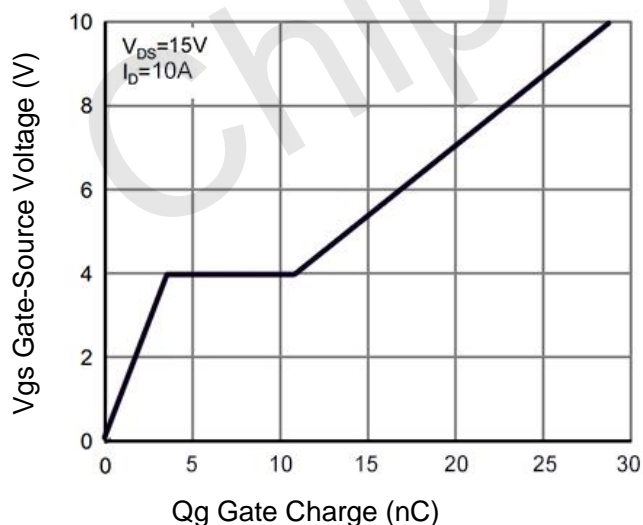


Figure 11 Gate Charge

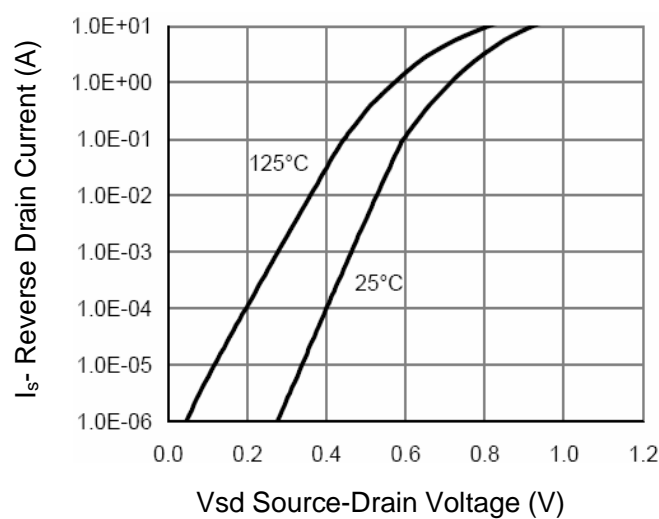


Figure 12 Source- Drain Diode Forward

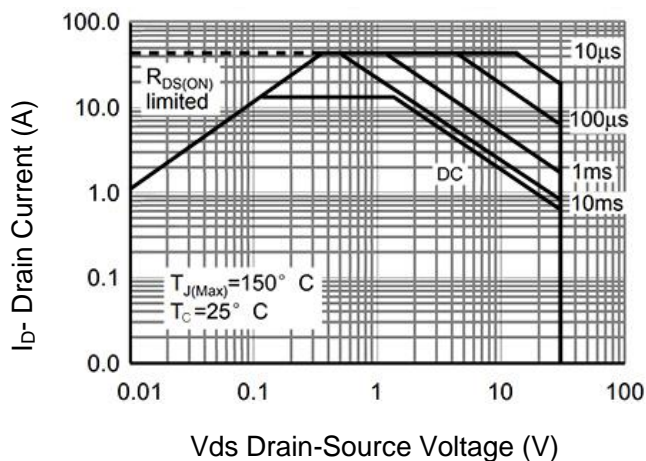


Figure 13 Safe Operation Area

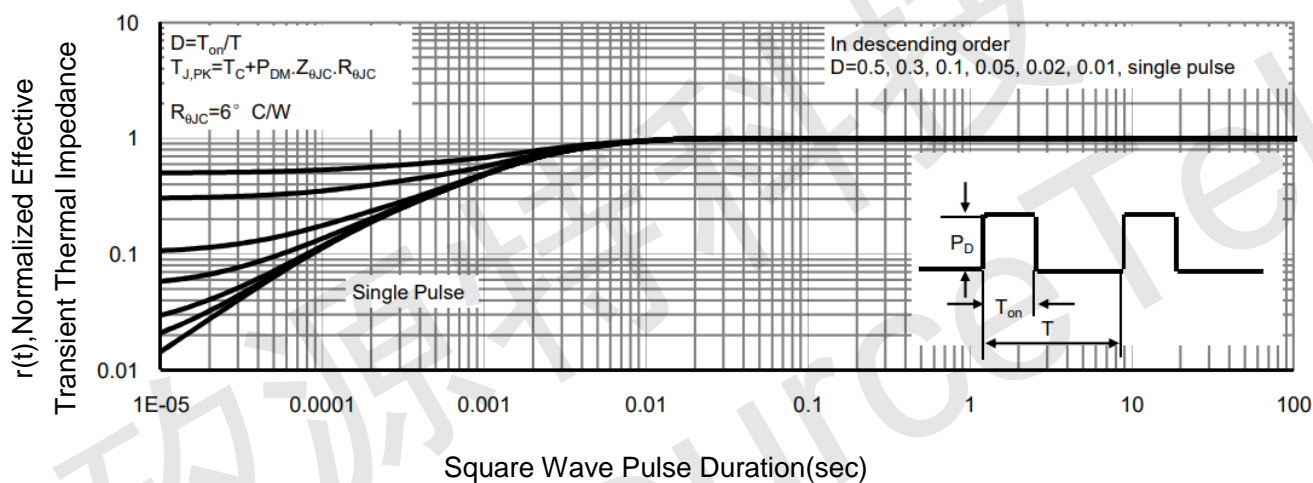
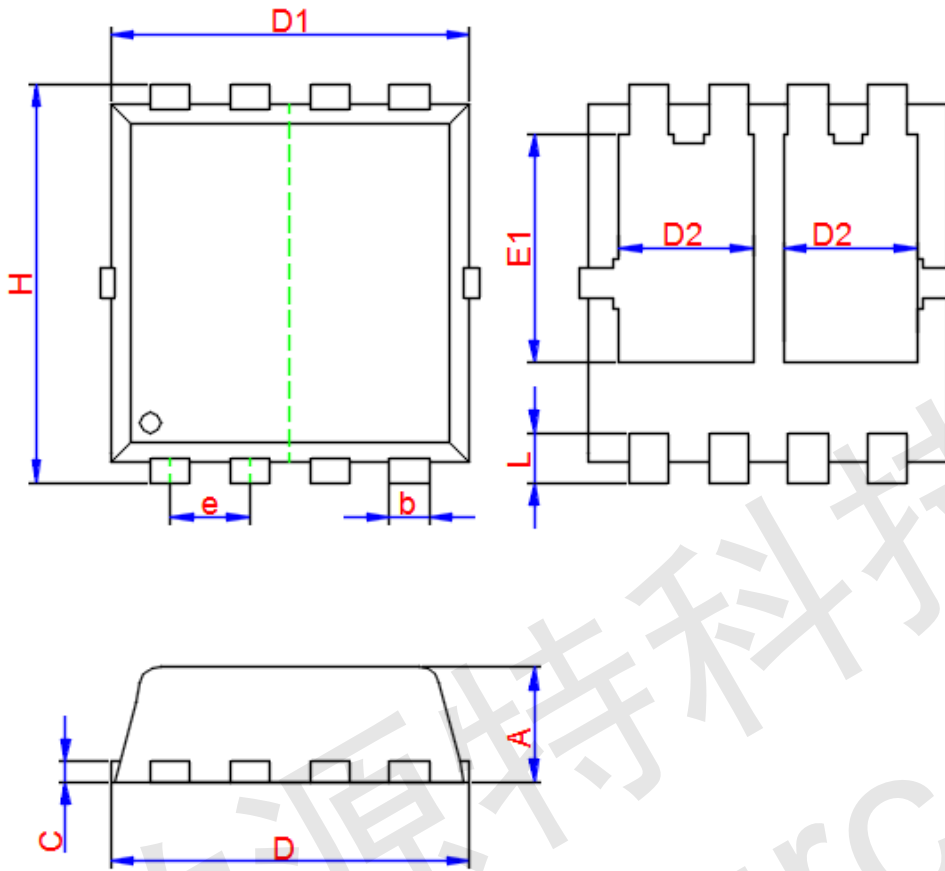


Figure 14 Normalized Maximum Transient Thermal Impedance





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