PED30P09M

## P-Channel Enhancement Mode Power MOSFET

Description

The PED30P09M 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 = -9A
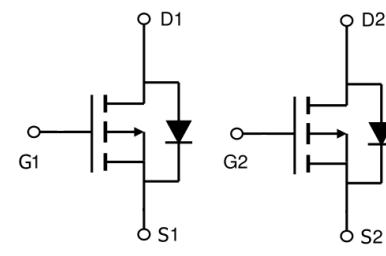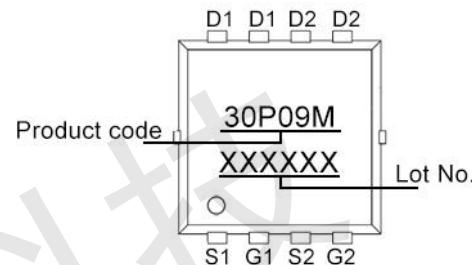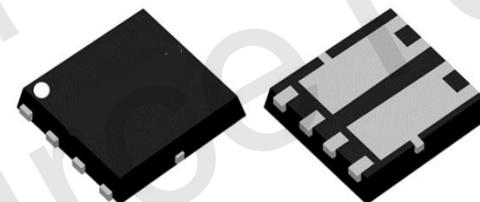
  $R_{DS(ON)}$ < 30mΩ @ V_{GS}=-10V
  $R_{DS(ON)}$ < 45mΩ @ V_{GS}=-4.5V

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

Application

- PWM applications
- Load switch
- Power management

Schematic diagram

Marking

Product code — 30P09M

XXXXXX — Lot No.

PDFN3.3x3.3-8L

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	-9	A
Drain Current-Continuous (TC=100℃)	I_D	-6	A
Pulsed Drain Current [Note 1]	I_{DM}	-36	A
Maximum Power Dissipation	P_D	17	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance, Junction-to-Case [Note 2]	$R_{\theta JC}$	7.4	℃/W

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Electrical Characteristics (TC =25℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-30V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm20V, V_{DS}=0V$	-	-	±100	nA
On Characteristics [Note 3]						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	-1.5	-2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-6A$	-	25	30	mΩ
		$V_{GS}=-4.5V, I_D=-3A$	-	36	45	mΩ
Forward Transconductance	g_{FS}	$V_{DS}=-10V, I_D=-6A$	-	25	-	S
Dynamic Characteristics [Note 4]						
Input Capacitance	C_{iss}	$V_{DS}=-15V, V_{GS}=0V$, F=1.0MHz	-	480	-	pF
Output Capacitance	C_{oss}		-	120	-	pF
Reverse Transfer Capacitance [Note 4]	C_{rss}		-	54	-	pF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-15V, R_L=1\Omega$, $V_{GS}=-10V, R_G=3\Omega$	-	8	-	nS
Turn-on Rise Time	t_r		-	5	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	28	-	nS
Turn-Off Fall Time	t_f		-	12	-	nS
Total Gate Charge	Q_g	$V_{DS}=-15V, I_D=-4A, V_{GS}=-10V$	-	14	-	nC
Gate-Source Charge	Q_{gs}		-	2	-	nC
Gate-Drain Charge	Q_{gd}		-	3	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage [Note 3]	V_{SD}	$V_{GS}=0V, I_S=-1A$	-	-	-1.2	V

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.

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## Typical Electrical and Thermal Characteristics
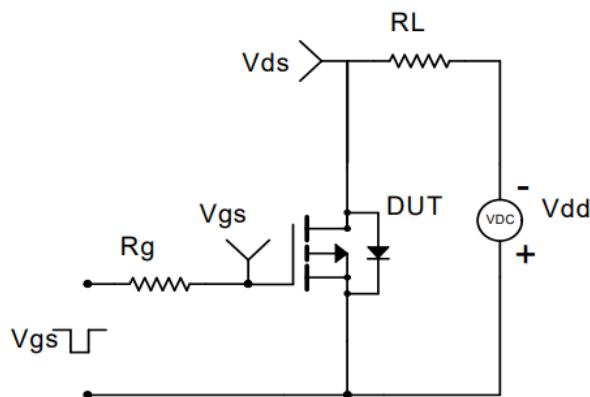
**Figure 1 Switching Test Circuit**
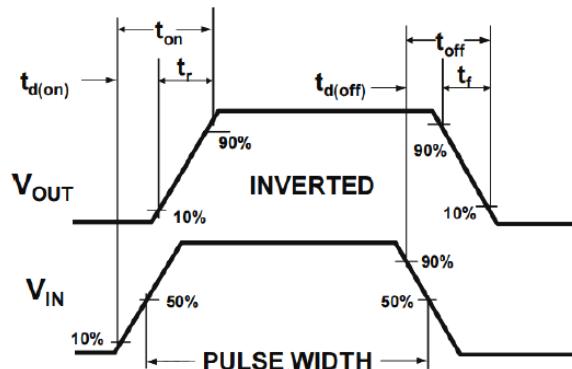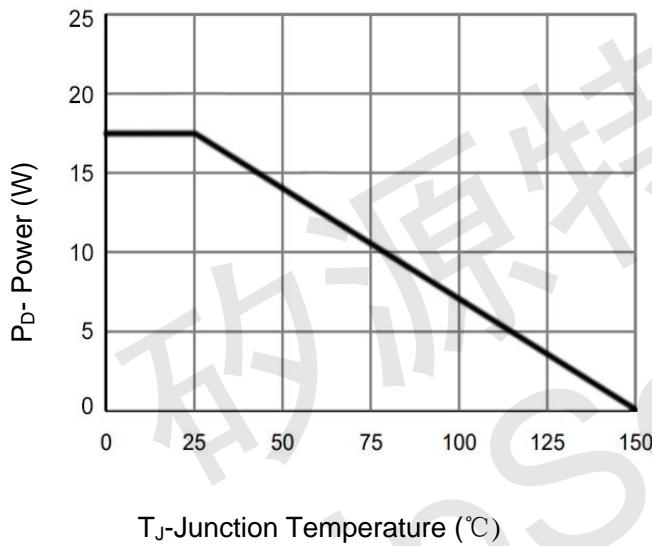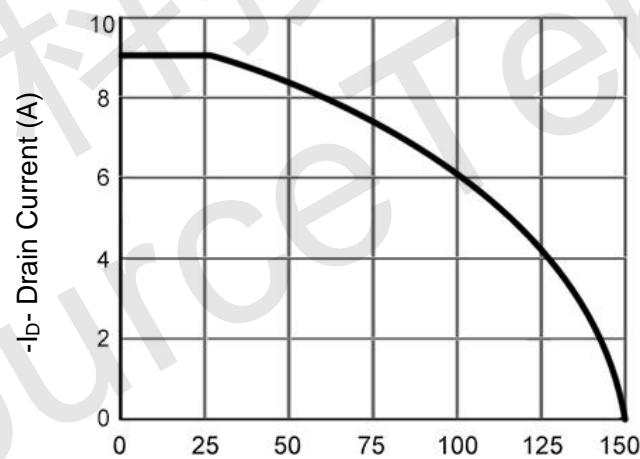

Figure 2 Switching Waveform
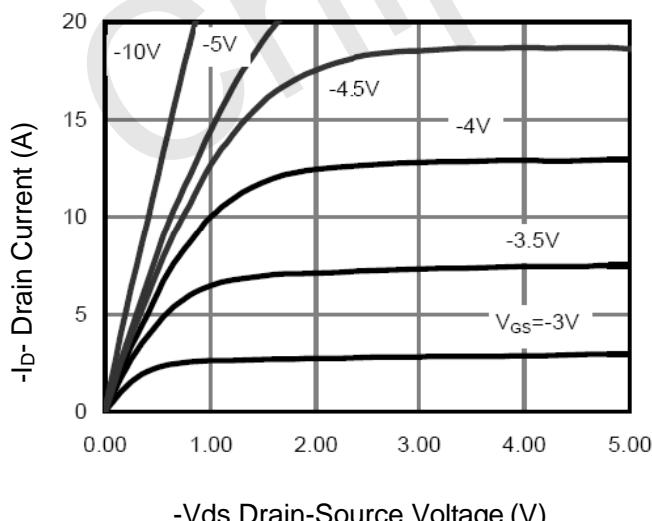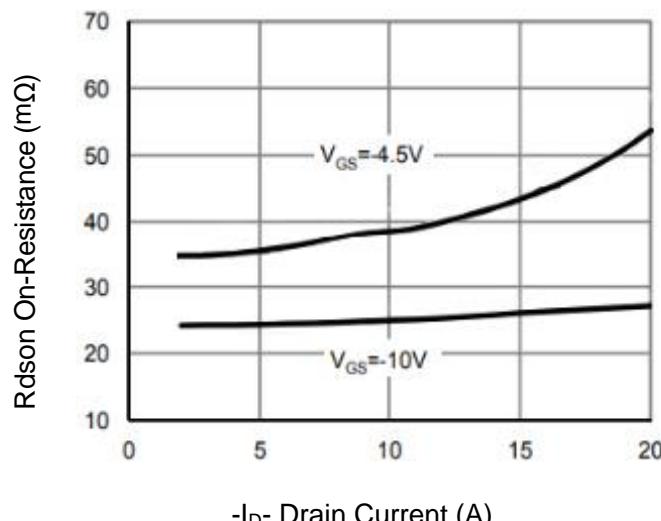

**Figure 3 Power De-rating**

Figure 4 Drain Current

Figure 5 Output Characteristics

Figure 6 Rdson vs Drain Current

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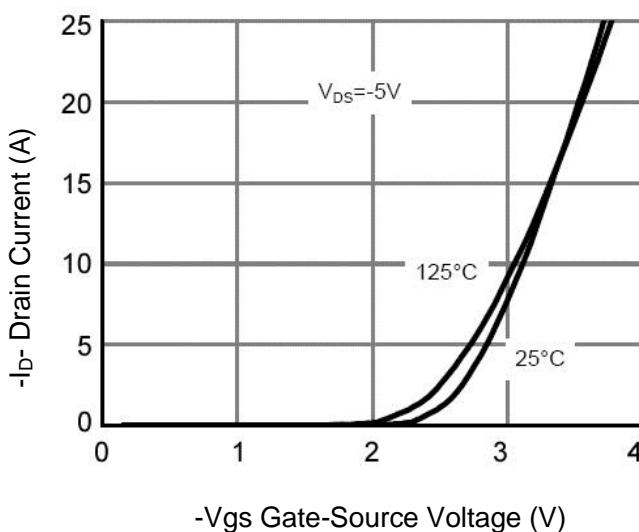
Figure 7 Transfer Characteristics
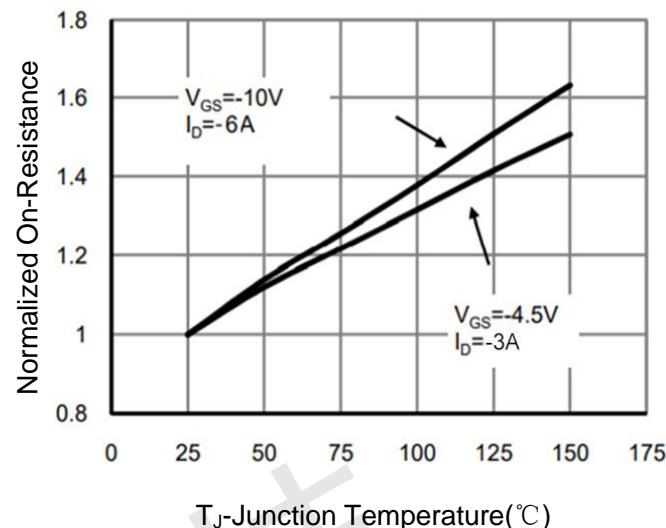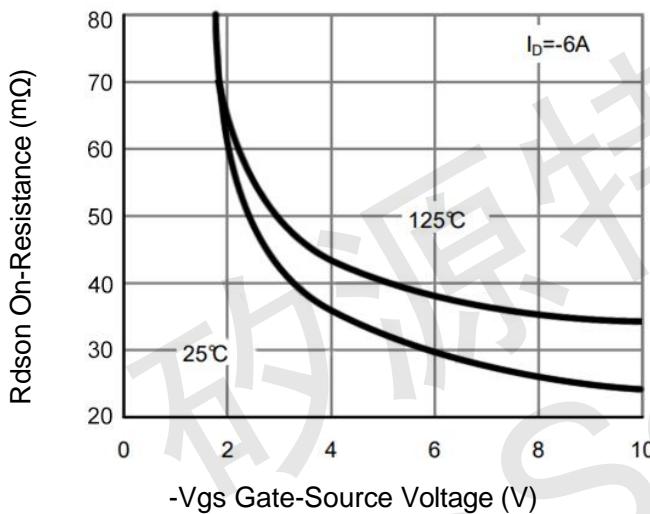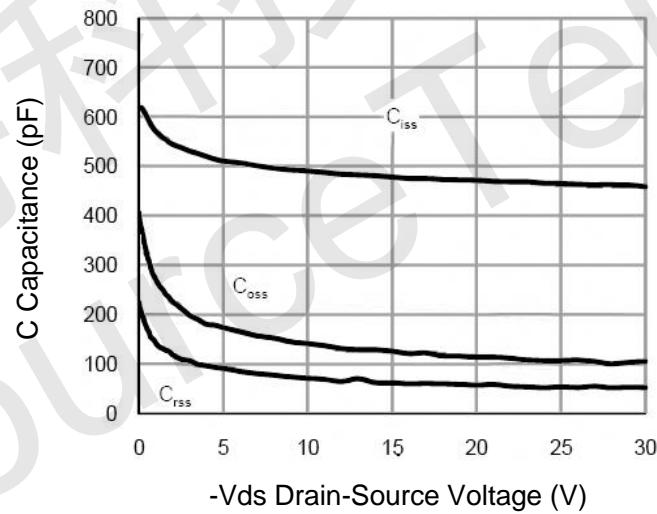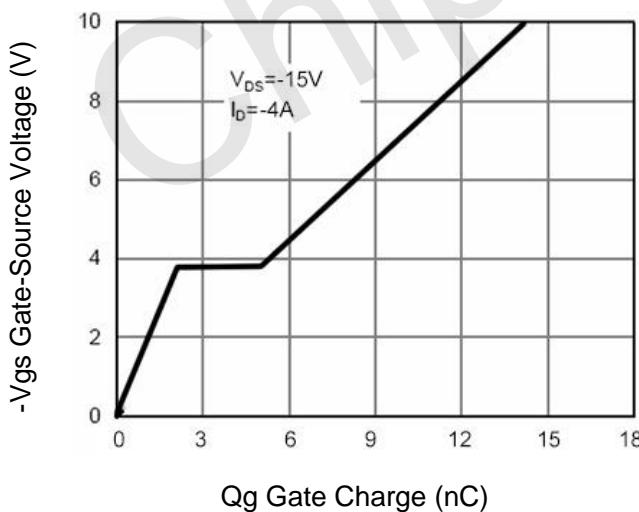
**Figure 8 Rdson vs Junction Temperature**


Figure 9 Rdson vs Vgs

**Figure 10 Capacitance vs Vds**

Figure 11 Gate Charge
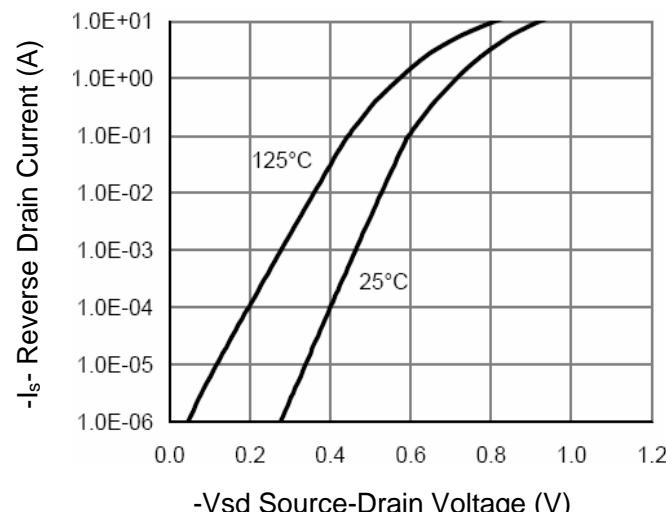
Figure 12 Source- Drain Diode Forward

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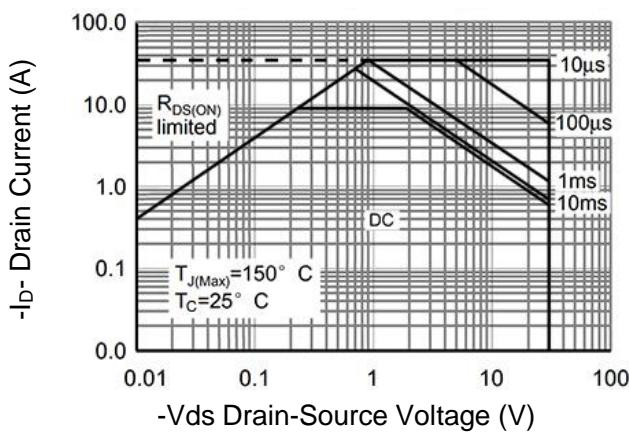
Figure 13 Safe Operation Area
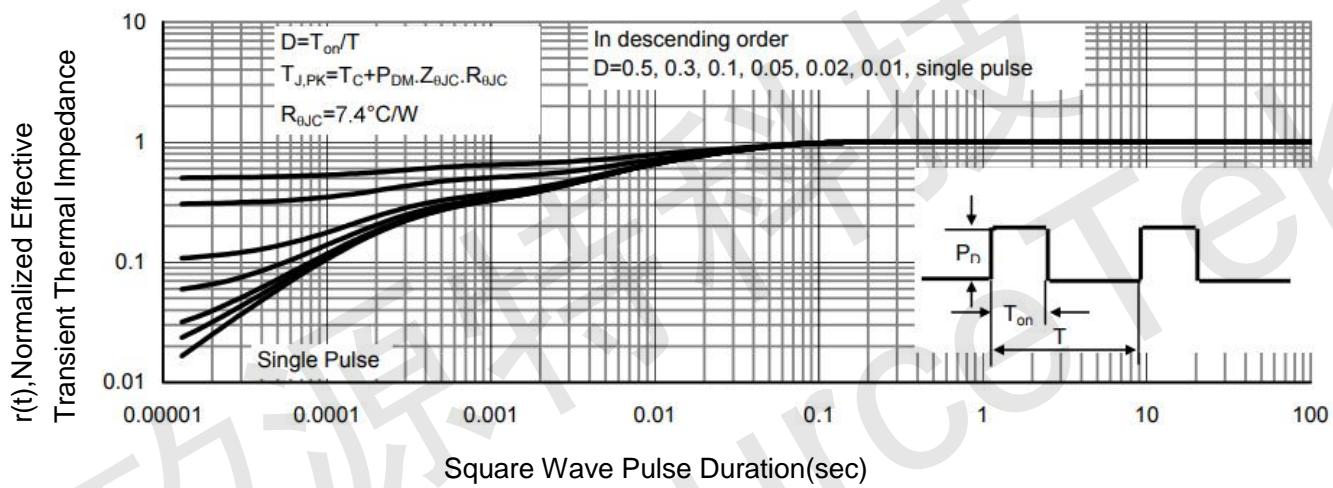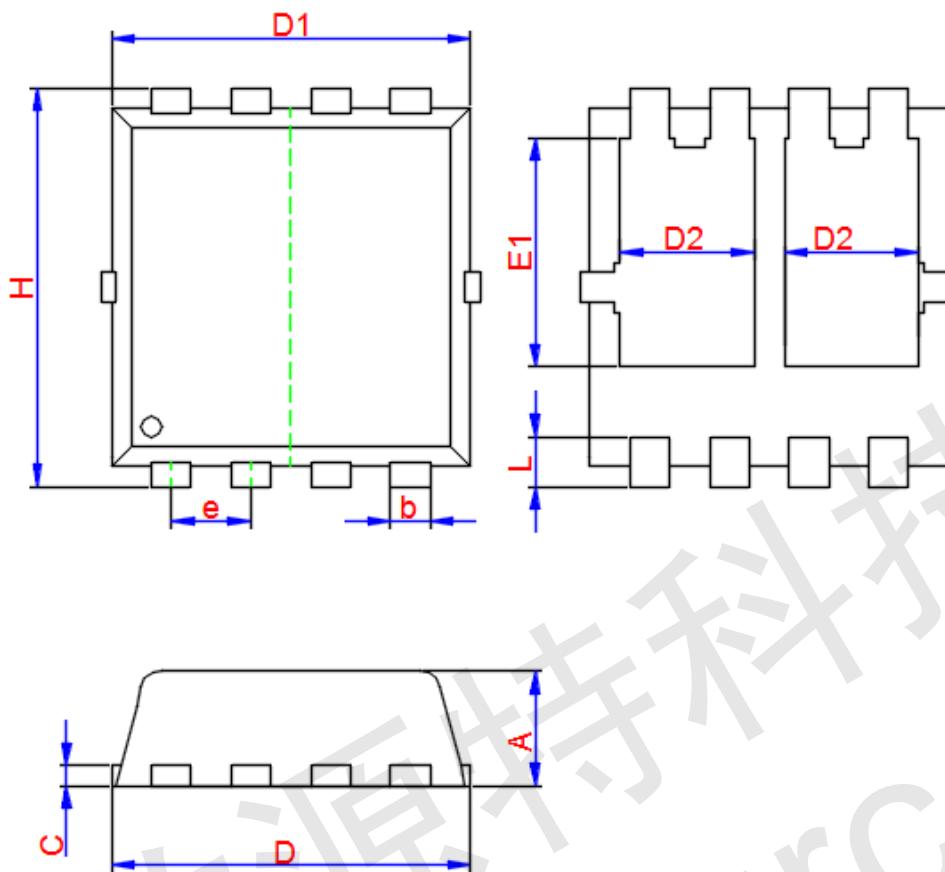
Figure 14 Normalized Maximum Transient Thermal Impedance

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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