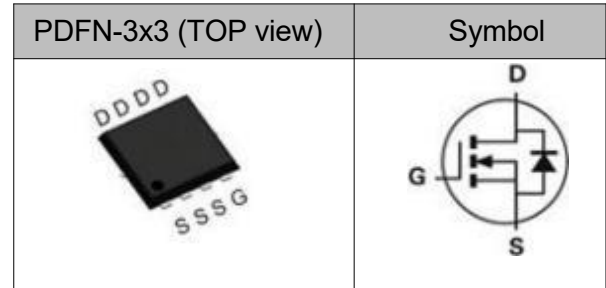


Features

- ◆ 30V, 148A, $R_{DS(on)}$ (Typ.) = $1.3m\Omega @ V_{GS} = 10V$
- ◆ Reliable and Rugged
- ◆ Fast Switching Speed
- ◆ Green Device Available
- ◆ 100% EAS Guaranteed

Application

- ◆ High Frequency Switching and Synchronous
- ◆ DC/DC Converter



Absolute Maximum Ratings $T_c = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Rating	Unit
V_{DS}	Drain-Source Voltage ^a	30	V
V_{GS}	Gate-Source Voltage	± 20	
I_D	Drain Current-Continuous	$T_C = 25^\circ\text{C}$	A
		$T_C = 100^\circ\text{C}$	
I_{DM}	Drain Current-Pulsed ^b	592	
P_D	Maximum Power Dissipation, $T_C = 25^\circ\text{C}$	54	W
E_{AS}	Single Pulsed Avalanche Energy ^c	33.8	mJ
T_J, T_{STG}	Operating and Store Temperature Range	150, -55 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.3	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	50	

Electrical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted

■ Off Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 30V, V_{GS} = 0V$	-	-	1.0	μA
I_{GSS}	Forward Gate Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA



MS3001X

N-Channel Enhancement Mode MOSFET

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	-	2.2	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10V, I_D = 30A$	-	1.3	1.6	m Ω
		$V_{GS} = 4.5V, I_D = 30A$	-	1.9	2.5	
g_{fs}	Forward Transconductance	$V_{DS} = 5V, I_D = 15A$		60		S

■ Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
C_{iss}	Input Capacitance	$V_{DS} = 15V,$ $V_{GS} = 0V,$ $f = 1.0MHz$	-	2660	-	pF
C_{oss}	Output Capacitance		-	860	-	
C_{rss}	Reverse Transfer Capacitance		-	70	-	

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	$V_{DS} = 15V,$ $V_{GS} = 10V,$ $I_D = 20A,$ $R_{GEN} = 3\Omega$	-	8	-	ns
t_r	Turn-On Rise Time		-	10	-	
$t_{d(off)}$	Turn-Off Delay Time		-	36	-	
t_f	Turn-Off Fall Time		-	18	-	
Q_g	Total Gate Charge	$V_{DS} = 15V,$ $V_{GS} = 10V,$ $I_D = 20A$	-	70	-	nC
Q_{gs}	Gate-Source Charge		-	6.6	-	
Q_{gd}	Gate-Drain Charge		-	3.8	-	

■ Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
I_S	Drain-Source Diode Forward Continuous Current	$V_G = V_D = 0V,$ Force Current	-	-	148	A
I_{SM}	Maximum Pulsed Current		-	-	592	
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0V, I_S = 10A$	-	0.8	-	V
T_{rr}	Body Diode Reverse Recovery Time	$I_F = 20A,$ $di_F/dt = 100A/\mu s$	-	28	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F = 20A,$ $di_F/dt = 100A/\mu s$	-	34	-	nC

Notes:

- $T_J = +25^\circ C$ to $+150^\circ C$.
- Repetitive rating: pulse width limited by maximum junction temperature.
- $L = 0.1mH, V_{DD} = 25V, I_{AS} = 26A, R_G = 25\Omega$ Starting $T_J = 25^\circ C$.
- Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.

■ Characteristic Curve

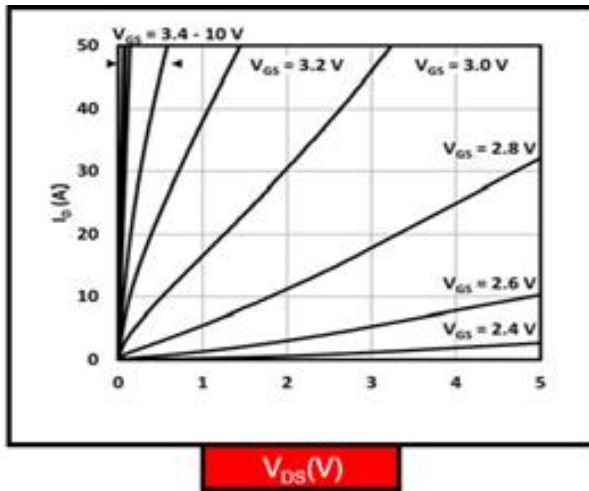


Figure 1. Typical Output Characteristics

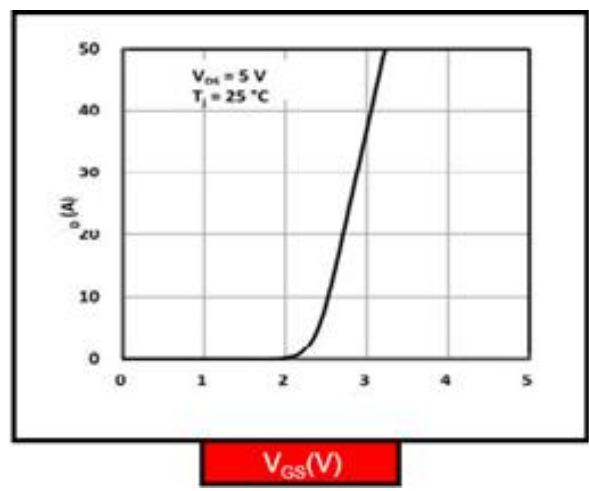


Figure 2. Typical Transfer Characteristics

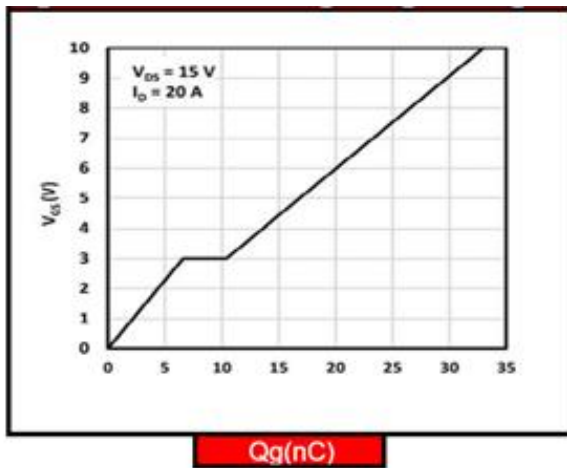


Figure 3. Typical Gate Charge

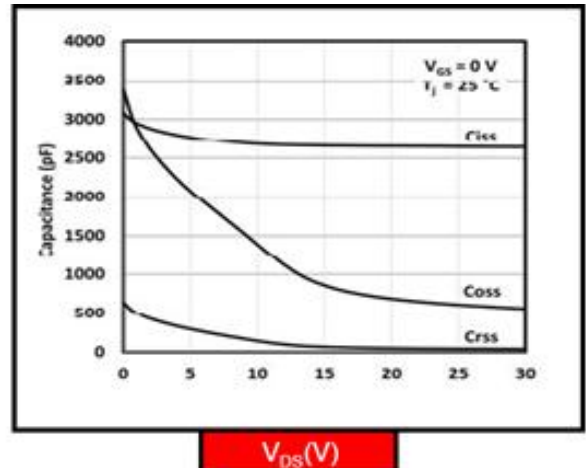


Figure 4. Typical Capacitance

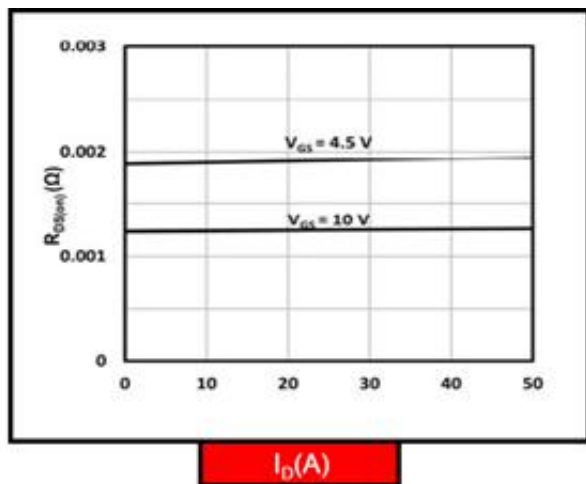


Figure 5. On-Resistance vs. Drain Current

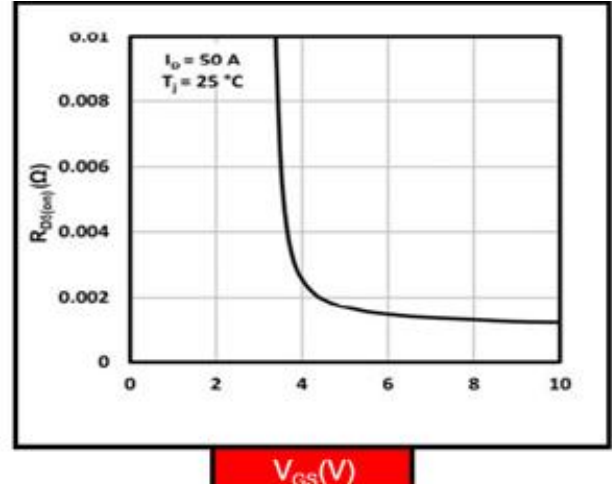


Figure 6. On-Resistance vs. Gate-Source Voltage

■ Characteristic Curve

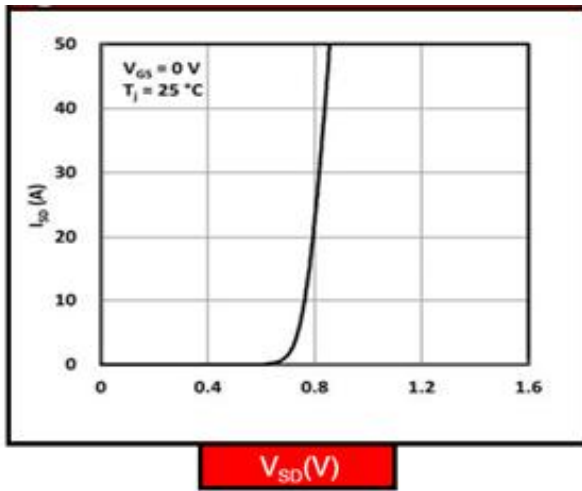


Figure 7. Body Diode Characteristics

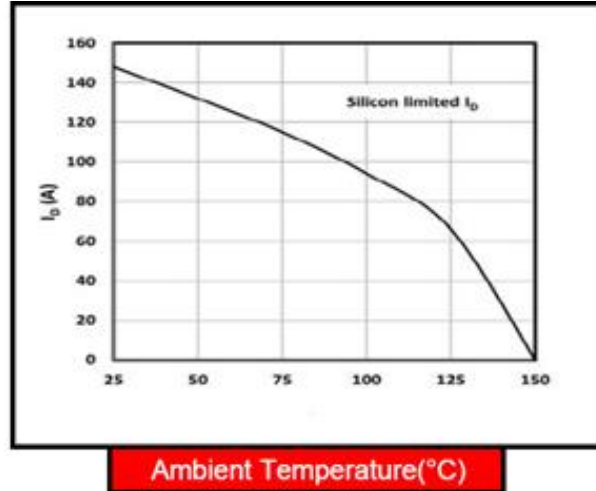
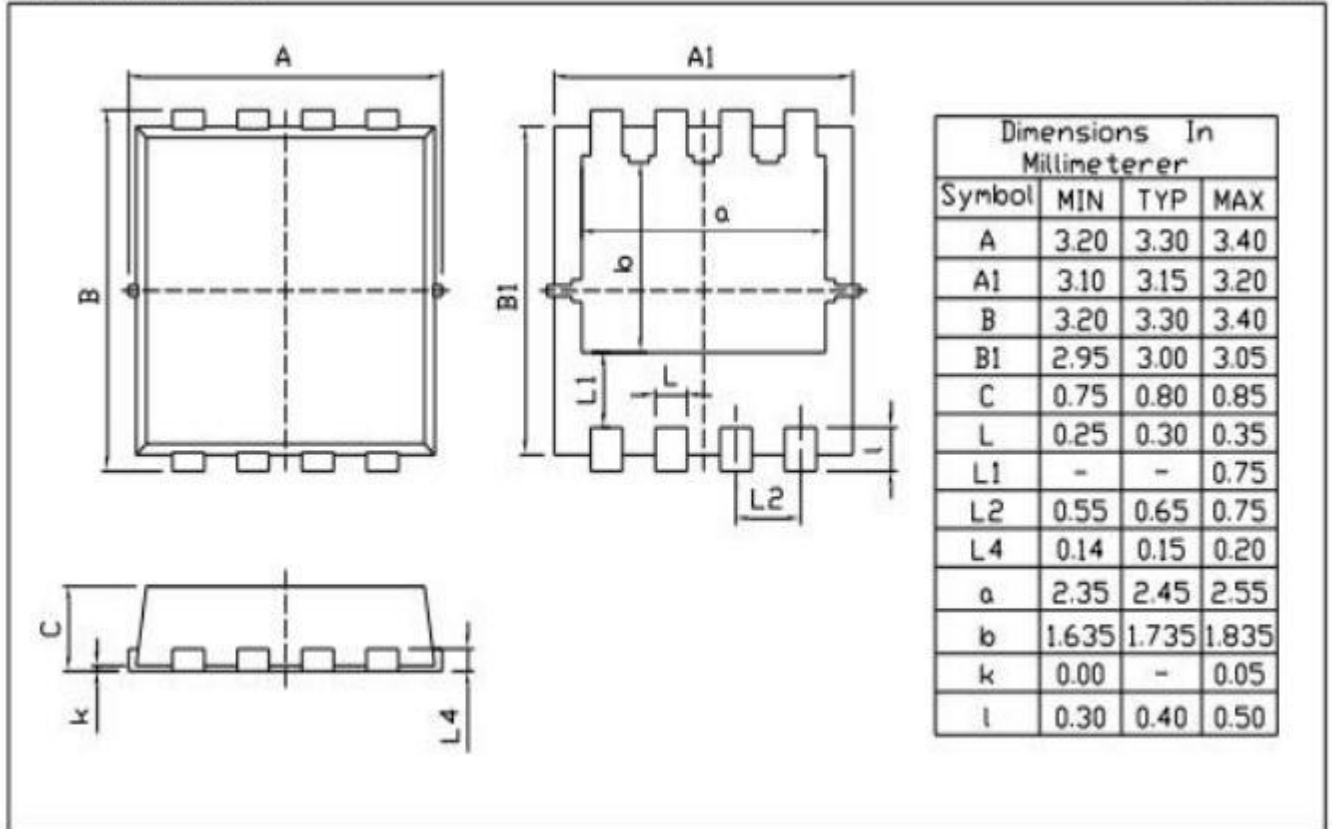


Figure 8. Maximum drain current Vs. ambient temperature

■ Package Information

PDFN3X3A-8L

Unit:mm



Rev.00 202011