



### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
20V	2.1m $\Omega$ @10V	80A
	2.4m $\Omega$ @4.5V	
	3.1m $\Omega$ @2.5V	

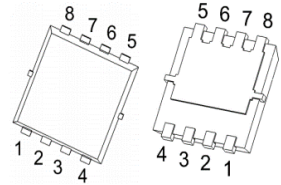
### Feature

- Trench Technology Power MOSFET
- Low  $R_{DS(ON)}$
- Low Gate Charge
- Low Gate Resistance
- 100% UIS Tested

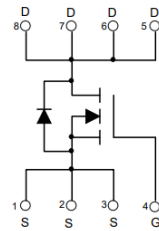
### Application

- Power Switching Application

### PDFN3.3X3.3-8L



### Schematic diagram



### MARKING:



M024N02U = Device Code  
XX = Date Code  
Solid Dot = Green Indicator

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain - Source Voltage	$V_{DS}$	20	V
Gate - Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current <sup>1</sup>	$I_D$	80	A
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	320	A
Single Pulsed Avalanche Current <sup>3</sup>	$I_{AS}$	32	A
Single Pulsed Avalanche Energy <sup>3</sup>	$E_{AS}$	210	mJ
Power Dissipation <sup>5</sup>	$P_D$	142	W
Thermal Resistance from Junction to Ambient <sup>6</sup>	$R_{\theta JA}$	40	$^\circ\text{C}/\text{W}$
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.88	$^\circ\text{C}/\text{W}$
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55~ +150	$^\circ\text{C}$

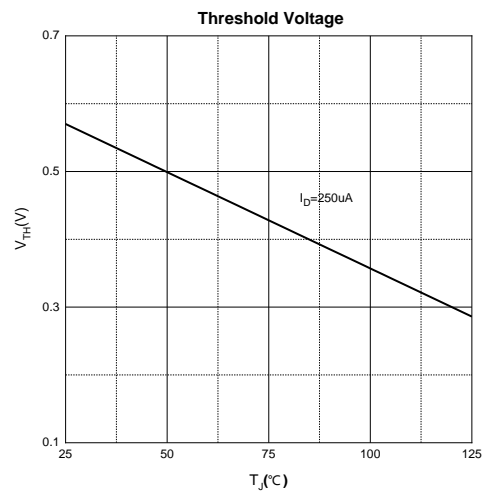
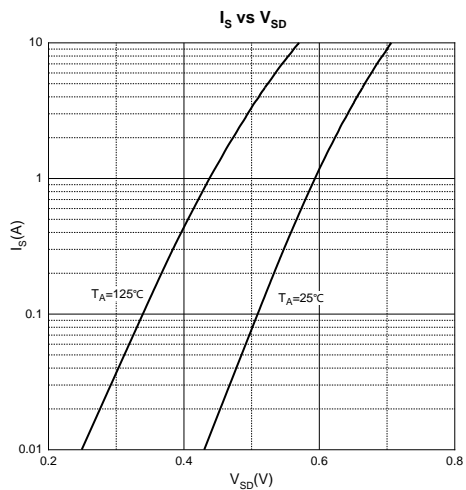
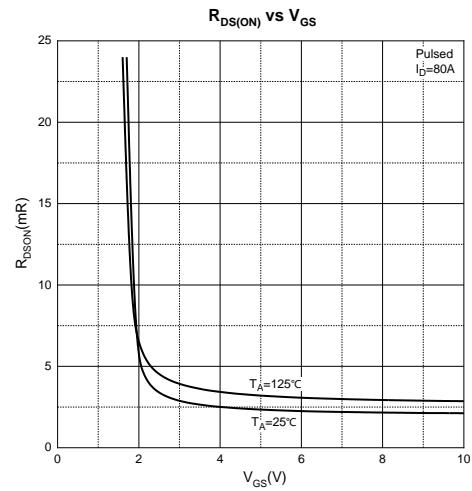
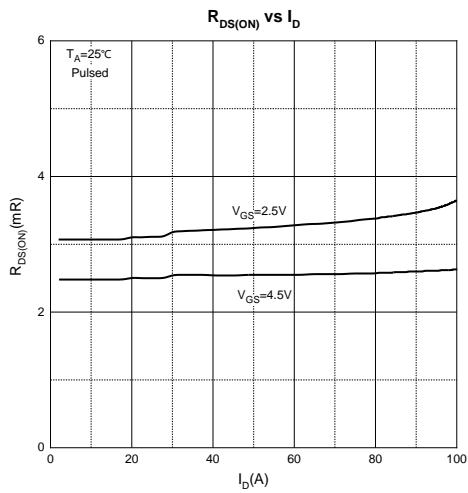
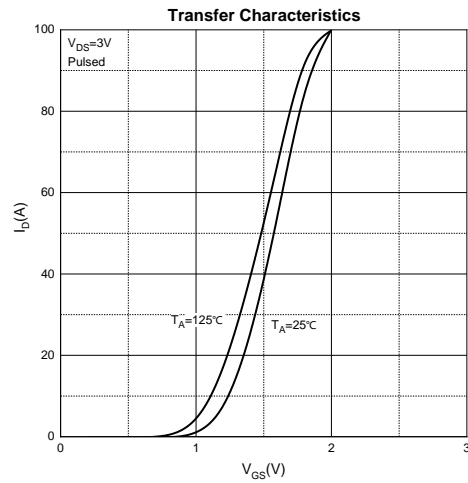
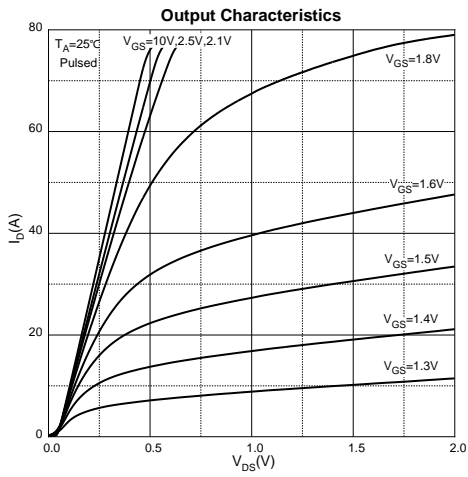
## MOSFET ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

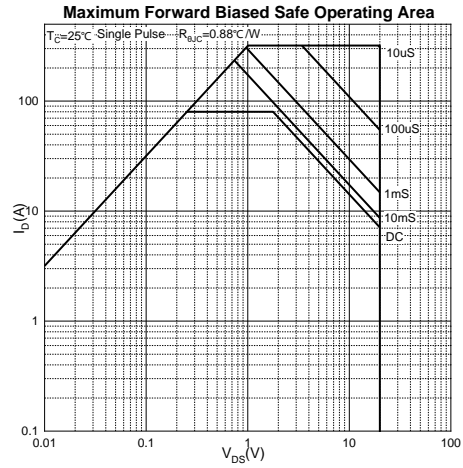
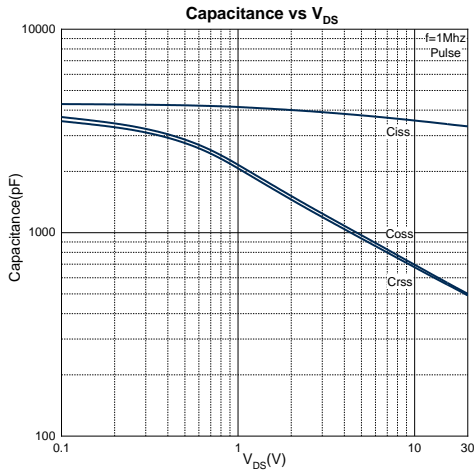
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Off Characteristics</b>						
Drain - Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	20			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 20V, V_{GS} = 0V$			1	$\mu A$
Gate - Body Leakage Current	$I_{GSS}$	$V_{GS} = \pm 12V, V_{DS} = 0V$			$\pm 100$	nA
<b>On Characteristics<sup>4</sup></b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.4	0.6	1.0	V
Drain-source On-resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 10A$		2.1	2.7	m $\Omega$
		$V_{GS} = 4.5V, I_D = 10A$		2.4	3.6	
		$V_{GS} = 2.5V, I_D = 10A$		3.1	4.7	
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$		3628		pF
Output Capacitance	$C_{oss}$			707		
Reverse Transfer Capacitance	$C_{rss}$			686		
Gate Resistance	$R_g$	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$		2.6		$\Omega$
<b>Switching Characteristics</b>						
Total Gate Charge	$Q_g$	$V_{DS} = 10V, V_{GS} = 4.5V, I_D = 4A$		111.4		nC
Gate-source Charge	$Q_{gs}$			4.2		
Gate-drain Charge	$Q_{gd}$			17.2		
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 10V, V_{GS} = 10V, I_D = 30A$ $R_G = 3\Omega$		21		ns
Turn-on Rise Time	$t_r$			44		
Turn-off Delay Time	$t_{d(off)}$			115		
Turn-off Fall Time	$t_f$			119		
<b>Source - Drain Diode Characteristics</b>						
Diode Forward Voltage <sup>4</sup>	$V_{SD}$	$V_{GS} = 0V, I_S = 10A$			1.2	V

Notes :

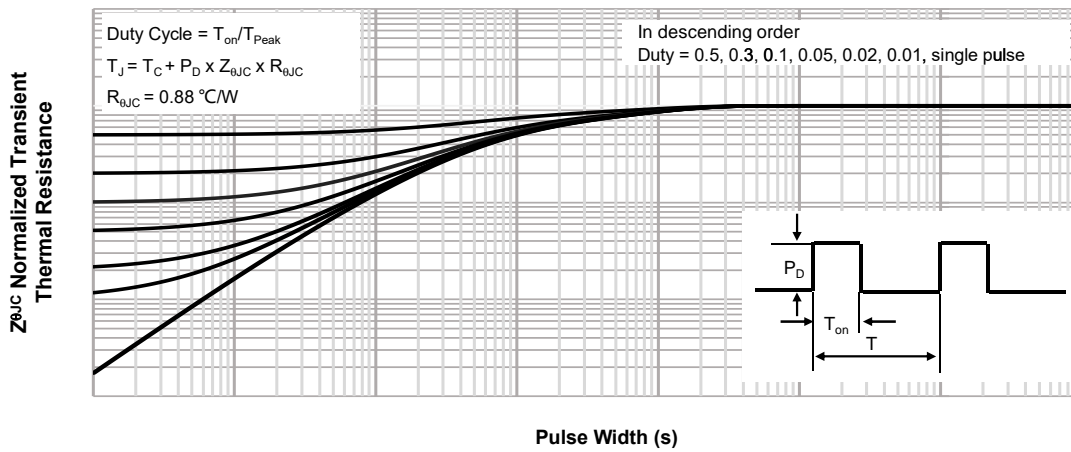
- 1.The maximum current rating is limited by package.And device mounted on a large heatsink
- 2.Pulse Test : Pulse Width  $\leq 10\mu s$ , duty cycle  $\leq 1\%$ .
- 3.EAS condition:  $V_{DD} = 15V, V_{GS} = 10V, L = 0.5mH, R_G = 25\Omega$  Starting  $T_J = 25^\circ\text{C}$ .
- 4.Pulse Test : Pulse Width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
- 5.The power dissipation  $P_D$  is limited by  $T_{J(MAX)} = 150^\circ\text{C}$ .And device mounted on a large heatsink
- 6.Device mounted on  $1in^2$  FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ\text{C}$ .

**Typical Characteristics**

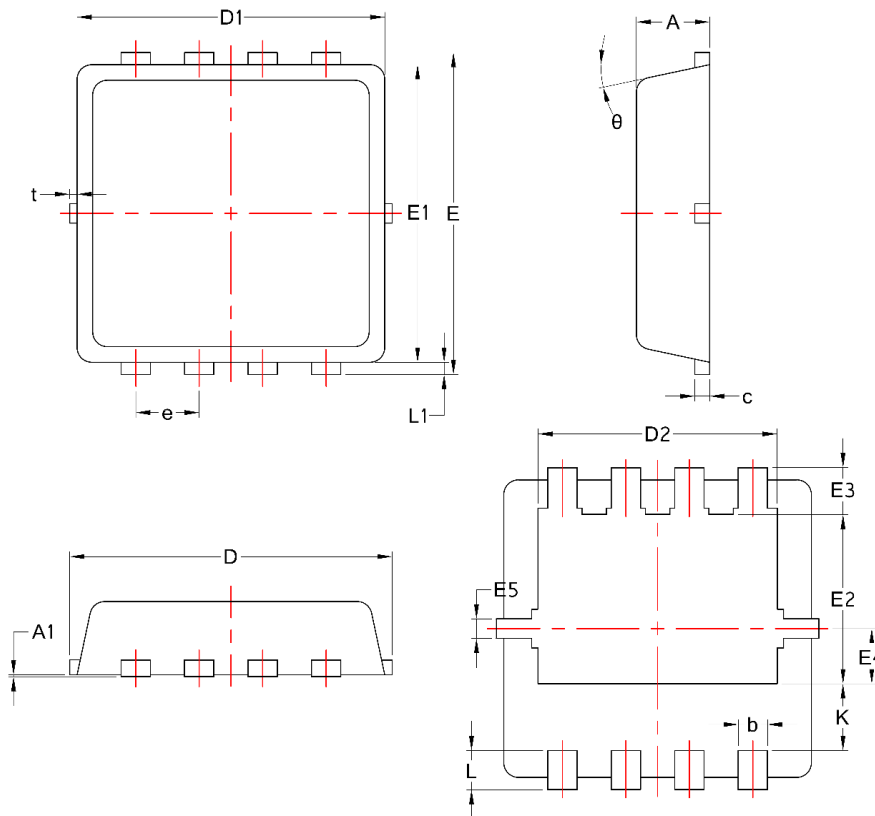




**Normalized Transient Thermal Impedance vs Pulse Width**



## PDFN3.3X3.3-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.850	0.028	0.033
A1	0.050MAX		0.002MAX	
b	0.200	0.400	0.008	0.016
c	0.100	0.250	0.004	0.010
D	3.150	3.450	0.124	0.136
D1	3.000	3.250	0.118	0.128
D2	2.290	2.650	0.090	0.104
E	3.150	3.450	0.124	0.136
E1	2.900	3.200	0.114	0.126
E2	1.540	1.940	0.061	0.076
E3	0.280	0.650	0.011	0.026
E4	0.370	0.770	0.015	0.030
E5	0.100	0.300	0.004	0.012
e	0.600	0.700	0.024	0.028
K	0.590	0.890	0.023	0.035
L	0.300	0.500	0.012	0.020
L1	0.060	0.200	0.002	0.008
t	0.000	0.130	0.000	0.005
$\theta$	10°	14°	10°	14°