



60V N&P-Channel Trench Power MOSFET

General Description

The SJM60NP735 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

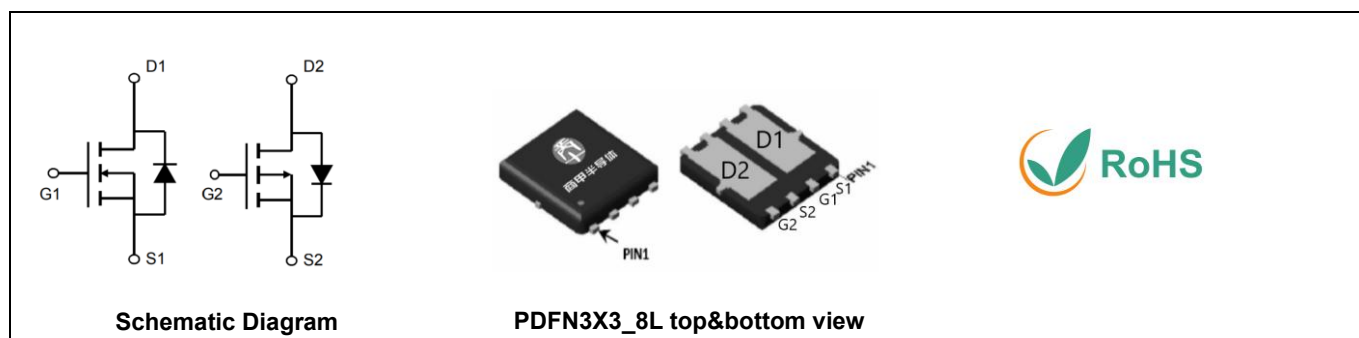
- Low Gate Charge
- 100% UIS Tested, 100% DVDS Tested
- High Power and current handing capability
- Lead free product is acquired

Application

- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

Key Performance Parametes

Parameter	Value	Value	Unit
V_{DS}	60	-60	V
$R_{DS(ON_TYP)}$	29	44	m Ω
I_D	14.3	-18.5	A
Q_G	18	26	nC



Package Marking and Ordering Information

Device/Ordering Code	Marking	Package	Packing	Reel Size	Tape width	Quantity
SJM60NP735	SJM60NP735	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 ($V_{GS}=0V$)	60	-60	V
V_{GS}	Gate-Source Voltage ($V_{DS}=0V$)	± 20	± 20	V
I_D	Drain Current-Continuous($T_c=25^\circ\text{C}$)	14.3	-18.5	A
	Drain Current-Continuous($T_c=100^\circ\text{C}$)	9.1	-11.7	A
I_{DM} (pluse)	Drain Current-Continuous@ Current-Pulsed (Note 1)	57.2	-74	A
P_D	Maximum Power Dissipation($T_c=25^\circ\text{C}$)	16	32	W
	Maximum Power Dissipation($T_c=100^\circ\text{C}$)	6.4	13	W
E_{AS}	Avalanche energy (Note 2)	42	100	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	7.8	3.85	$^\circ\text{C/W}$



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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	$V_{GS}=0V, I_D=250\mu A$	60			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=60V, V_{GS}=0V, T_J=25^{\circ}\text{C}$			1	μA
		$V_{DS}=60V, V_{GS}=0V, T_J=125^{\circ}\text{C}$			100	μA
I_{GSS}	Gate-Body Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1		2.5	V
g_{FS}	Forward Transconductance	$V_{DS}=5V, I_D=10A$		13		S
$R_{DS(ON)}$	Drain-Source On-State Resistance	$V_{GS}=10V, I_D=10A, T_J=25^{\circ}\text{C}$		29	36.3	m Ω
$R_{DS(ON)}$	Drain-Source On-State Resistance	$V_{GS}=4.5V, I_D=5A, T_J=25^{\circ}\text{C}$		34	45.2	m Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=30V, V_{GS}=0V, f=1.0\text{MHz}$		970		pF
C_{oss}	Output Capacitance			55		pF
C_{rss}	Reverse Transfer Capacitance			46		pF
R_g	Gate resistance	$V_{GS}=0V, V_{DS}=0V, f=1.0\text{MHz}$		1.1		Ω
Switching Parameters						
$t_{d(on)}$	Turn-on Delay Time	$V_{GS}=10V, V_{DS}=30V, R_L=3\Omega, R_{GEN}=3\Omega$		12.7		nS
t_r	Turn-on Rise Time			2.6		nS
$t_{d(off)}$	Turn-Off Delay Time			27.2		nS
t_f	Turn-Off Fall Time			3.2		nS
Q_g	Total Gate Charge	$V_{GS}=10V, V_{DS}=30V, I_D=10A$		18		nC
Q_{gs}	Gate-Source Charge			4		nC
Q_{gd}	Gate-Drain Charge			3.7		nC
Source-Drain Diode Characteristics						
I_{SD}	Source-Drain Current (Body Diode)				14.3	A
V_{SD}	Forward on Voltage (Note 3)	$V_{GS}=0V, I_S=10A$			1.2	V
t_{rr}	Reverse Recovery Time	$I_F=10A, dI/dt=100A/\mu s$		19.5		ns
Q_{rr}	Reverse Recovery Charge	$I_F=10A, dI/dt=100A/\mu s$		15.8		nC

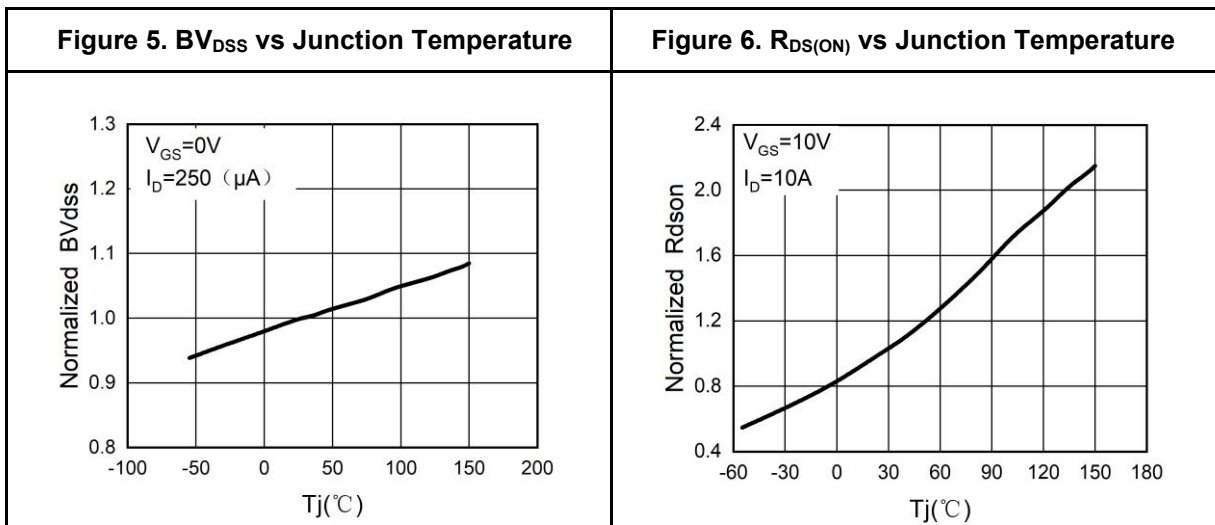
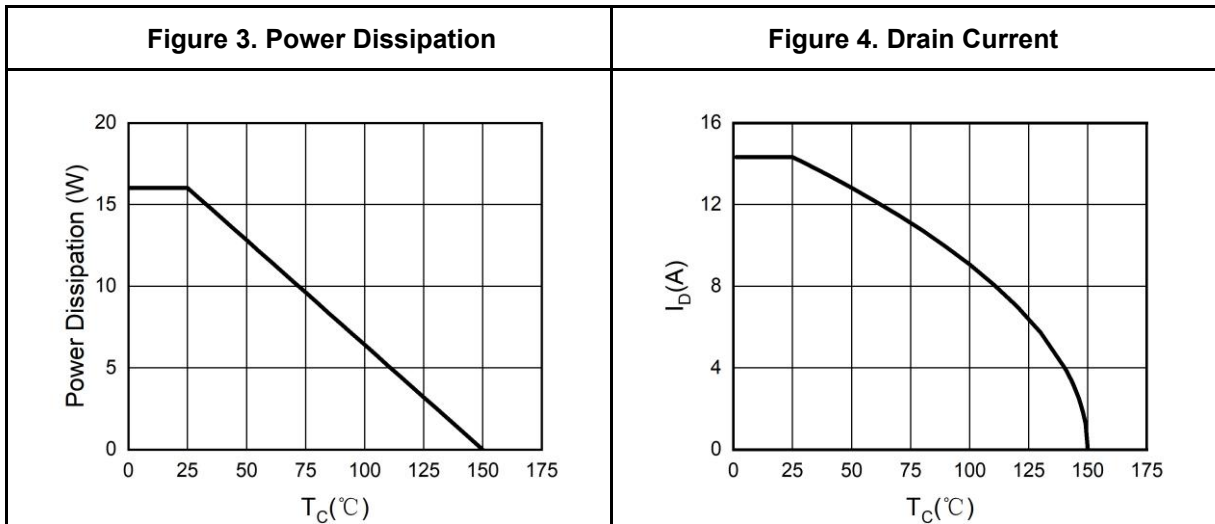
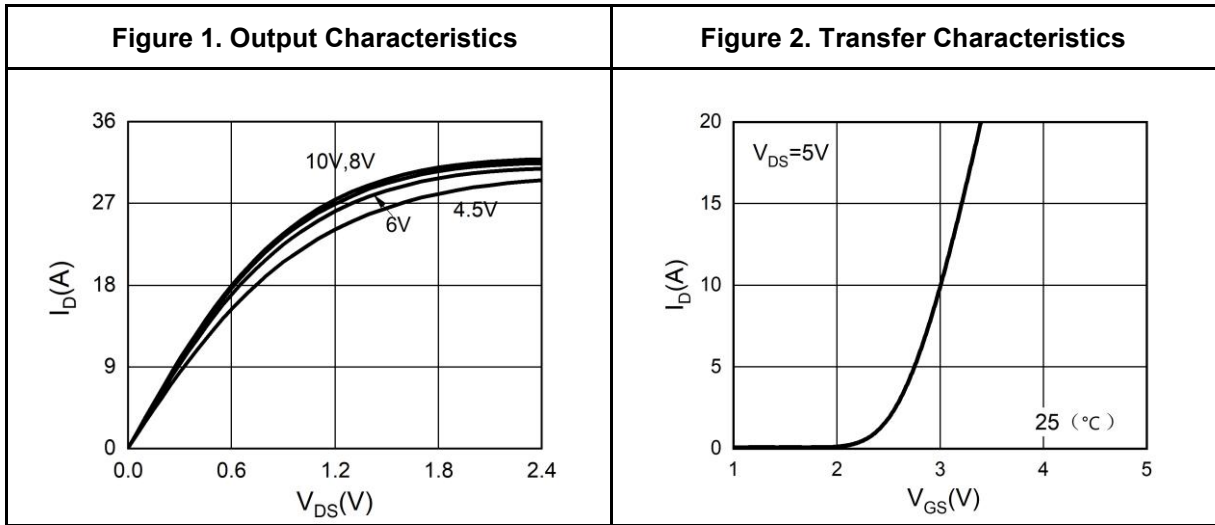
Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.

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

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

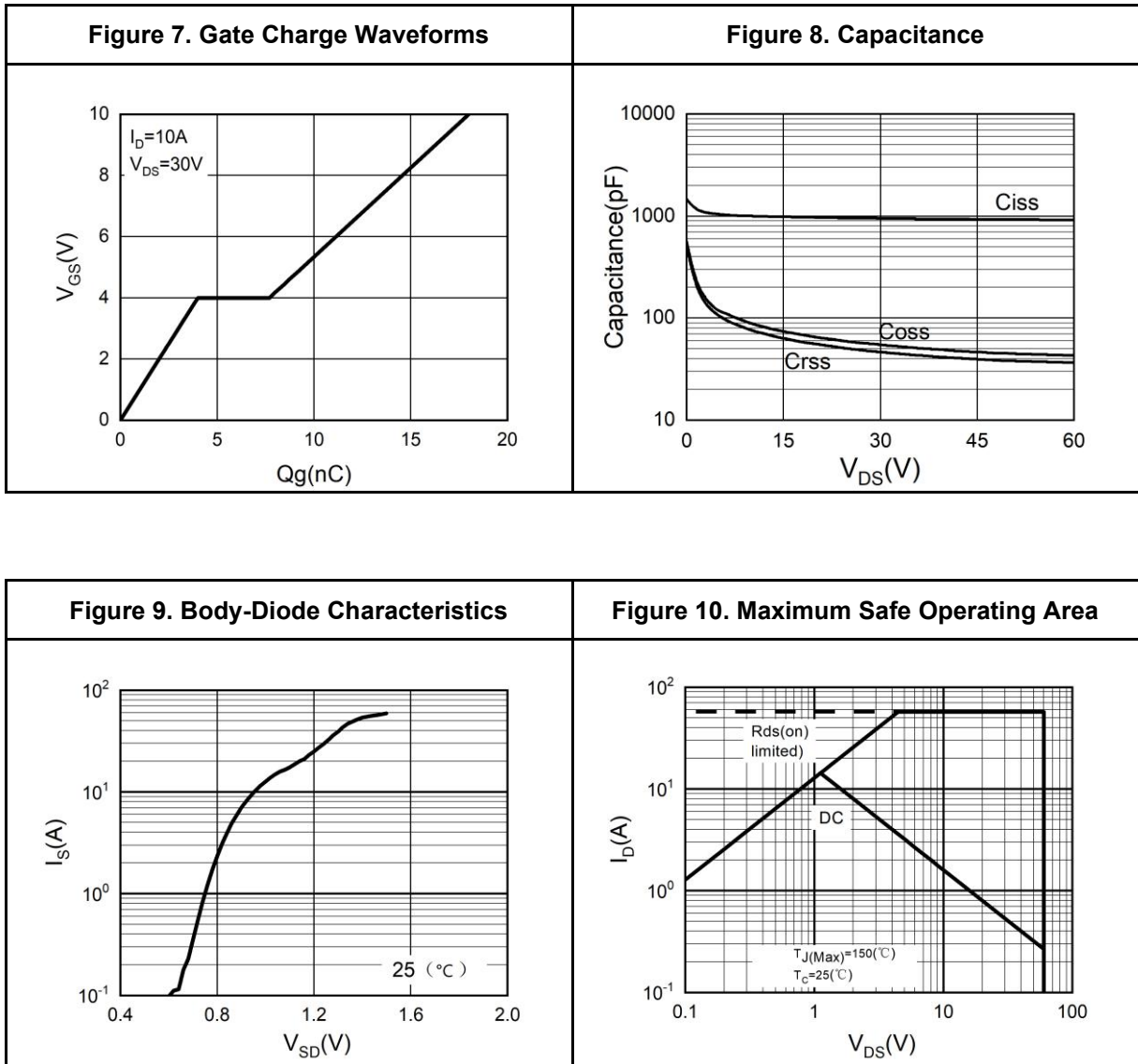


N-Channel Typical Electrical And Thermal Characteristics (Curves)





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	$V_{GS}=0V, I_D=-250\mu A$	-60			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-60V, V_{GS}=0V, T_J=25^\circ\text{C}$			-1	μA
		$V_{DS}=-60V, V_{GS}=0V, T_J=125^\circ\text{C}$			-100	μA
I_{GSS}	Gate-Body Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1		-2.5	V
g_{FS}	Forward Transconductance	$V_{DS}=-5V, I_D=-10A$		17		S
$R_{DS(ON)}$	Drain-Source On-State Resistance	$V_{GS}=-10V, I_D=-10A, T_J=25^\circ\text{C}$		44	55	m Ω
$R_{DS(ON)}$	Drain-Source On-State Resistance	$V_{GS}=-4.5V, I_D=-8A, T_J=25^\circ\text{C}$		52.7	70.1	m Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=-30V, V_{GS}=0V, f=1.0\text{MHz}$		2100		pF
C_{oss}	Output Capacitance			92		pF
C_{rss}	Reverse Transfer Capacitance			80		pF
R_g	Gate resistance	$V_{GS}=0V, V_{DS}=0V, f=1.0\text{MHz}$		4.2		Ω
Switching Parameters						
$t_{d(on)}$	Turn-on Delay Time	$V_{GS}=-10V, V_{DS}=-30V, R_L=3\Omega, R_{GEN}=3\Omega$		11		nS
t_r	Turn-on Rise Time			7.2		nS
$t_{d(off)}$	Turn-Off Delay Time			64		nS
t_f	Turn-Off Fall Time			32		nS
Q_g	Total Gate Charge	$V_{GS}=-10V, V_{DS}=-30V, I_D=-10A$		26		nC
Q_{gs}	Gate-Source Charge			4		nC
Q_{gd}	Gate-Drain Charge			4.8		nC
Source-Drain Diode Characteristics						
I_{SD}	Source-Drain Current (Body Diode)				-18.5	A
V_{SD}	Forward on Voltage (Note 3)	$V_{GS}=0V, I_S=-10A$			-1.2	V
t_{rr}	Reverse Recovery Time	$I_F=-10A, dI/dt=-100A/\mu s$		24		ns
Q_{rr}	Reverse Recovery Charge	$I_F=-10A, dI/dt=-100A/\mu s$		16		nC

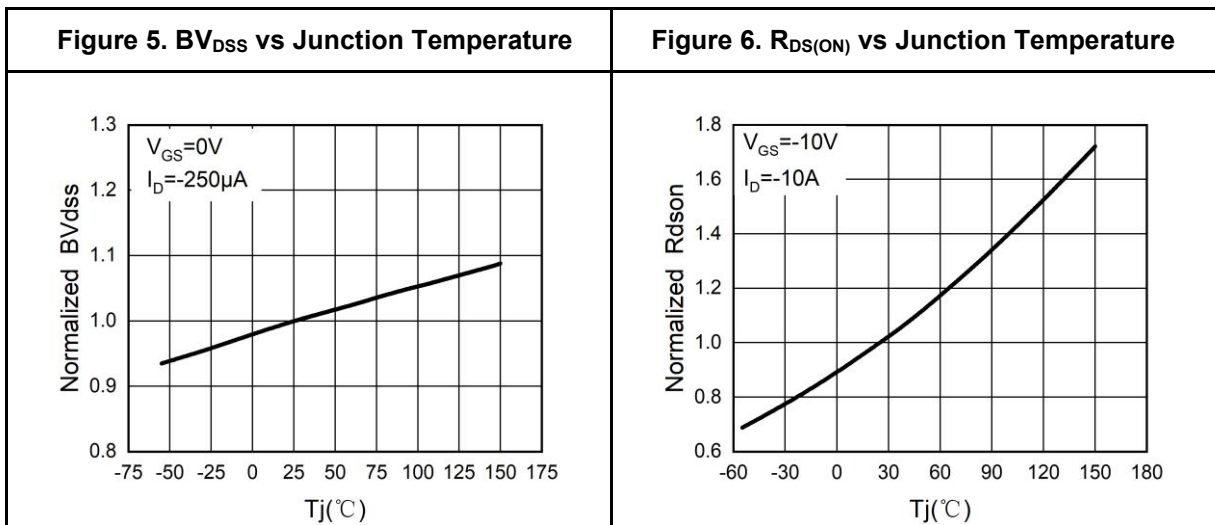
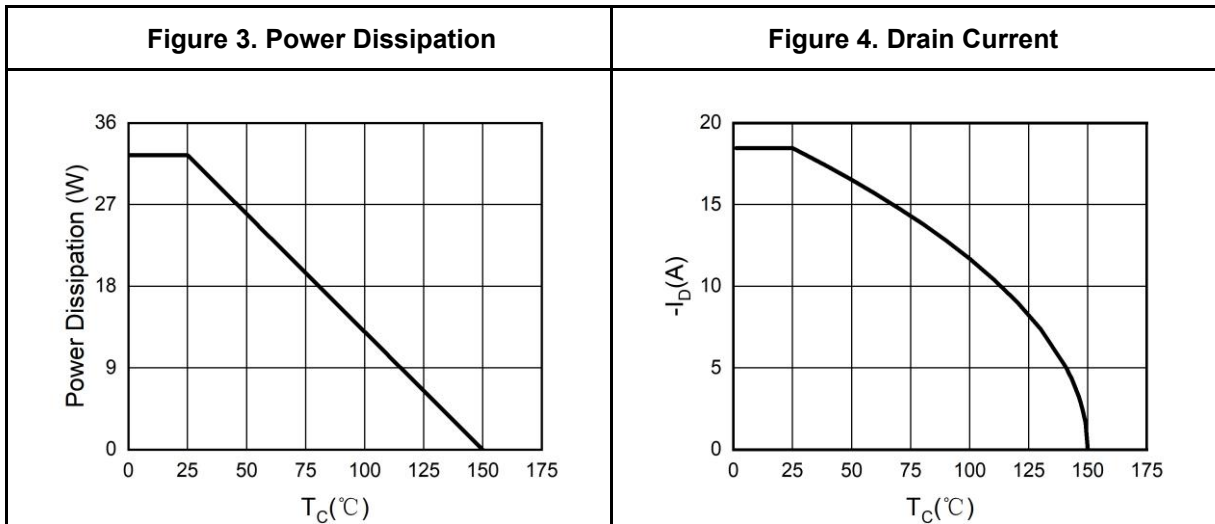
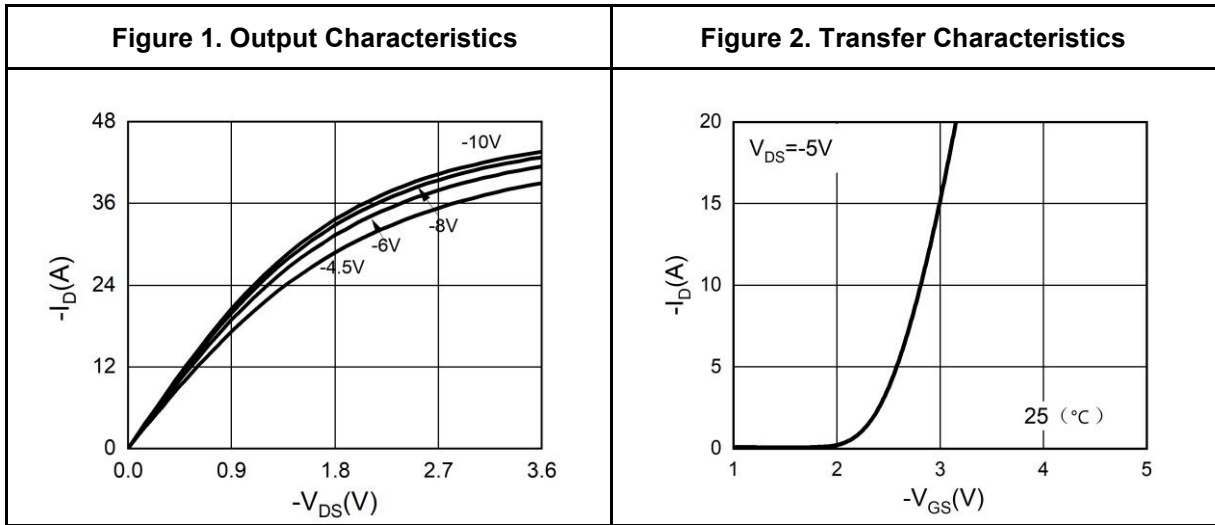
Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.

Notes 2.EAS condition: $T_J=25^\circ\text{C}, V_{DD}=-40V, V_G=-10V, R_g=25\Omega, L=0.5\text{mH}$.

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



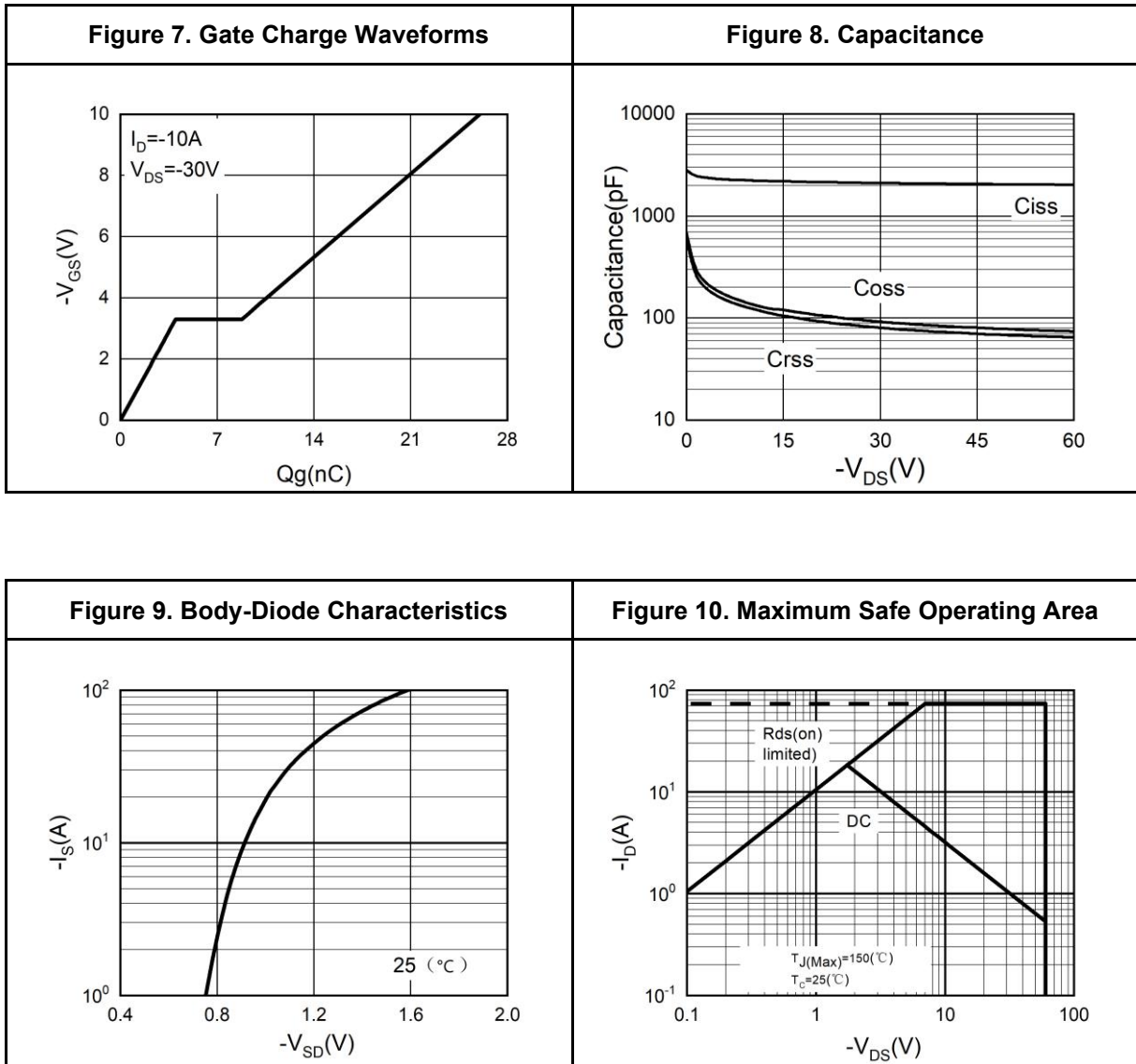
P-Channel Typical Electrical And Thermal Characteristics (Curves)





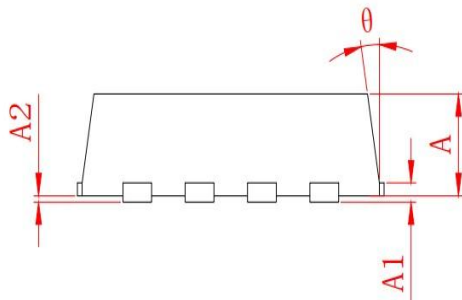
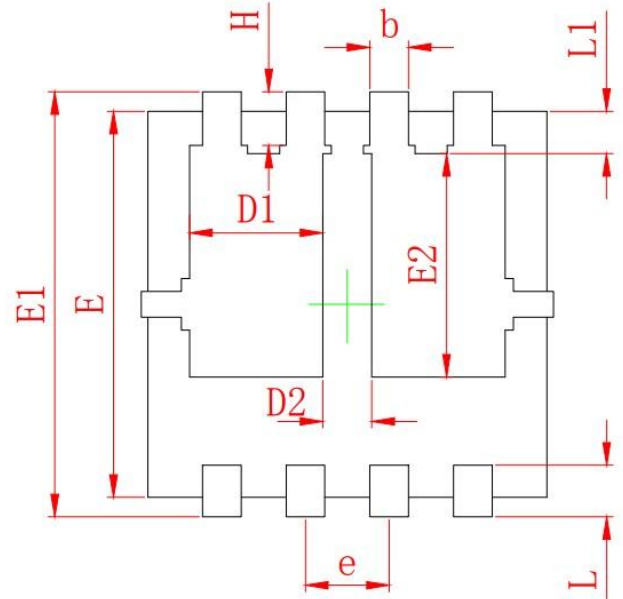
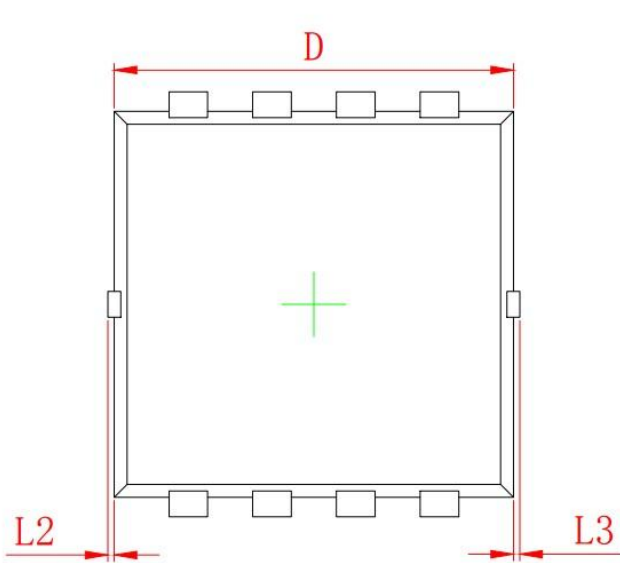
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P-Channel Typical Electrical And Thermal Characteristics (Curves)





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°



Attention

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