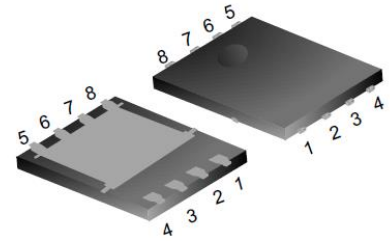


138A,80V N-CHANNEL POWER MOSFET

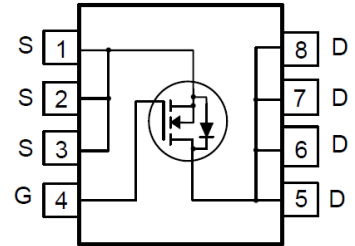
Features

- $R_{DS(on)}=3.0m\Omega$ (Typ.) @ $V_{GS}=10V, I_D=20A$
- Low gate charge
- Low on-resistance
- Fast switching



Applications

- Power factor correction (PFC)
- Switched mode power supplies (SMPS)
- Uninterruptible Power Supply (UPS)



Key Performance and Package Parameters

Order codes	V_{DS}	I_D	$R_{DS(ON)}$, Typ	T_{vjmax}	Marking	Package
XM003S080AK1Y8	80V	138A	3.0m Ω	150 $^{\circ}C$	M3S80AK1	PDFN-8-5X6X0.95-1.27

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

Symbol	Parameter	Value	Units
V_{DSS}	Drain-Source Voltage	80	V
V_{GSS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current (T _c =25 $^{\circ}C$)	138	A
I_{DM}	Pulsed Drain Current	400	A
P_D	Maximum Power Dissipation (T _c =25 $^{\circ}C$)	125	W
E_{AS}	Avalanche Energy, Single Pulse (note1)	231	mJ
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}C$

Thermal Data

Symbol	Parameter	Conditions	Max.	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Steady State)	PDFN-8-5X6X0.95-1.27	1.0	$^{\circ}C/W$

Electrical Characteristics ($T_c=25^\circ\text{C}$ unless otherwise noted.)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	80	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=80V, V_{GS}=0V$	---	---	1	μA
I_{GSS}	Gate Leakage Current, Forward	$V_{GS}=20V, V_{DS}=0V$	---	---	100	nA
	Gate Leakage Current, Reverse	$V_{GS}=-20V, V_{DS}=0V$	---	---	-100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	2.0	---	4.0	V
$R_{DS(ON)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=20A$	---	3.0	3.6	$m\Omega$
Q_g	Total Gate Charge	$V_{DD}=40V$	---	67	---	nC
Q_{gs}	Gate-Source Charge	$V_{GS}=10V$	---	25	---	nC
Q_{gd}	Gate-Drain Charge	$I_D=20A$	---	13	---	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=40V, V_{GS}=10V$ $I_D=20A, R_G=10\Omega$	---	35	---	ns
t_r	Turn-on Rise Time		---	69	--	ns
$t_{d(off)}$	Turn-off Delay Time		---	89	---	ns
t_f	Turn-off Fall Time		---	64	---	ns
C_{iss}	Input Capacitance	$V_{DS}=40V$	---	4435	---	pF
C_{oss}	Output Capacitance	$V_{GS}=0V$	---	760	---	pF
C_{rss}	Reverse Transfer Capacitance	$f=1\text{MHz}$	---	28	---	pF

Diode Characteristics ($T_c=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
V_{SD}	Diode Forward Voltage	$I_S=20A, V_{GS}=0V$	---	---	1.4	V
t_{rr}	Diode Reverse Recovery Time	$I_S=20A, V_{GS}=0V$	---	60	---	ns
Q_{rr}	Diode Reverse Recovery Charge	$di_f/dt=100A/\mu s$	---	98	---	μC

Notes:

1. $V_{DD}=50V, L=0.1mH, R_G=25\Omega$, starting, $T_J=25^\circ\text{C}$.

Typical Characteristics

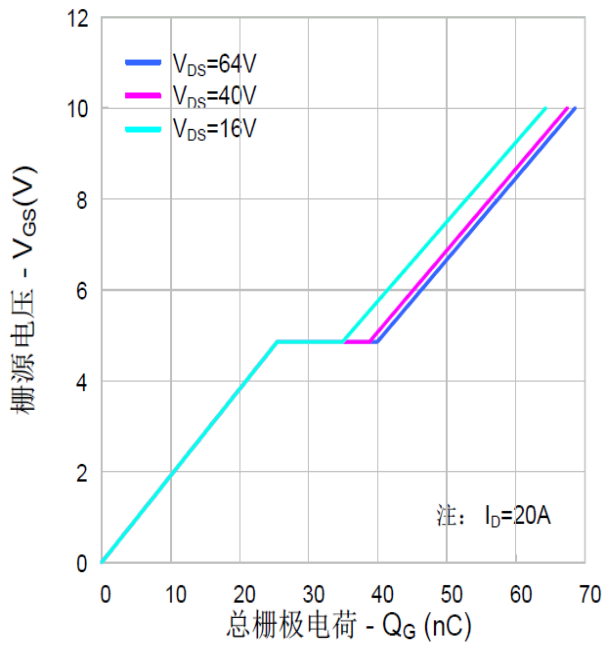


Fig.1 Gate Charge

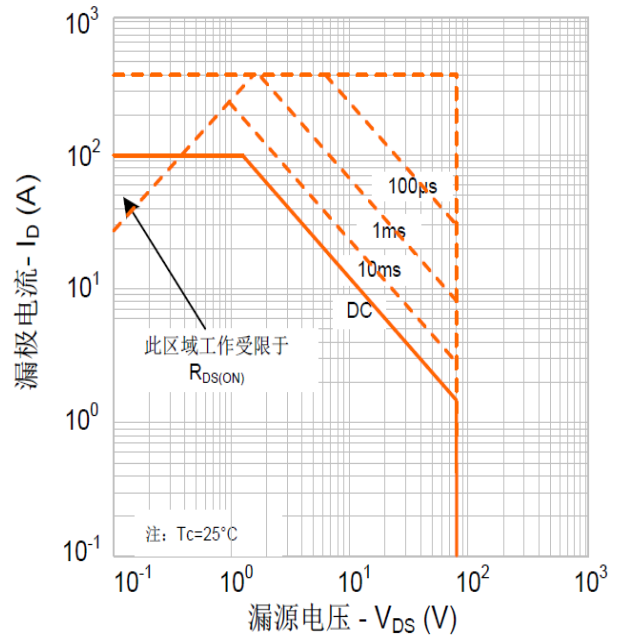


Fig.2 Safe Operation Area

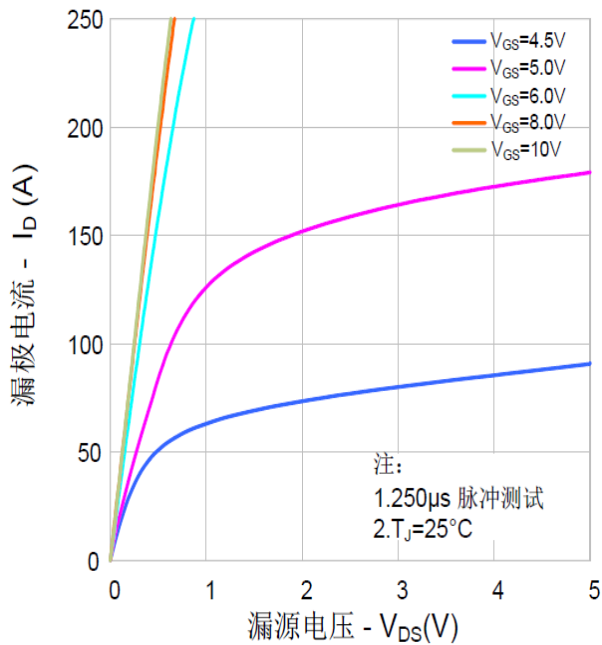


Fig.3 Output Characteristics

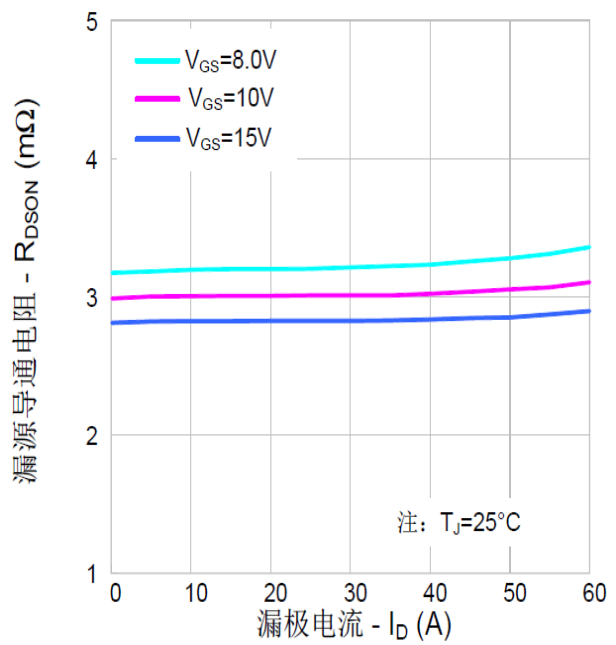


Fig.4 Drain-Source On Resistance

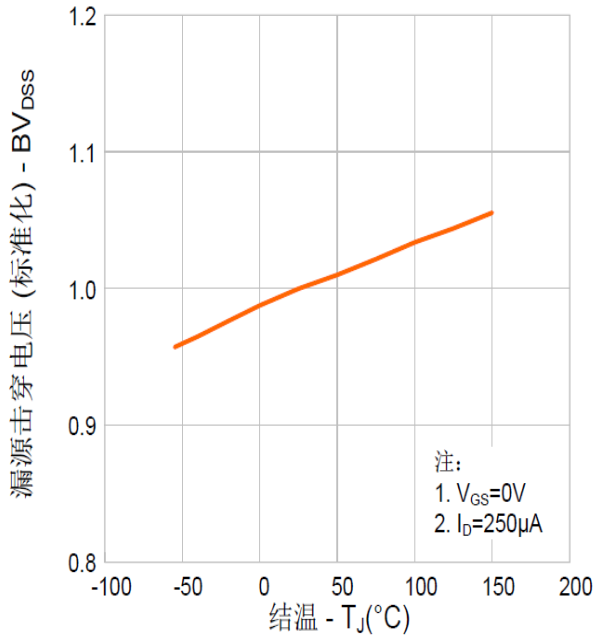


Fig.5 Drain-Source Breakdown Voltage

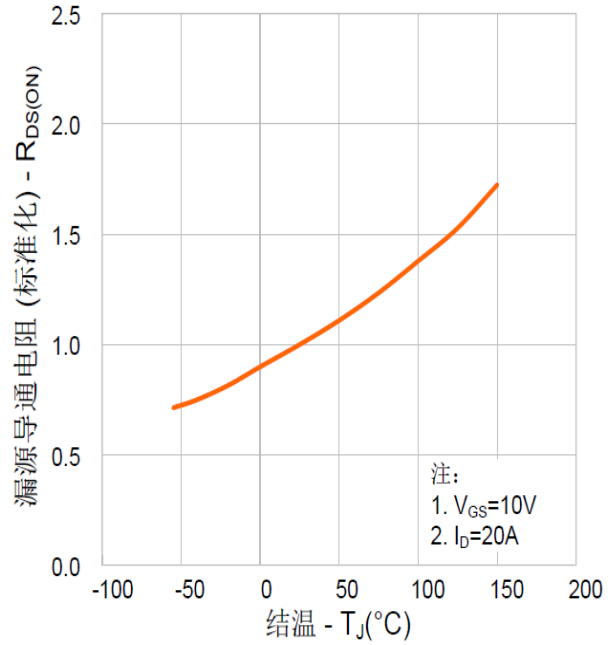


Fig.6 Drain-Source On Resistance

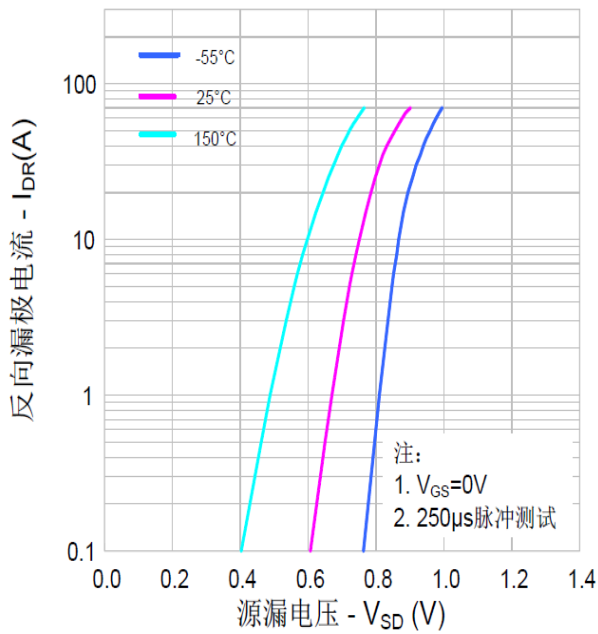


Fig.7 Source-Drain Diode Forward Current

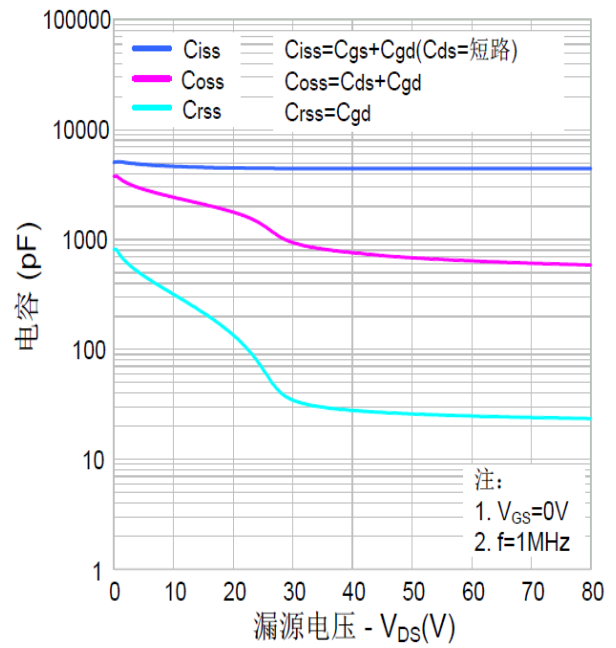
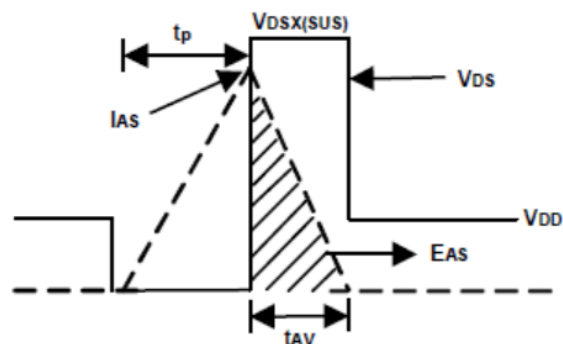
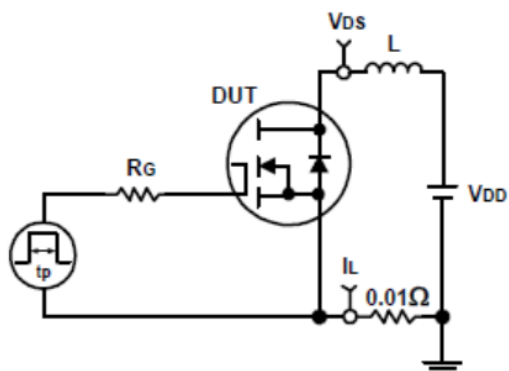
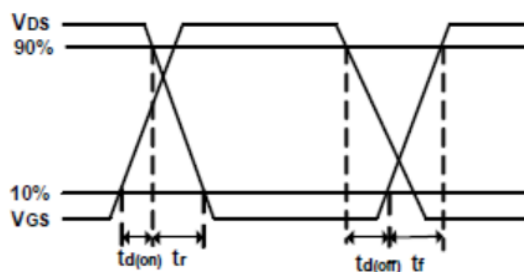
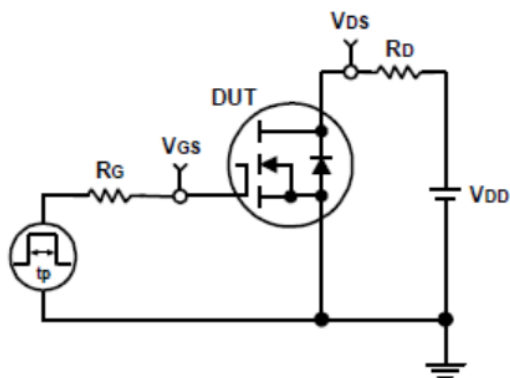


Fig.8 Capacitance

Avalanche Test Circuit and Waveforms

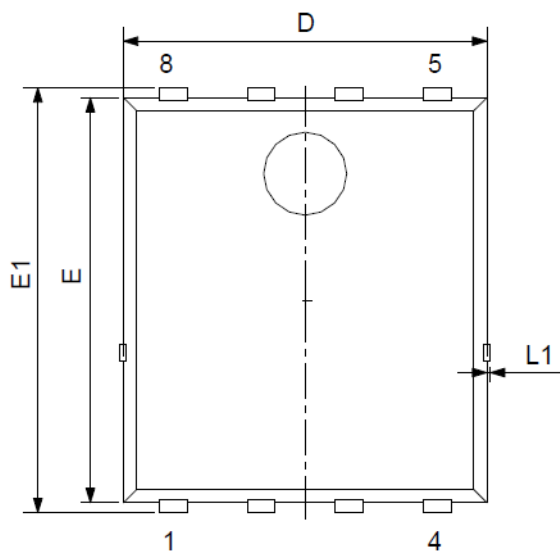


Switching Time Test Circuit and Waveforms

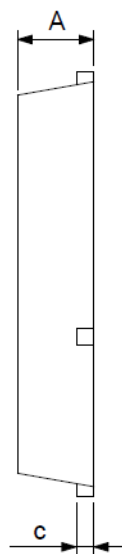


Package Information

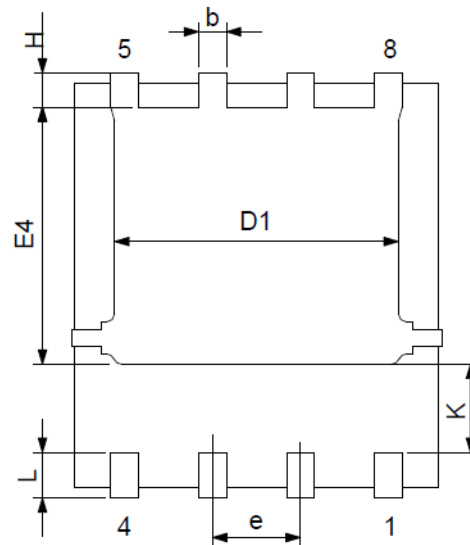
PDFN-8-5X6X0.95-1.27



Top View



Side View



Bottom View

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.90	—	1.20
c	0.154	0.25	0.354
D	4.80	—	5.40
E	5.66	—	6.06
D1	3.76	—	4.30
E1	5.90	—	6.35
b	0.30	—	0.55
K	1.10	1.30	1.50
e	1.07	1.27	1.37
E4	3.34	—	3.92
L	0.30	0.60	0.71
L1	—	—	0.12
H	0.40	—	0.71