



20V N-Channel Trench Power MOSFET

General Description

The SJM20N023 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a wide variety of applications.

Features

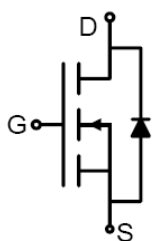
- Low Gate Charge
- 100% UIS Tested, 100% DVDS Tested
- High Power and current handling capability
- Lead free product is acquired

Application

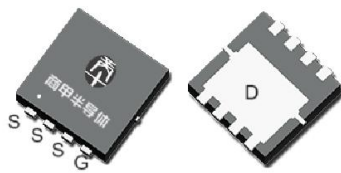
- PWM Applications
- Load Switch
- Power Management

Key Performance Parameters

Parameter	Value	Unit
V_{DS}	20	V
$R_{DS(ON_TYP)}$	2.3	m Ω
I_D	111	A
Q_G	68	nC



Schematic Diagram



PDFN3X3-8L top&bottom view



Package Marking and Ordering Information

Device/Ordering Code	Marking	Package	Packing	Reel Size	Tape width	Quantity
SJM20N023	SJM20N023	PDFN3X3-8L	Tape	\	\	5000 Pcs

Table 1. Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage ($V_{GS}=0V$)	20	V
V_{GS}	Gate-Source Voltage ($V_{DS}=0V$)	± 12	V
I_D	Drain Current-Continuous($T_C=25^\circ\text{C}$)	111	A
	Drain Current-Continuous($T_C=100^\circ\text{C}$)	70	A
$I_{DM}(\text{pluse})$	Drain Current-Continuous@ Current-Pulsed (Note 1)	444	A
P_D	Maximum Power Dissipation($T_C=25^\circ\text{C}$)	50	W
	Maximum Power Dissipation($T_C=100^\circ\text{C}$)	20	W
E_{AS}	Avalanche energy (Note 2)	306	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	$^\circ\text{C}$

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to- Case		2.5	$^\circ\text{C/W}$



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Table 3. Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =250μA	20			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =20V, V _{GS} =0V T _J =25℃			1	μA
		V _{DS} =20V, V _{GS} =0V T _J =125℃			100	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±12V, V _{DS} =0V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	0.5		1	V
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =20A		88		S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =4.5V, I _D =20A T _J =25℃		2.3	2.9	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =2.5V, I _D =15A T _J =25℃		2.9	3.9	mΩ
Dynamic Characteristics						
C _{iSS}	Input Capacitance	V _{DS} =10V,V _{GS} =0V, f=1.0MHz		5670		pF
C _{oSS}	Output Capacitance			460		pF
C _{rSS}	Reverse Transfer Capacitance			416		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1.0MHz		1.6		Ω
Switching Parameters						
t _{d(on)}	Turn-on Delay Time	V _{GS} =4.5V, V _{DS} =10V, R _L =0.5Ω, R _{GEN} =3Ω		8		nS
t _r	Turn-on Rise Time			20		nS
t _{d(off)}	Turn-Off Delay Time			75		nS
t _f	Turn-Off Fall Time			82		nS
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =10V, I _D =20A		70		nC
Q _{gs}	Gate-Source Charge			10		nC
Q _{gd}	Gate-Drain Charge			14		nC
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current (Body Diode)				111	A
V _{SD}	Forward on Voltage (Note 3)	V _{GS} =0V, I _S =20A			1	V
t _{rr}	Reverse Recovery Time	I _F =20A, dI/dt=100A/μs		15		ns
Q _{rr}	Reverse Recovery Charge	I _F =20A, dI/dt=100A/μs		6		nC

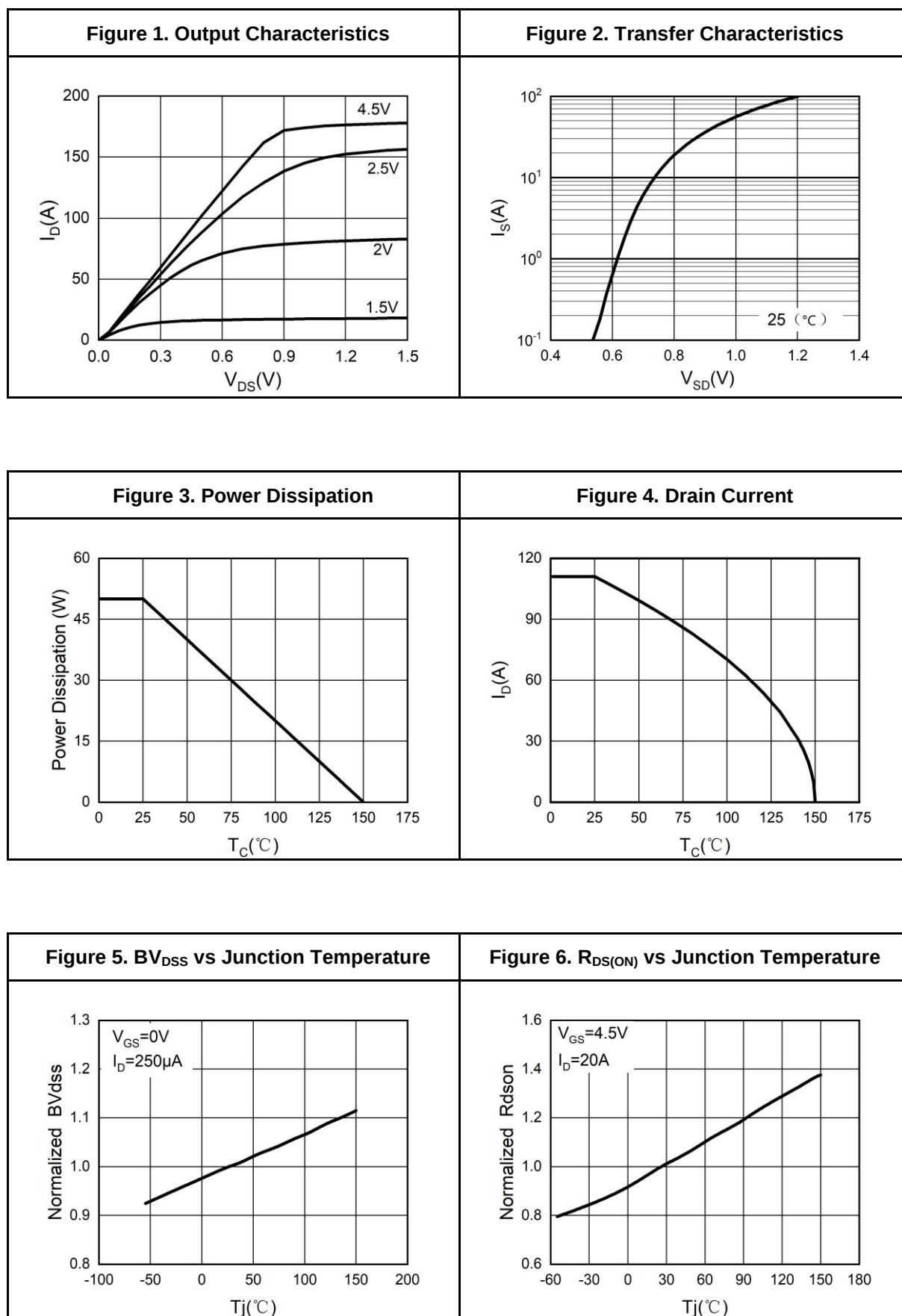
Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.

Notes 2.EAS condition: $T_J=25^{\circ}\text{C}, V_{DD}=10V, V_G=10V, R_g=25\Omega, L=0.5\text{mH}$.

Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.



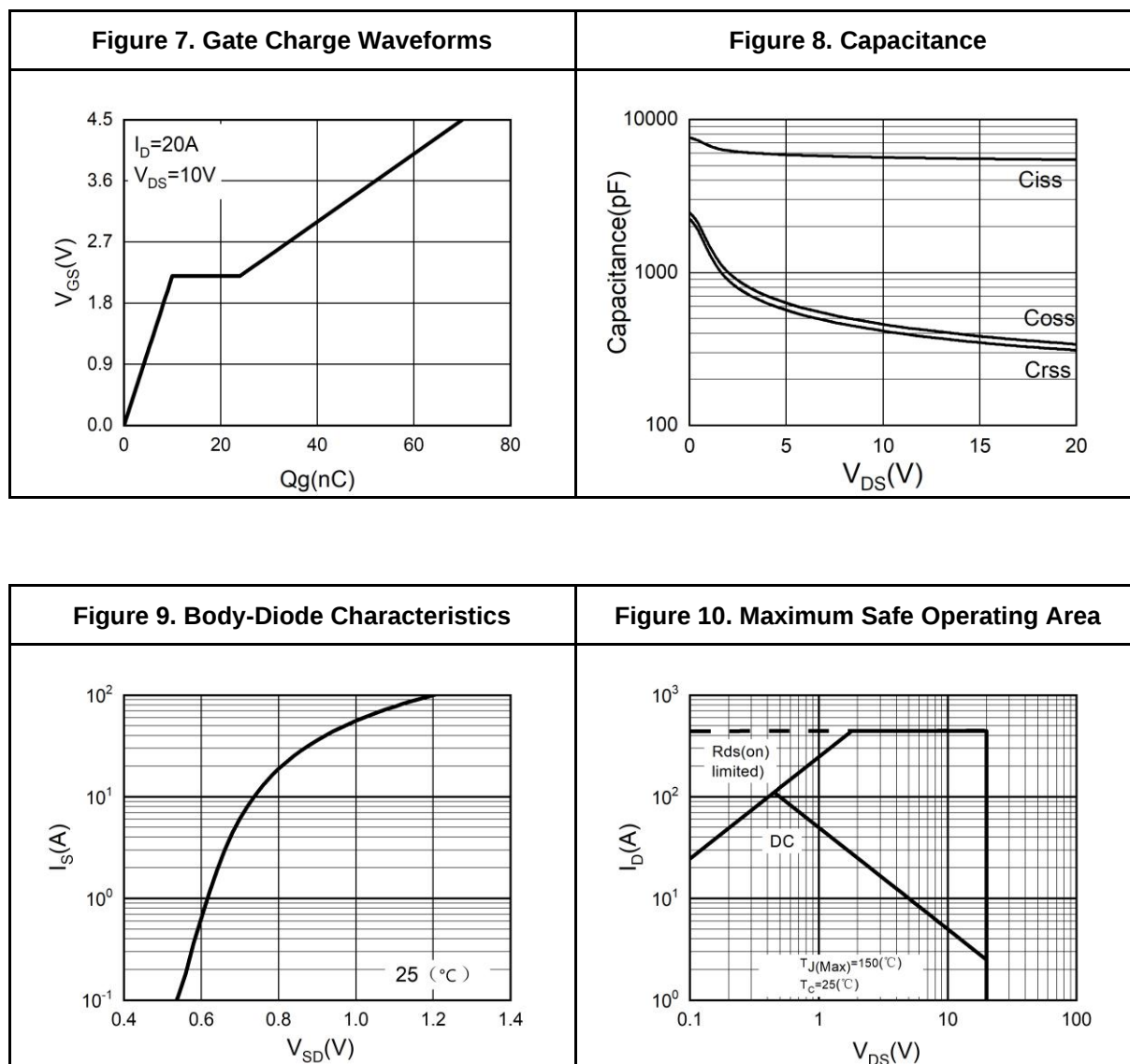
Typical Electrical And Thermal Characteristics (Curves)





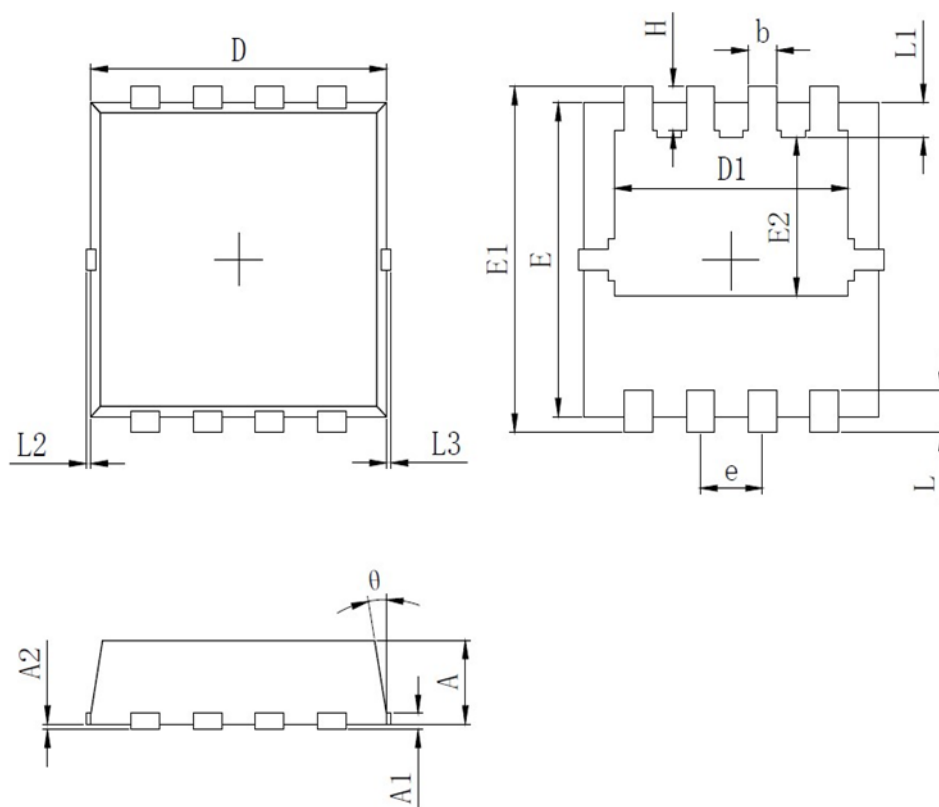
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Typical Electrical And Thermal Characteristics (Curves)





PDFN3X3-8L Package Information



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	0.700	0.800	0.900
A1	0.152 REF.		
A2	0~0.05		
D	3.000	3.100	3.200
D1	2.300	2.450	2.600
E	2.900	3.000	3.100
E1	3.150	3.300	3.450
E2	1.320	1.520	1.720
b	0.200	0.300	0.400
e	0.550	0.650	0.750
L	0.300	0.400	0.500
L1	0.180	0.330	0.480
L2	0~0.100		
L3	0~0.100		
H	0.315	0.415	0.515
θ	8°	10°	12°



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