N-Channel Enhancement Mode Power MOSFET

Description

The PED2317N uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a load switch or in PWM applications. It is ESD protected.
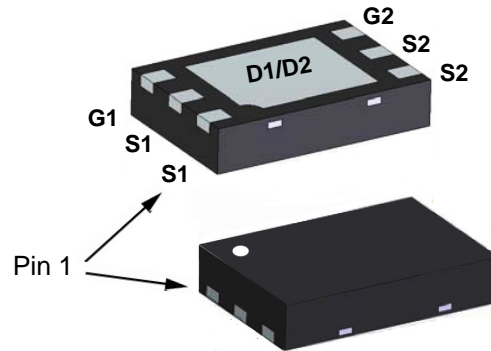
General Features

● V_{DS} = 20V, I_D =10A

$R_{DS(ON)}$ = 7.7mΩ @ V_{GS}=4.5V
$R_{DS(ON)}$ = 7.9mΩ @ V_{GS}=4.2V
$R_{DS(ON)}$ = 8.3mΩ @ V_{GS}=3.8V
$R_{DS(ON)}$ = 10.9mΩ @ V_{GS}=2.5V

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

Application

● PWM application
● Load switch
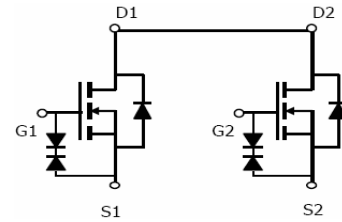
Schematic diagram

DFN2x3-6L Pin assignment and Top / Bottom View

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	I_D	10	A
Drain Current-Pulsed (Note 1)	I_{DM}	30	A
Maximum Power Dissipation	P_D	0.98	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	126	℃/W

Electrical Characteristics (TA=25℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V$ $I_D=250\mu A$	20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=20V,V_{GS}=0V$	-	-	1	μA

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm12V,V_{DS}=0V$	-	-	±10	μA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS},I_D=250\mu A$	0.45	0.65	1	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=4.5V, I_D=5.5A$	7.2	7.7	9	mΩ
		$V_{GS}=4.2V, I_D=5.5A$	7.4	7.9	9.4	mΩ
		$V_{GS}=3.8V, I_D=5.0A$	7.8	8.3	10	mΩ
		$V_{GS}=2.5V, I_D=5.0A$	10	10.9	12	mΩ
Forward Transconductance	g_{FS}	$V_{DS}=5V,I_D=5A$	-	20	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{Iss}	$V_{DS}=10V,V_{GS}=0V,$ F=1.0MHz	-	1640	-	PF
Output Capacitance	C_{oss}		-	164	-	PF
Reverse Transfer Capacitance	C_{rss}		-	132	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=15V, I_D=5.5A$ $V_{GS}=4.5V, R_{GEN}=6\Omega$	-	9.4		nS
Turn-on Rise Time	t_r		-	37		nS
Turn-Off Delay Time	$t_{d(off)}$		-	62		nS
Turn-Off Fall Time	t_f		-	26		nS
Total Gate Charge	Q_g	$V_{DS}=15V,I_D=5.5A,$ $V_{GS}=4.5V$	-	21		nC
Gate-Source Charge	Q_{gs}		-	3.5	-	nC
Gate-Drain Charge	Q_{gd}		-	8.4	-	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		-	-	9.5	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 production
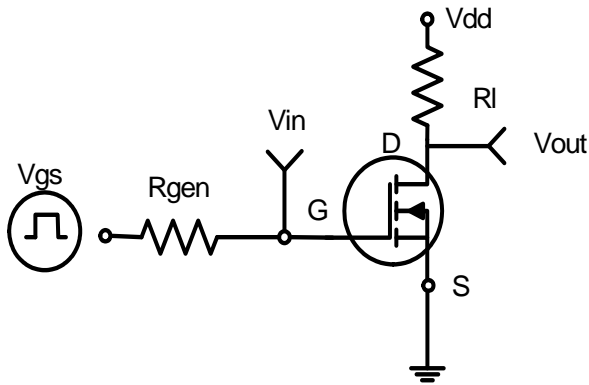
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS
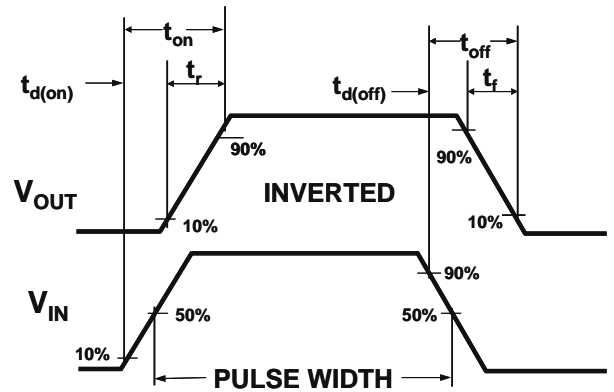
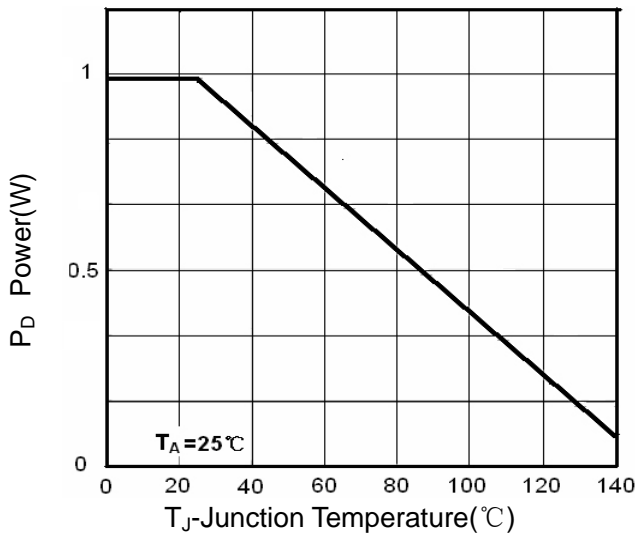**Figure 1:Switching Test Circuit**

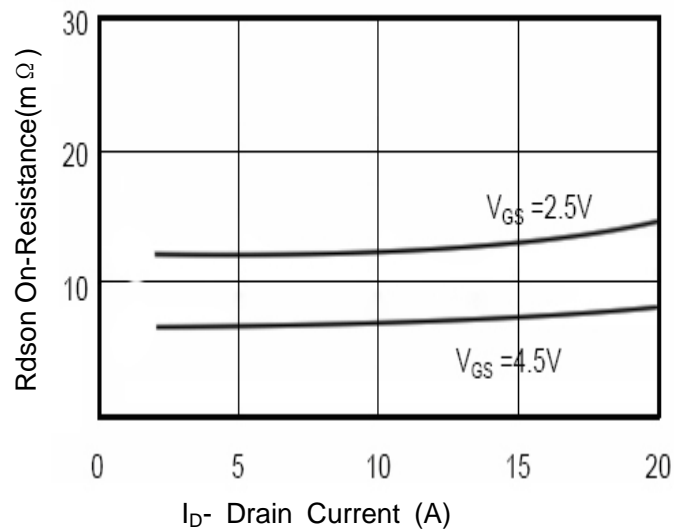**Figure 2:Switching Waveforms**
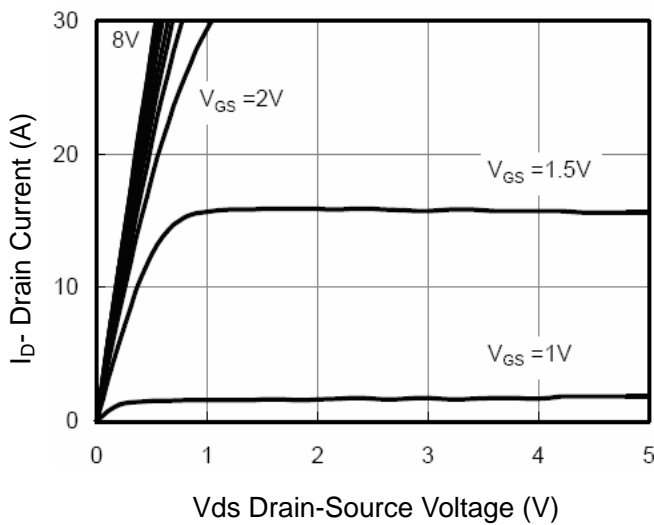
Figure 3 Power Dissipation
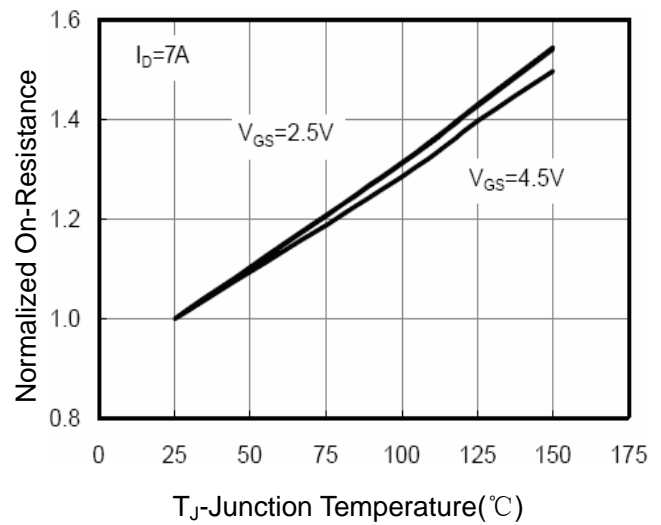
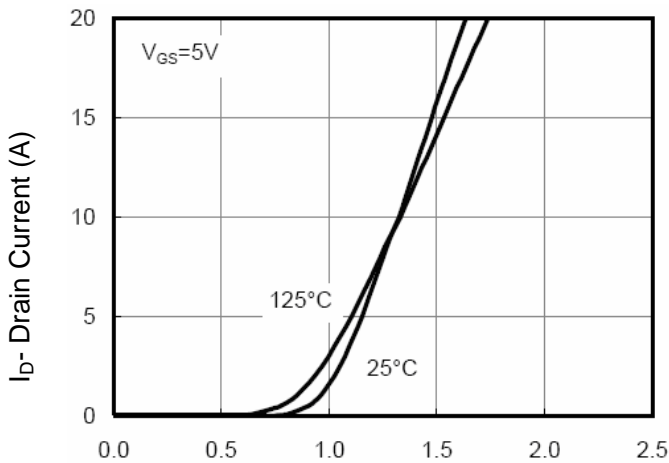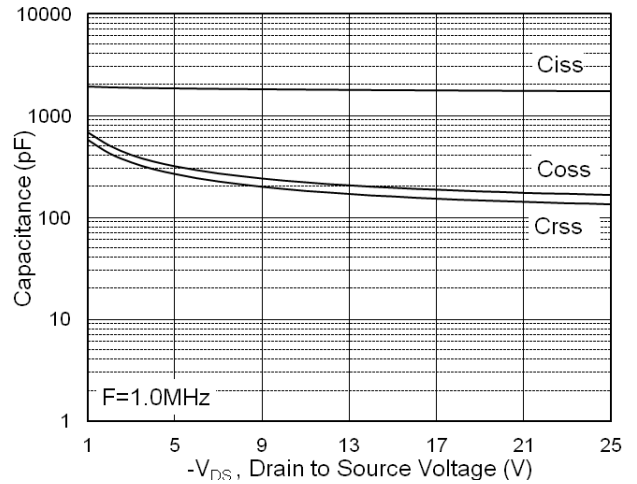**Figure 4 Drain-Source On-Resistance**

Figure 5 Output CHARACTERISTICS

Figure 6 Drain-Source On-Resistance

Figure 7 Transfer Characteristics

Figure 8 Capacitance vs Vds
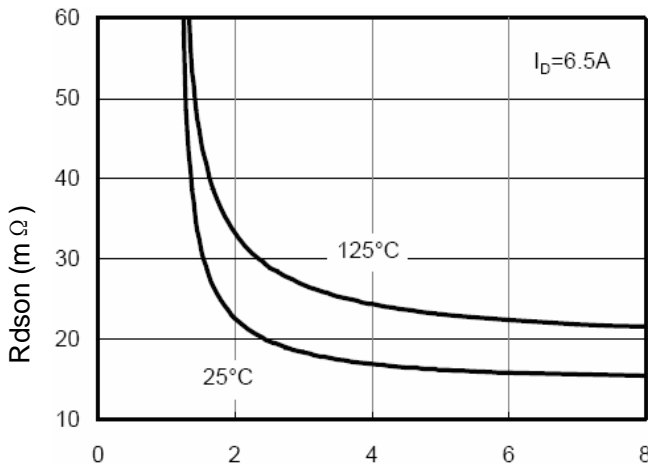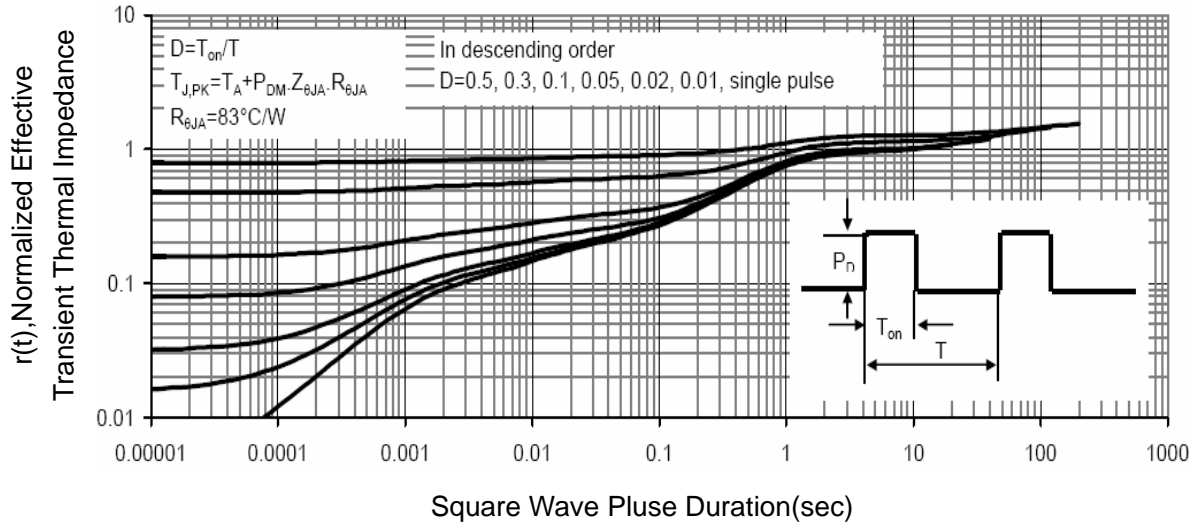
Figure 9 Rdson vs Vgs
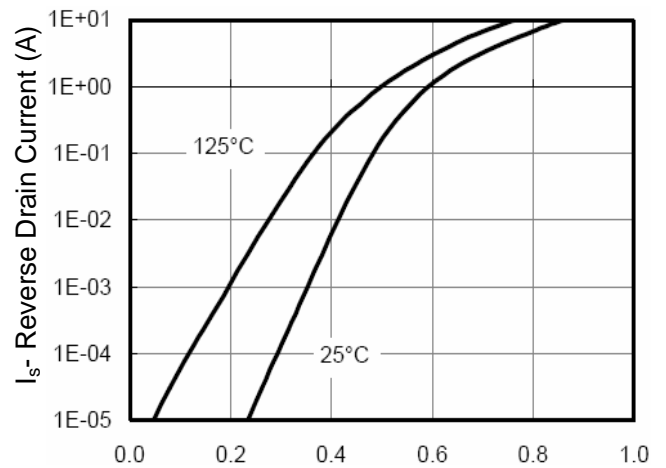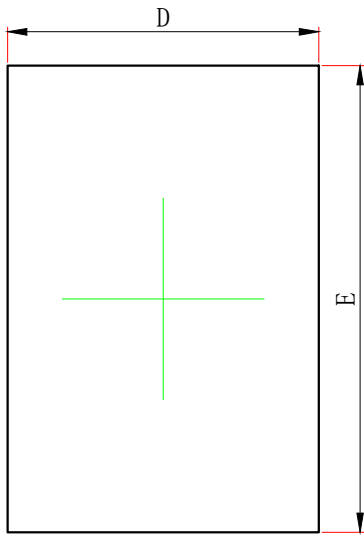
Figure 10 Capacitance vs Vds
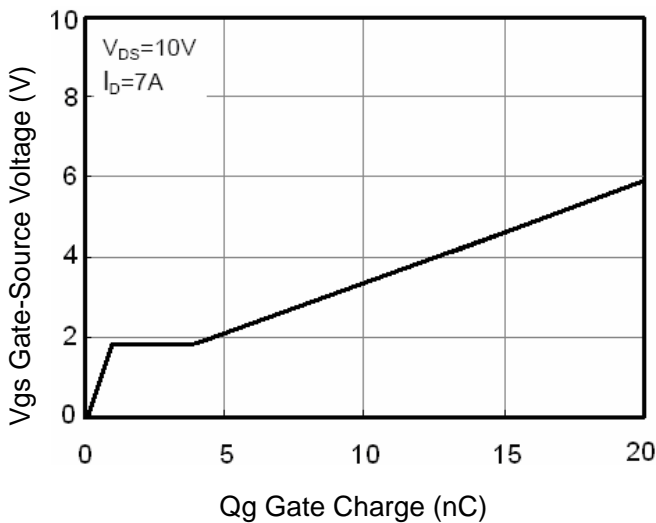
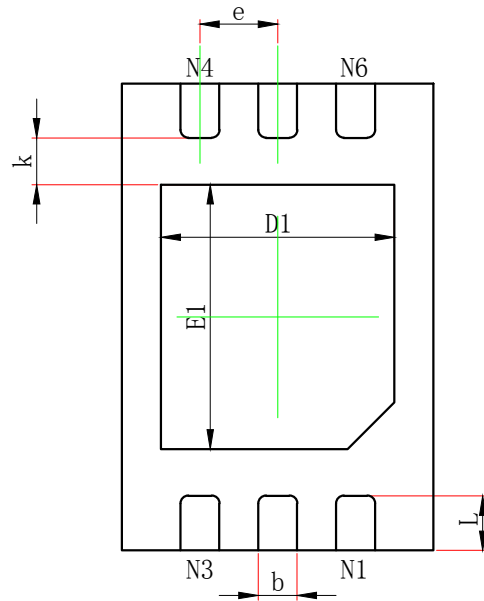Figure 11 Gate Charge
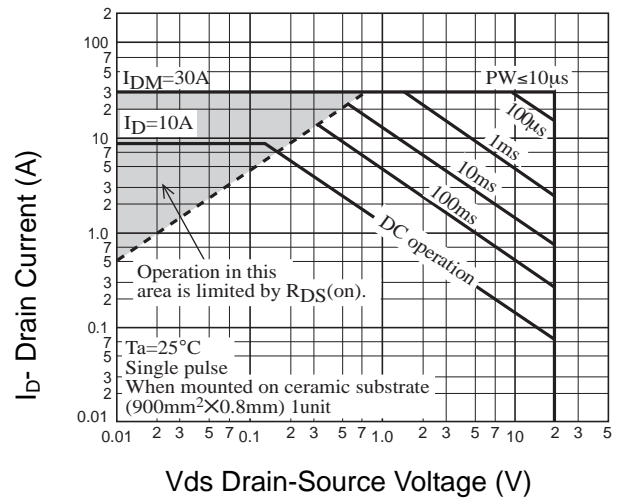
Figure 12   Safe Operation Area
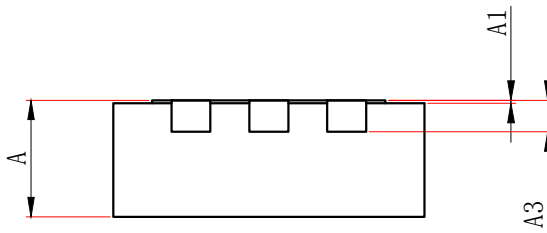
Figure 13 Normalized Maximum Transient Thermal Impedance

DFNWB2×3-6L(P0.50T0.75) PACKAGEOUTLINEDIMENSIONS

TOPVIEW

BOTTOMVIEW

SIDEVIEW

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A3	0.203REF.		0.008REF.	
D	1.950	2.050	0.077	0.081
E	2.950	3.050	0.116	0.120
D1	1.450	1.550	0.057	0.061
E1	1.650	1.750	0.065	0.069
k	0.200MIN.		0.008MIN.	
b	0.200	0.300	0.008	0.012
e	0.500TYP.		0.020TYP.	
L	0.300	0.400	0.012	0.016