

DATASHEET

N-Channel Enhancement Mode Power MOSFET

Description

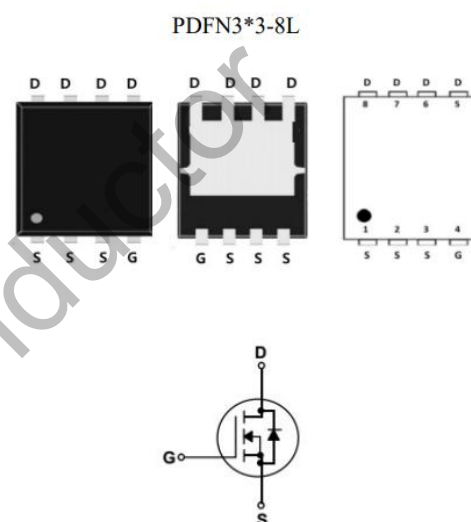
This Power MOSFET is produced using advanced TRENCH technology.

This advanced technology has been especially tailored to minimize conduction loss, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

Features

- $V_{DS} = 30V$, $I_D = 90A$
- $R_{DS(ON)} TYP = 3.3m\Omega @ V_{GS} = 10V$
- $R_{DS(ON)} TYP = 5m\Omega @ V_{GS} = 4.5V$
- Very Low On-resistance $R_{DS(ON)}$
- Low C_{rss}
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

PDFN3*3-8L



Applications

- Portable Equipment and Battery Powered systems
- Power Management in Notebook Computer

100% UIS TESTED!

100% ΔV_{ds} TESTED!



Package Marking and Ordering Information

Device	Marking	Package	Packing	Reel size	Reel (pcs)	Per Carton (pcs)
90N03A		PDFN3*3	Reel	13inch	5000	60000

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Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Drain-source Voltage		V_{DS}	30	V
Gate-source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C=25^{\circ}\text{C}$	I_D	90	A
	$T_C=100^{\circ}\text{C}$		48	
Maximum Power Dissipation($T_C=25^{\circ}\text{C}$)		P_D	31	W
Avalanche energy , single Pulse($L=0.5\text{mH}$) ^(note2)		E_{AS}	39	mJ
Operating Junction And Storage Temperature		T_j, T_{stg}	-55 To 150	$^{\circ}\text{C}$
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		T_L	300	$^{\circ}\text{C}$

Thermal Resistance

Parameter	Symbol	Max	Unit
Junction-to-Case	$R_{\theta JC}$	4	$^{\circ}\text{C/W}$

Note:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$

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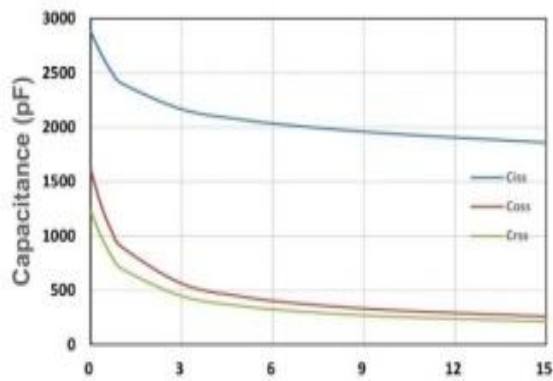
Electrical Characteristic (TC=25°C unless otherwise noted)

Parameter	Symbol	Value			Unit	Test Condition
		Min.	Typ.	Max.		
Off Characteristic						
Drain-source breakdown voltage	BV _{DSS}	30	-	-	V	V _{GS} =0V, I _D = 250μA
Zero gate voltage drain current	I _{DSS}	-	-	1	μA	V _{DS} = 24V, V _{GS} =0V
Gate-source leakage current	I _{GSS}	-	-	± 10	uA	V _{GS} =± 20V, V _{DS} =0V
On Characteristics						
Gate threshold voltage	V _{GS(th)}	1.1	1.6	2.1	V	V _{DS} =V _{GS} , I _D = 250μA
Drain-source on-state resistance	R _{DS(on)}	-	3.3	4.5	mΩ	V _{GS} = 10V, I _D = 20A
		-	5.0	7.2	mΩ	V _{GS} = 4.5V, I _D = 18A
Dynamic Characteristic						
Input Capacitance	C _{iss}	-	1859	-	PF	V _{GS} =0V, V _{DS} = 15V, f=1.0MHz
Output Capacitance	C _{oss}	-	260	-		
Reverse Transfer Capacitance	C _{rss}	-	212	-		
Switching Characteristics						
Turn-on delay time	t _{d(on)}	-	9.6	-	nS	V _{DS} =15V, V _{GS} = 10V, R _G = 3.9Ω, I _D = 15A, R _L =1 Ω
Turn-on Rise time	t _r	-	23.4	-		
Turn-off delay time	t _{d(off)}	-	62.8	-		
Turn-off Fall time	t _f	-	23	-		
Gate Total Charge	Q _G	-	48	-	nC	V _{GS} = 10V, V _{DS} = 25V, I _D = 14A
Gate-Source Charge	Q _{gS}	-	3.4	-		
Gate-Drain Charge	Q _{gd}	-	14	-		
Drain-Source Diode Characteristics						
Body Diode Forward Voltage	V _{SD}	-	0.75	1.1	V	V _{GS} =0V, I _{SD} = 1A, T _J = 25℃
Body Diode Reverse Recovery Time	T _{rr}	-	18.2	-	ns	T _J =25℃ , I _F = 2A, V _{GS} =0V, d _i /d _t =100A/μs
Body Diode Reverse Recovery Charge	Q _{rr}	-	9.2	-	nC	

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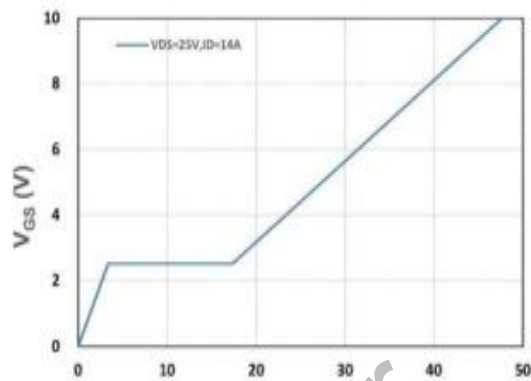
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■ TYPICAL CHARACTERISTICS



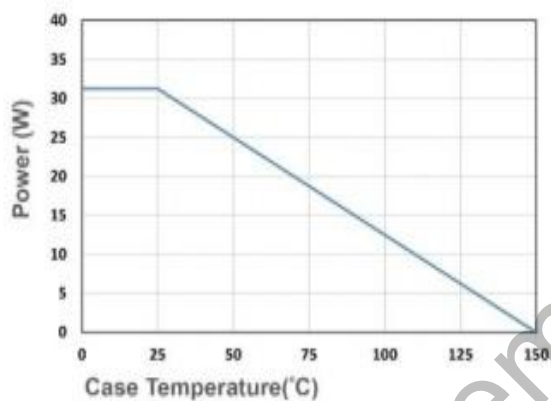
V_{DS} - Drain - Source Voltage (V)

Figure 1. Capacitance



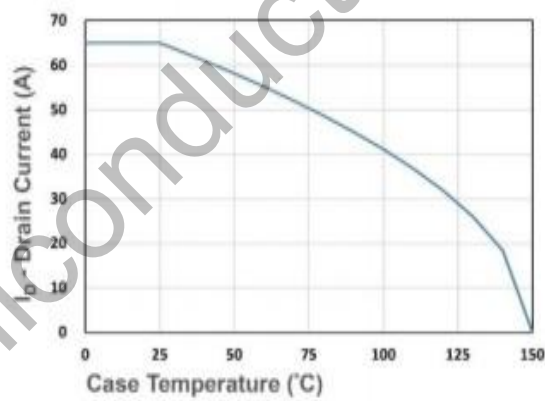
Q_g , Total Gate Charge (nC)

Figure 2. Gate Charge Characteristics



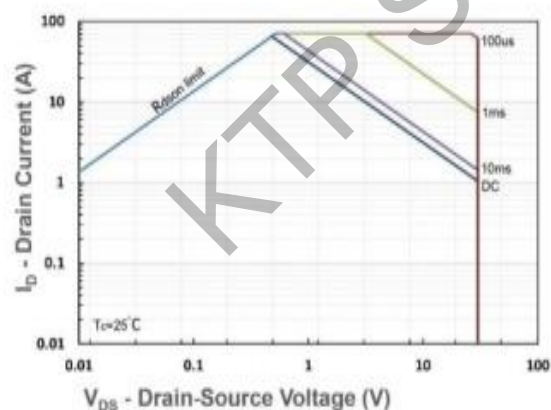
Case Temperature(°C)

Figure 3. Power Dissipation



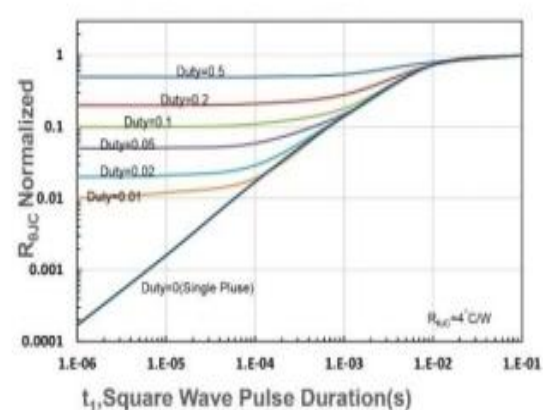
Case Temperature (°C)

Figure 4. Drain Current



V_{DS} - Drain-Source Voltage (V)

Figure 5. Safe Operating Area



t_1 , Square Wave Pulse Duration(s)

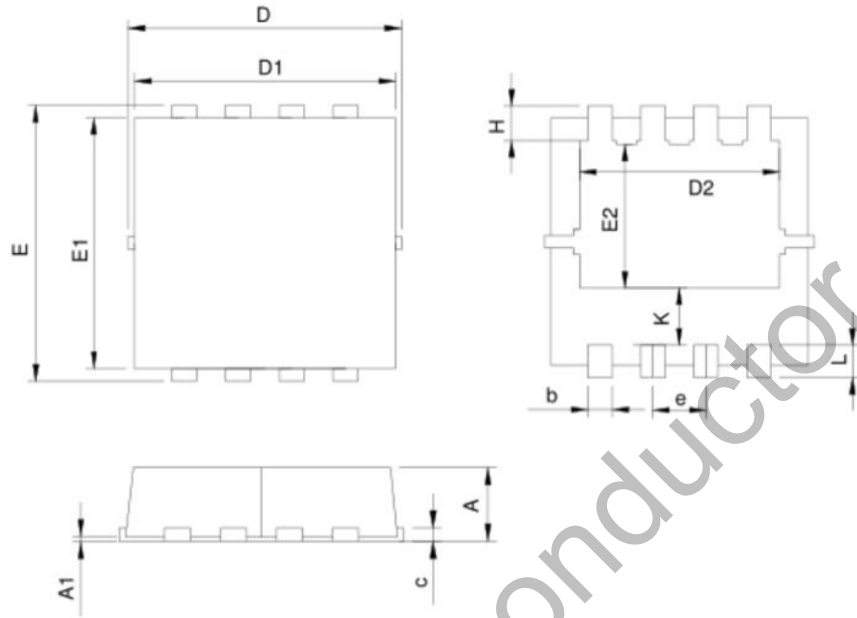
Figure 6. $R_{\theta JC}$ Transient Thermal Impedance

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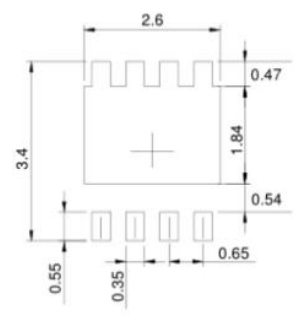
Package Information

PDFN3*3-8L



SYMBOL	DFN3.3x3.3-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.70	1.00	0.028	0.039
A1	0.00	0.05	0.000	0.002
b	0.25	0.35	0.010	0.014
c	0.14	0.20	0.006	0.008
D	3.10	3.50	0.122	0.138
D1	3.05	3.25	0.120	0.128
D2	2.35	2.55	0.093	0.100
E	3.10	3.50	0.122	0.138
E1	2.90	3.10	0.114	0.122
E2	1.64	1.84	0.065	0.072
e	0.65 BSC		0.026 BSC	
H	0.32	0.52	0.013	0.020
K	0.59	0.79	0.023	0.031
L	0.25	0.55	0.010	0.022

RECOMMENDED LAND PATTERN



UNIT: mm