



30V NP-Channel Trench Power MOSFET

General Description

The SJM30NP400 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a wide variety of applications.

Features

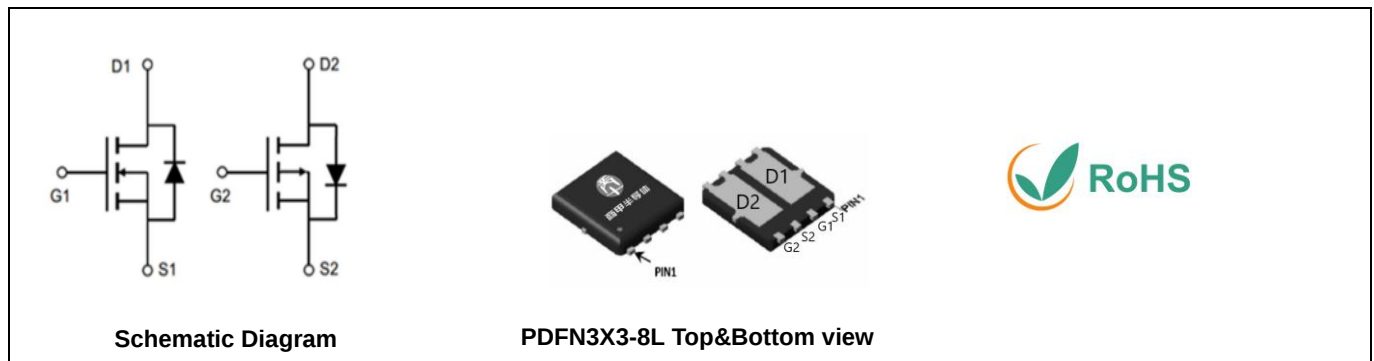
- Low Gate Charge
- High Power and current handing capability
- Lead free product is acquired

Application

- PWM Applications
- Load Switch
- Power Management

Key Performance Parametes

Parameter	Value	Value	Unit
V_{DS}	30	-30	V
$R_{DS(ON_TYP)}$	11	26.3	mΩ
I_D	24.6	-14.5	A
Q_G	16	15	nC



Package Marking and Ordering Information

Device/Ordering Code	Marking	Package	Packing	Reel Size	Tape width	Quantity
SJM30NP400	SJM30NP400	PDFN3X3-8L	Tape	\	\	5000 Pcs

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

Symbol	Parameter	N Limit	P Limit	Unit
V_{DS}	Drain-Source Voltage ($V_{GS}=0V$)	30	-30	V
V_{GS}	Gate-Source Voltage ($V_{DS}=0V$)	± 20	± 20	V
I_D	Drain Current-Continuous($T_c=25^\circ\text{C}$)	24.6	-14.5	A
	Drain Current-Continuous($T_c=100^\circ\text{C}$)	15.5	-9.2	A
I_{DM} (pluse)	Drain Current-Continuous@ Current-Pulsed (Note 1)	98.4	-58	A
P_D	Maximum Power Dissipation($T_c=25^\circ\text{C}$)	11.5	11.5	W
	Maximum Power Dissipation($T_c=100^\circ\text{C}$)	4.6	4.6	W
E_{AS}	Avalanche energy (Note 2)	32	30	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150		$^\circ\text{C}$

Table 2. Thermal Characteristic

Symbol	Parameter	N Limit	P Limit	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to- Case	10.9	10.9	$^\circ\text{C/W}$



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Table 3. N-Channel 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	30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} =0V T _J =25℃			1	μA
		V _{DS} =30V, V _{GS} =0V T _J =125℃			100	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1		2.5	V
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =4A		15.7		S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =4A T _J =25℃		11	14.3	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =4.5V, I _D =3A T _J =25℃		13.4	17.8	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =15V,V _{GS} =0V, f=1.0MHz		780		pF
C _{oss}	Output Capacitance			90		pF
C _{rss}	Reverse Transfer Capacitance			70		pF
Switching Parameters						
t _{d(on)}	Turn-on Delay Time	V _{GS} =4.5V, V _{DS} =15V, R _L =5Ω, R _{GEN} =3Ω		12.3		nS
t _r	Turn-on Rise Time			3.6		nS
t _{d(off)}	Turn-Off Delay Time			38		nS
t _f	Turn-Off Fall Time			7		nS
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =15V, I _D =4A		16		nC
Q _{gs}	Gate-Source Charge			3		nC
Q _{gd}	Gate-Drain Charge			4		nC
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current (Body Diode)				24.6	A
V _{SD}	Forward on Voltage ^(Note 3)	V _{GS} =0V, I _S =4A			1.2	V

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

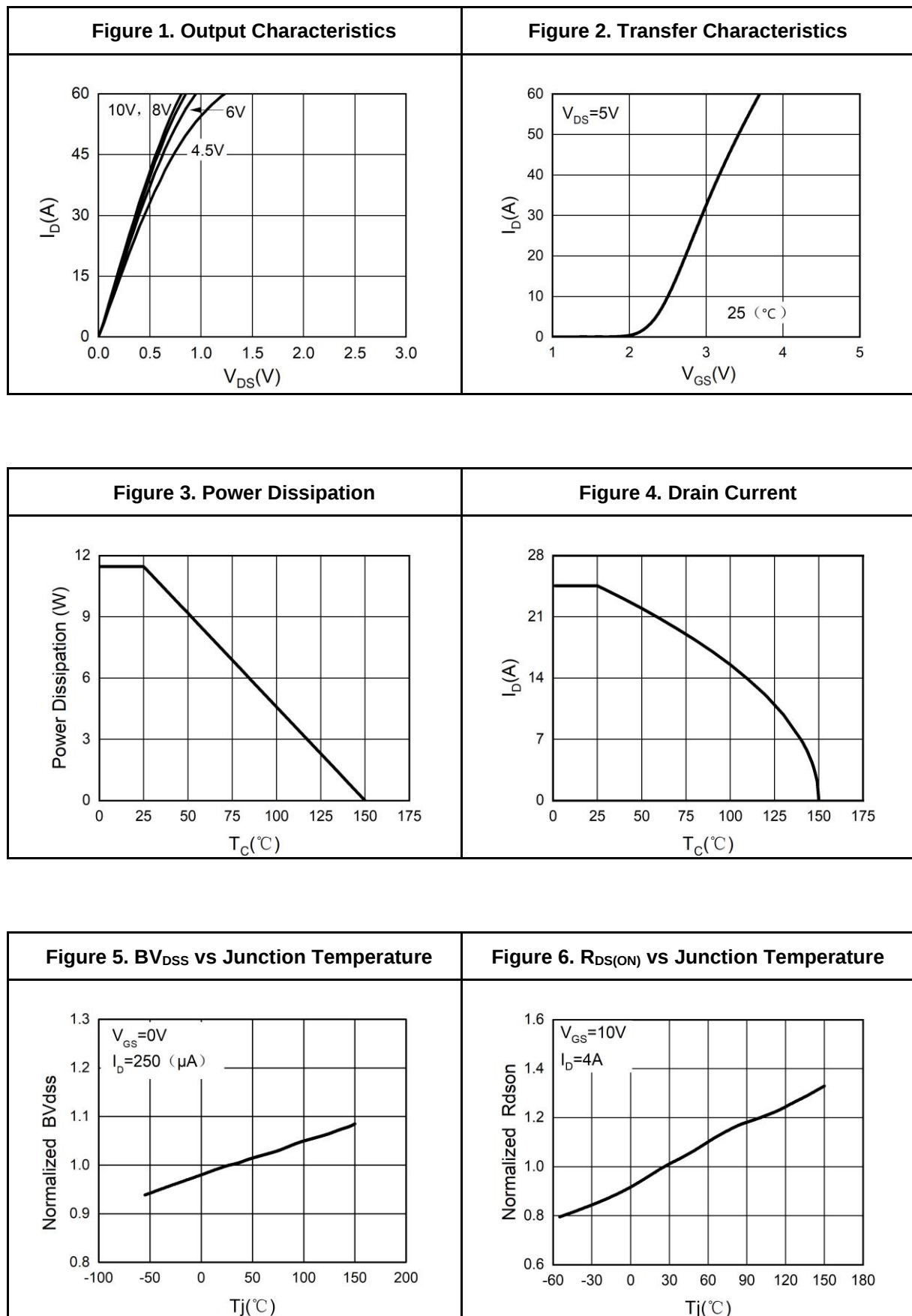
Notes 2.EAS condition: $T_J=25^{\circ}\text{C}, V_{DD}=30V, V_G=10V, R_g=25\Omega, L=0.5mH$.

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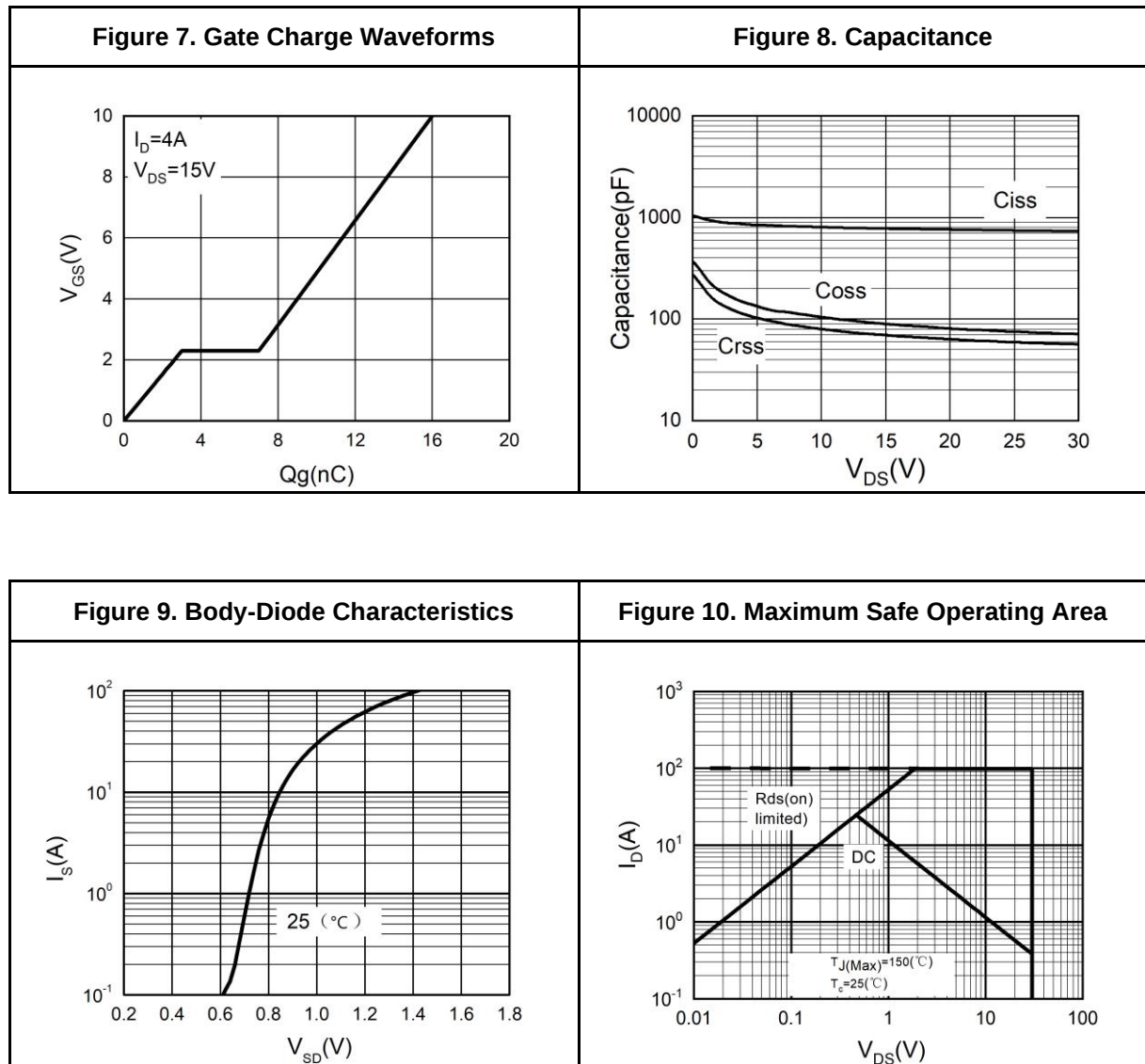
N-Channel Typical Electrical And Thermal Characteristics (Curves)





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N-Channel Typical Electrical And Thermal Characteristics (Curves)





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Table 4. P-Channel 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	-30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-30V, V _{GS} =0V T _J =25℃			-1	μA
		V _{DS} =-30V, V _{GS} =0V T _J =125℃			-100	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-1		-2.5	V
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-5A		8.1		S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =-10V, I _D =-5A T _J =25℃		26.3	34.2	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =-4.5V, I _D =-4A T _J =25℃		36.8	48.9	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-15V,V _{GS} =0V, f=1.0MHz		740		pF
C _{oss}	Output Capacitance			53		pF
C _{rss}	Reverse Transfer Capacitance			43		pF
Switching Parameters						
t _{d(on)}	Turn-on Delay Time	V _{GS} =-10V, V _{DS} =-15V, R _L =3Ω, R _{GEN} =3Ω		13.4		nS
t _r	Turn-on Rise Time			3.4		nS
t _{d(off)}	Turn-Off Delay Time			42		nS
t _f	Turn-Off Fall Time			9		nS
Q _g	Total Gate Charge	V _{GS} =-10V, V _{DS} =-15V, I _D =-5A		15		nC
Q _{gs}	Gate-Source Charge			4		nC
Q _{gd}	Gate-Drain Charge			2		nC
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current (Body Diode)				-14.5	A
V _{SD}	Forward on Voltage ^(Note 3)	V _{GS} =0V, I _S =-5A			-1.2	V

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

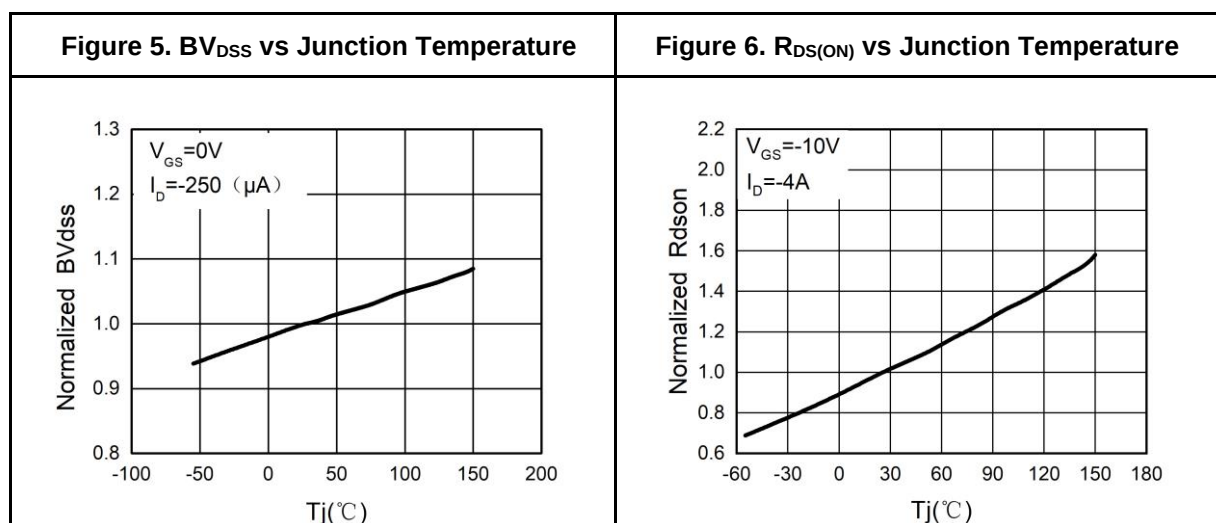
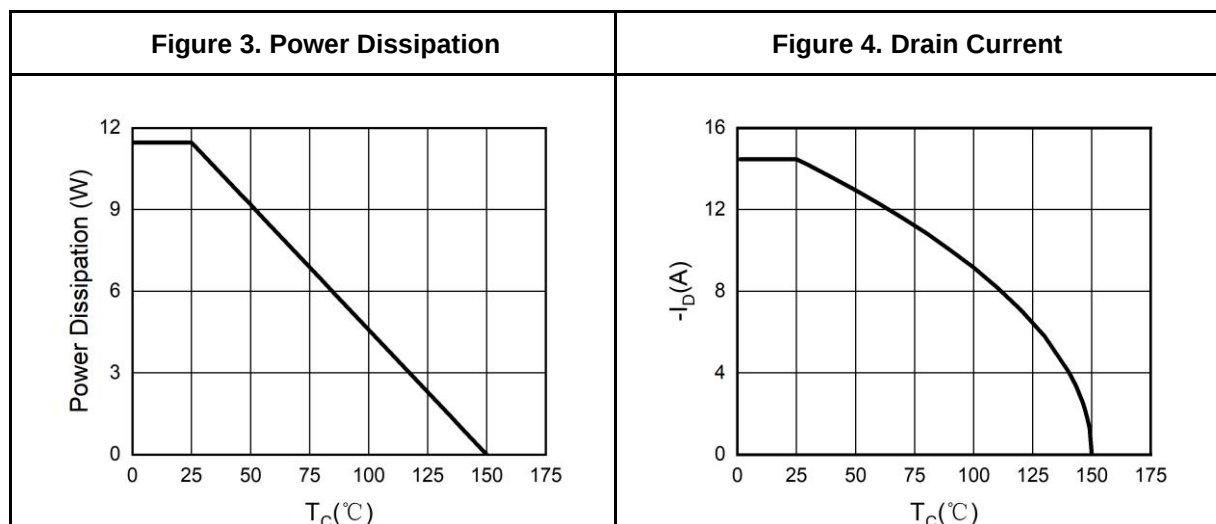
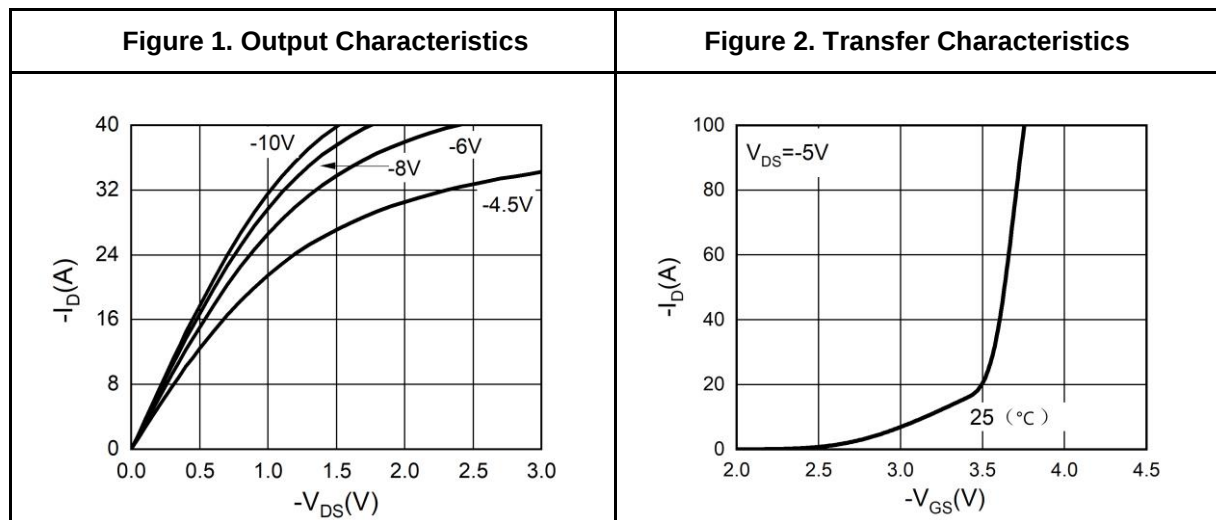
Notes 2.EAS condition: $T_J=25^{\circ}\text{C}, V_{DS}=-30V, V_G=-10V, R_g=25\Omega, L=0.5\text{mH}$.

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



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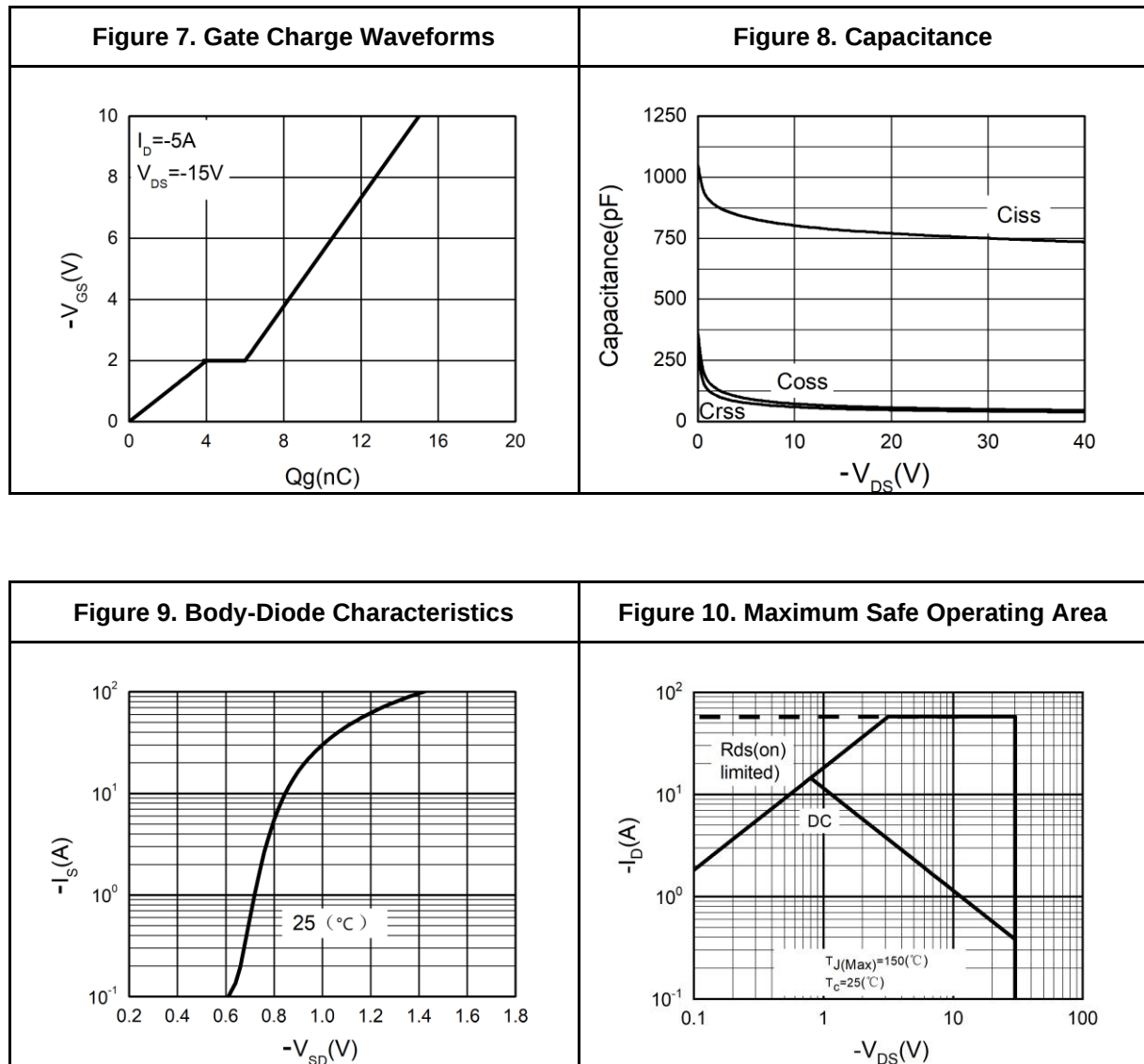
P-Channel Typical Electrical And Thermal Characteristics (Curves)





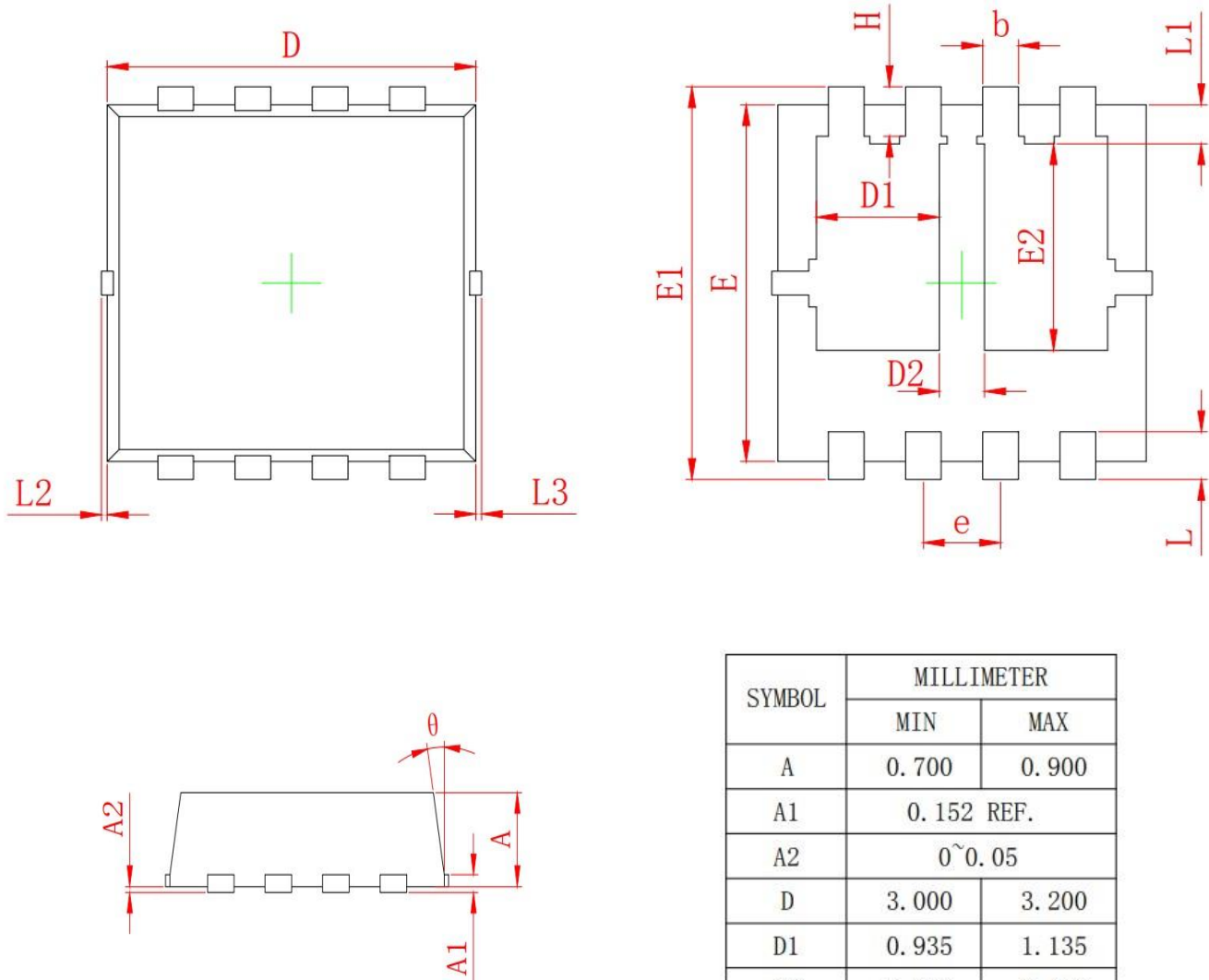
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P-Channel Typical Electrical And Thermal Characteristics (Curves)





PDFN3X3-8L Package Information



SYMBOL	MILLIMETER	
	MIN	MAX
A	0.700	0.900
A1	0.152 REF.	
A2	0~0.05	
D	3.000	3.200
D1	0.935	1.135
D2	0.280	0.480
E	2.900	3.100
E1	3.150	3.450
E2	1.535	1.935
b	0.200	0.400
e	0.550	0.750
L	0.300	0.500
L1	0.180	0.480
L2	0~0.100	
L3	0~0.100	
H	0.315	0.515
θ	8°	12°



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