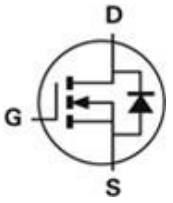
MS3005X

N-Channel Enhancement Mode MOSFET

Features

- 30V, 30A, $R_{DS(ON)}$(Typ.) = 3.9mΩ@V_{GS} = 10V.
- Reliable and Rugged
- Fast Switching Speed
- Green Device Available
- 100% EAS Guaranteed

PDFN-3x3 (TOP view)	Symbol
	

Application

- High Frequency Switching and Synchronous
- DC/DC Converter

Absolute Maximum Ratings T_C = 25° C unless otherwise noted

Symbol	Parameter	Rating	Unit
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	
I_D	Drain Current-Continuous, T_c =25°C	30	A
	Drain Current-Continuous, T_c =100°C	30	
I_{DM}	Drain Current-Pulsed [a]	200	
E_{AS}	Avalanche Energy, Single pulse [b]	64	mJ
I_{AS}	Avalanche Current	24	A
P_D	Maximum Power Dissipation @ T_c =25°C	23	W
T_{STG}	Store Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JC}$	Thermal Resistance Junction-Case Max	-	5.4	°C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient Max[c]	-	75	°C/W

Electrical Characteristics T_J = 25° 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 = 250μA	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 24V, V_{GS} = 0V	-	-	1	μA
I_{GSS}	Forward Gate Body Leakage Current	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA

On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V_{GS}(th)	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	1.0	1.5	2.0	V
R_{DS}(on)	Static Drain-Source On-Resistance [d]	V_{GS} = 10V, I_D = 20A	-	3.9	4.8	mΩ
		V_{GS} = 4.5V, I_D = 20A	-	5.2	6.4	
gfs	Forward Transconductance	V_{DS}= 5V, I_D= 20A	-	63	-	S

Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Ciss	Input Capacitance	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz	-	867	-	pF
Coss	Output Capacitance		-	434	-	
Crss	Reverse Transfer Capacitance		-	55	-	

On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	V_{DS} = 15V, R_L= 0.75Ω, R_G = 3Ω,V_{GS}=10V	-	8.9	-	ns
t_r	Turn-On Rise Time		-	73.9	-	
$t_{d(off)}$	Turn-Off Delay Time		-	17.7	-	
t_f	Turn-Off Fall Time		-	81	-	
Qg	Total Gate Charge	V_{DS} = 15V, I_D = 20A, V_{GS} = 10V	-	17		nC
Qgs	Gate-Source Charge		-	3.8	-	
Qgd	Gate-Drain Charge		-	3.2	-	

Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V, Force Current	-	-	30	A
V_{SD}	Drain-Source Diode Forward Voltage[d]	V_{GS} = 0V, I_{SD} = 1A	-	-	1	V
t_{rr}	Reverse Recovery Time	I_F= 20A, di/dt=100A/us, T_J=25°C	-	14	-	ns
Q_{rr}	Reverse Recovery Charge		-	3	-	nC

Notes:

a：Max. current is limited by junction temperature.

b：The EAS data shows Max. Rating. The test condition is V_{DD}=50V,V_{GS}=10V,L=0.5mH,I_{AS}=16A.

c：Surface Mounted on 1in2 FR-4 board with 1oz.

d：Pulse test (pulse width≤300us, duty cycle≤2%).

e：Guaranteed by design, not subject to production testing.

Typical Characteristics

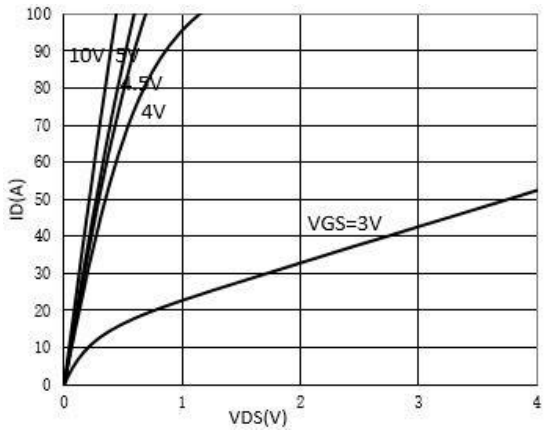


Figure 1. Output Characteristics

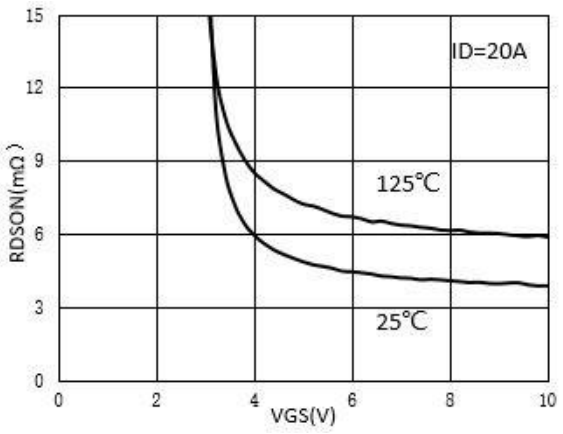


Figure 2. On-Resistance vs. V_{GS}

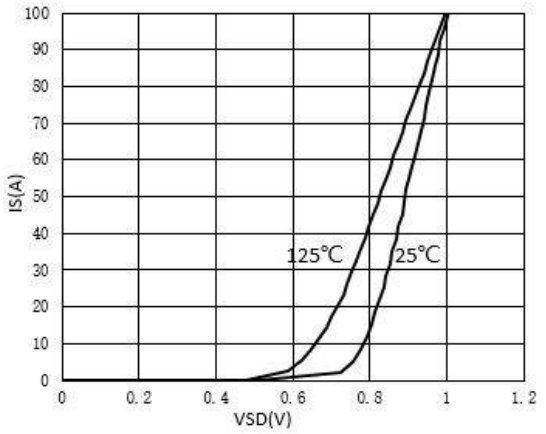


Figure 3. Source-Drain Diode Forward

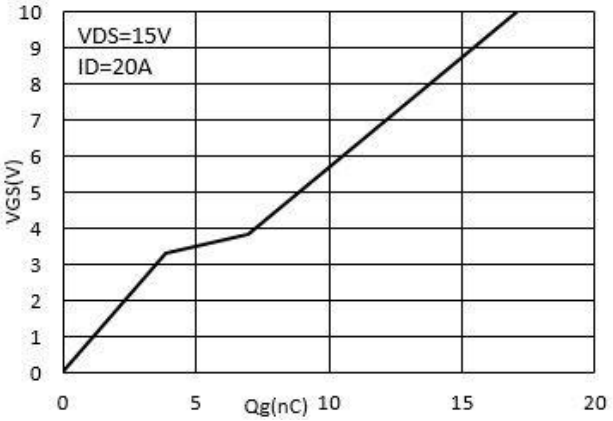


Figure 4.Gate Charge Characteristics

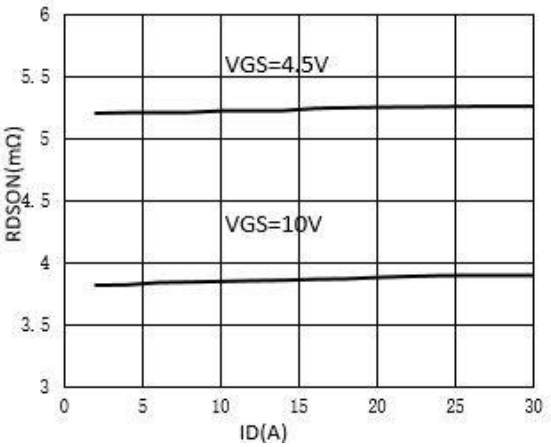


Figure 5.On-Resistance vs. Drain Current and Gate Voltage

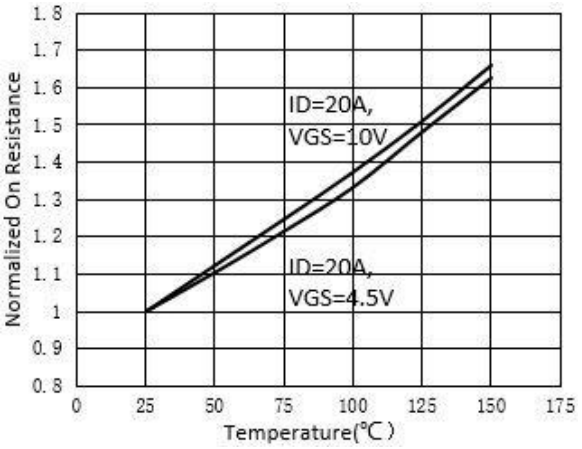


Figure 6.Drain-Source On Resistance

Typical Characteristics

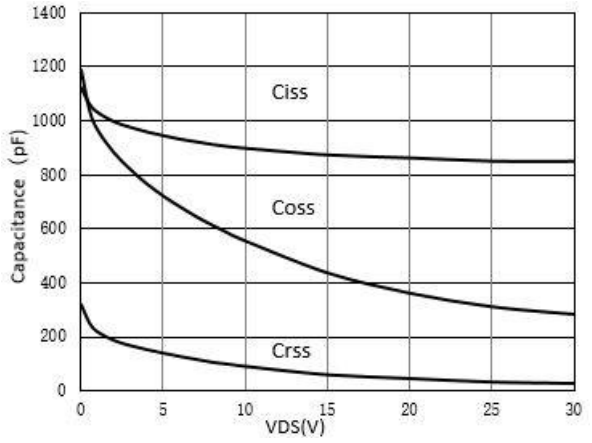


Figure 7.Capacitance

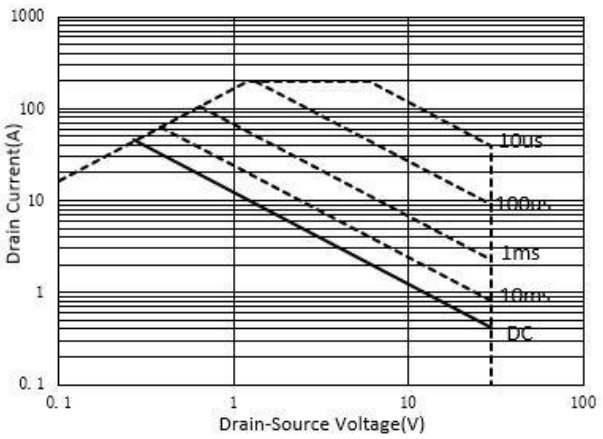


Figure 8. Safe Operating Area

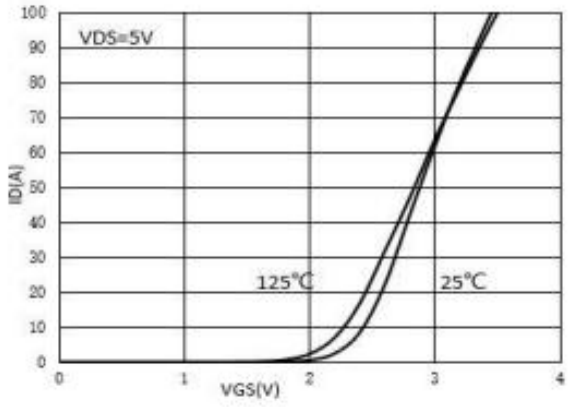


Figure 9.Transfer Characteristics

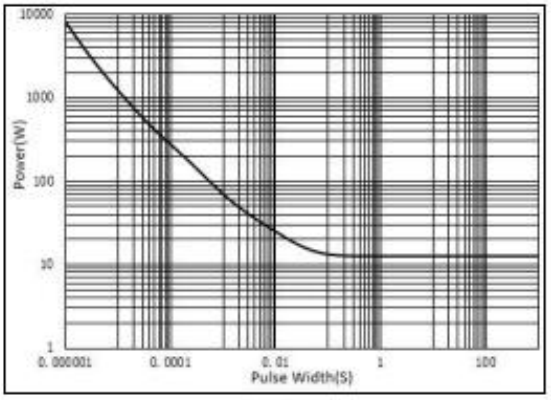


Figure 10. Single Pulse Power Rating Junction-to-Case

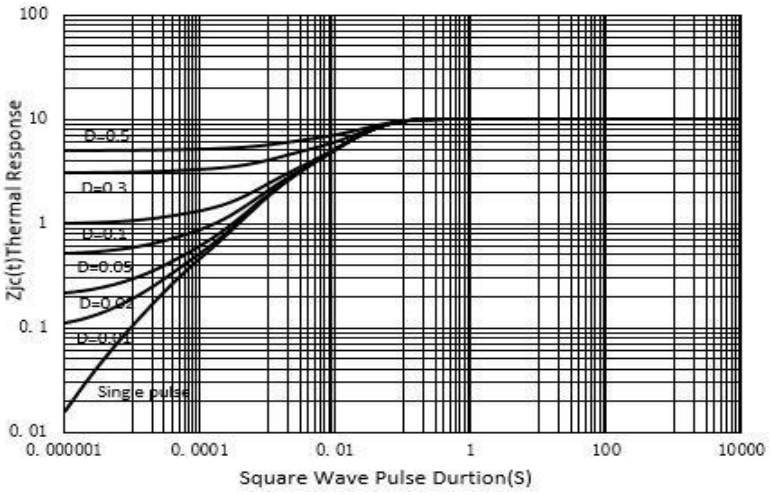
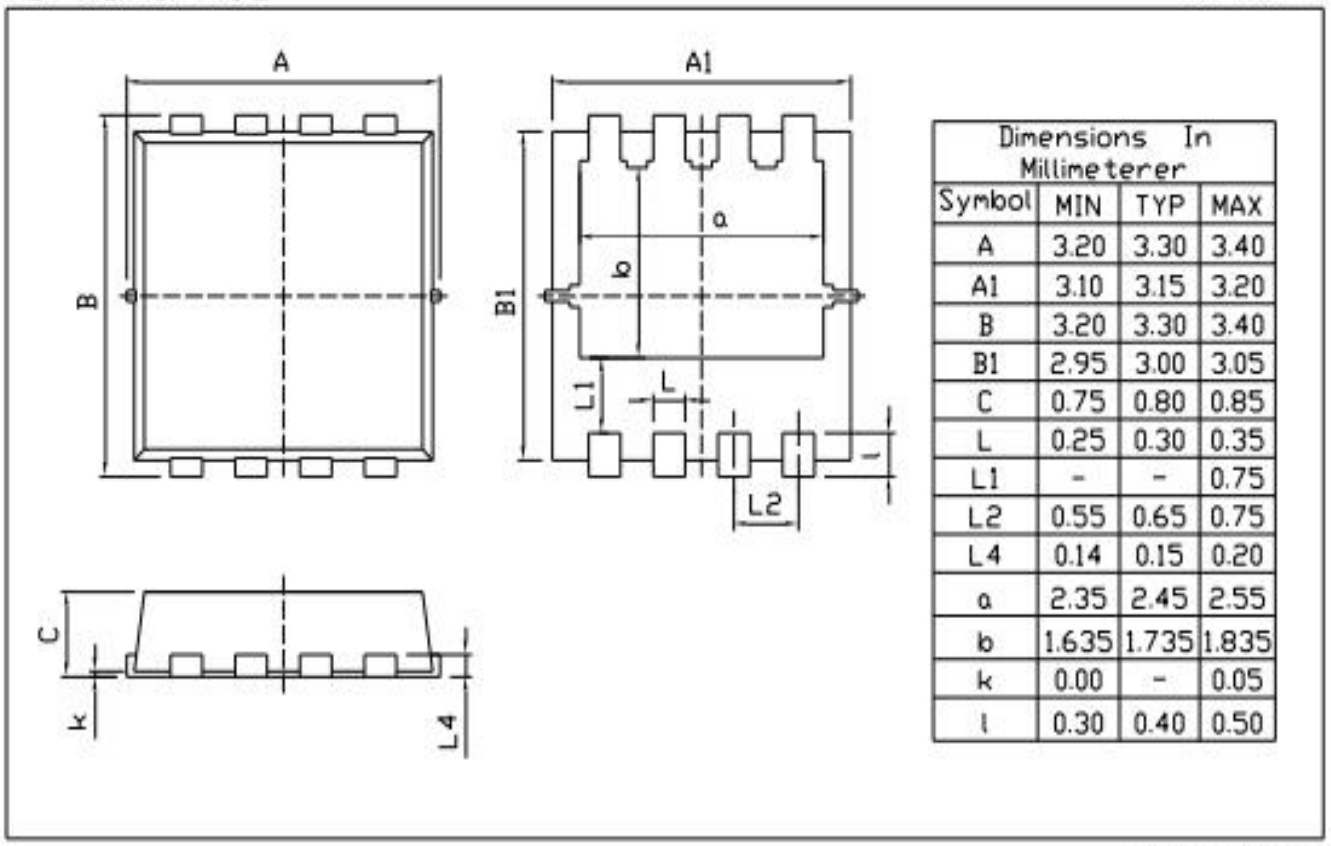


Figure 11. $R_{\theta JC}$ Transient Thermal Impedance

Package Information

PDFN3X3A-8L

Unit:mm



Dimensions In Millimeterer			
Symbol	MIN	TYP	MAX
A	3.20	3.30	3.40
A1	3.10	3.15	3.20
B	3.20	3.30	3.40
B1	2.95	3.00	3.05
C	0.75	0.80	0.85
L	0.25	0.30	0.35
L1	-	-	0.75
L2	0.55	0.65	0.75
L4	0.14	0.15	0.20
a	2.35	2.45	2.55
b	1.635	1.735	1.835
k	0.00	-	0.05
l	0.30	0.40	0.50

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