



60V N&P-Channel Trench Power MOSFET

General Description

The SJH60NP735 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

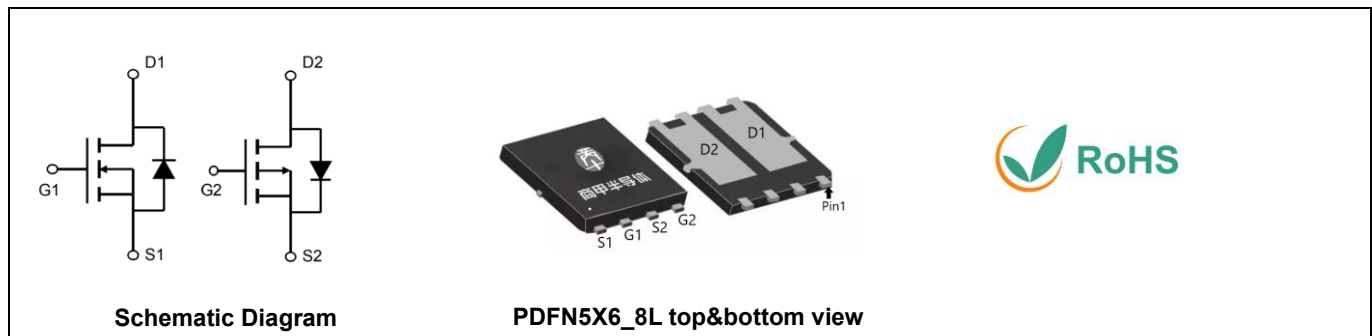
- Low Gate Charge
- 100% UIS Tested, 100% DVDS Tested
- High Power and current handing capability
- Lead free product is acquired

Application

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

Key Performance Parametes

Parameter	Value	Value	Unit
V_{DS}	60	-60	V
$R_{DS(ON_TYP)}$	24	43	mΩ
I_D	23	-21	A
Q_G	22	26	nC



Package Marking and Ordering Information

Device/Ordering Code	Marking	Package	Packing	Reel Size	Tape width	Quantity
SJH60NP735	SJH60NP735	PDFN5X6	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($T_c=25^\circ\text{C}$)	23	-21	A
	Drain Current-Continuous($T_c=100^\circ\text{C}$)	14.5	-13	A
$I_{DM}(\text{pulse})$	Drain Current-Continuous@ Current-Pulsed (Note 1)	92	-84	A
P_D	Maximum Power Dissipation($T_c=25^\circ\text{C}$)	34	40	W
	Maximum Power Dissipation($T_c=100^\circ\text{C}$)	13.5	16	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	3.7	3.1	$^\circ\text{C/W}$



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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	60			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =60V, V _{GS} =0V T _J =25℃			1	μA
		V _{DS} =60V, 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 =10A		16		S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =10A T _J =25℃		24	30	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =4.5V, I _D =5A T _J =25℃		43	54	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =30V, V _{GS} =0V, f=1.0MHz		1100		pF
C _{oss}	Output Capacitance			56		pF
C _{rss}	Reverse Transfer Capacitance			46		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1.0MHz		2.3		Ω
Switching Parameters						
t _{d(on)}	Turn-on Delay Time	V _{GS} =10V, V _{DS} =30V, R _L =3Ω, R _{GEN} =3Ω		12		nS
t _r	Turn-on Rise Time			3		nS
t _{d(off)}	Turn-Off Delay Time			24		nS
t _f	Turn-Off Fall Time			3.5		nS
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =30V, I _D =10A		22		nC
Q _{gs}	Gate-Source Charge			2.6		nC
Q _{gd}	Gate-Drain Charge			4.9		nC
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current (Body Diode)				23	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/μs		20		ns
Q _{rr}	Reverse Recovery Charge	I _F =10A, dI/dt=100A/μs		18		nC

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

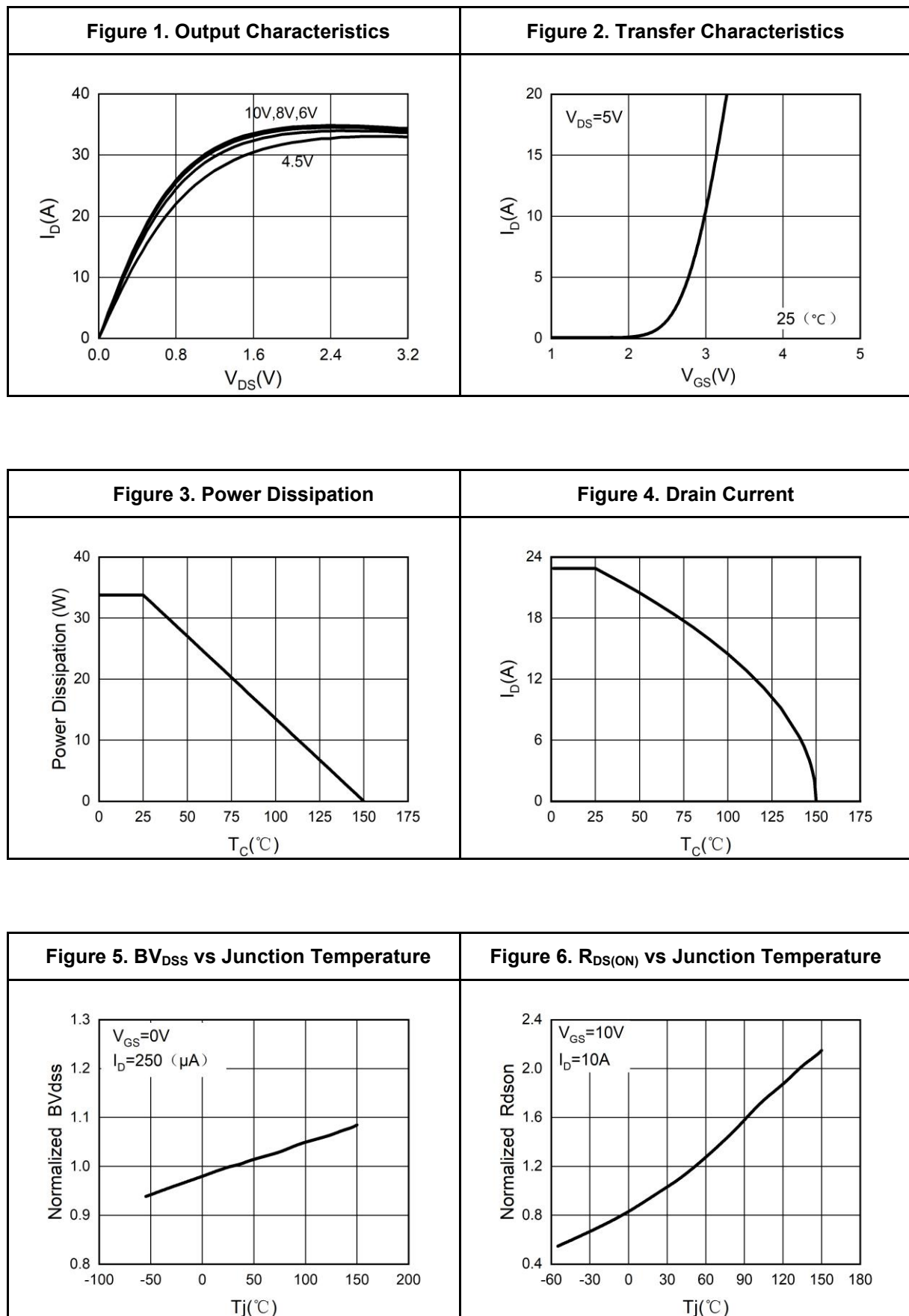
Notes 2.EAS condition: $T_J=25^\circ\text{C}, V_{DD}=30V, V_G=10V, R_g=25\Omega, L=0.5mH$.

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



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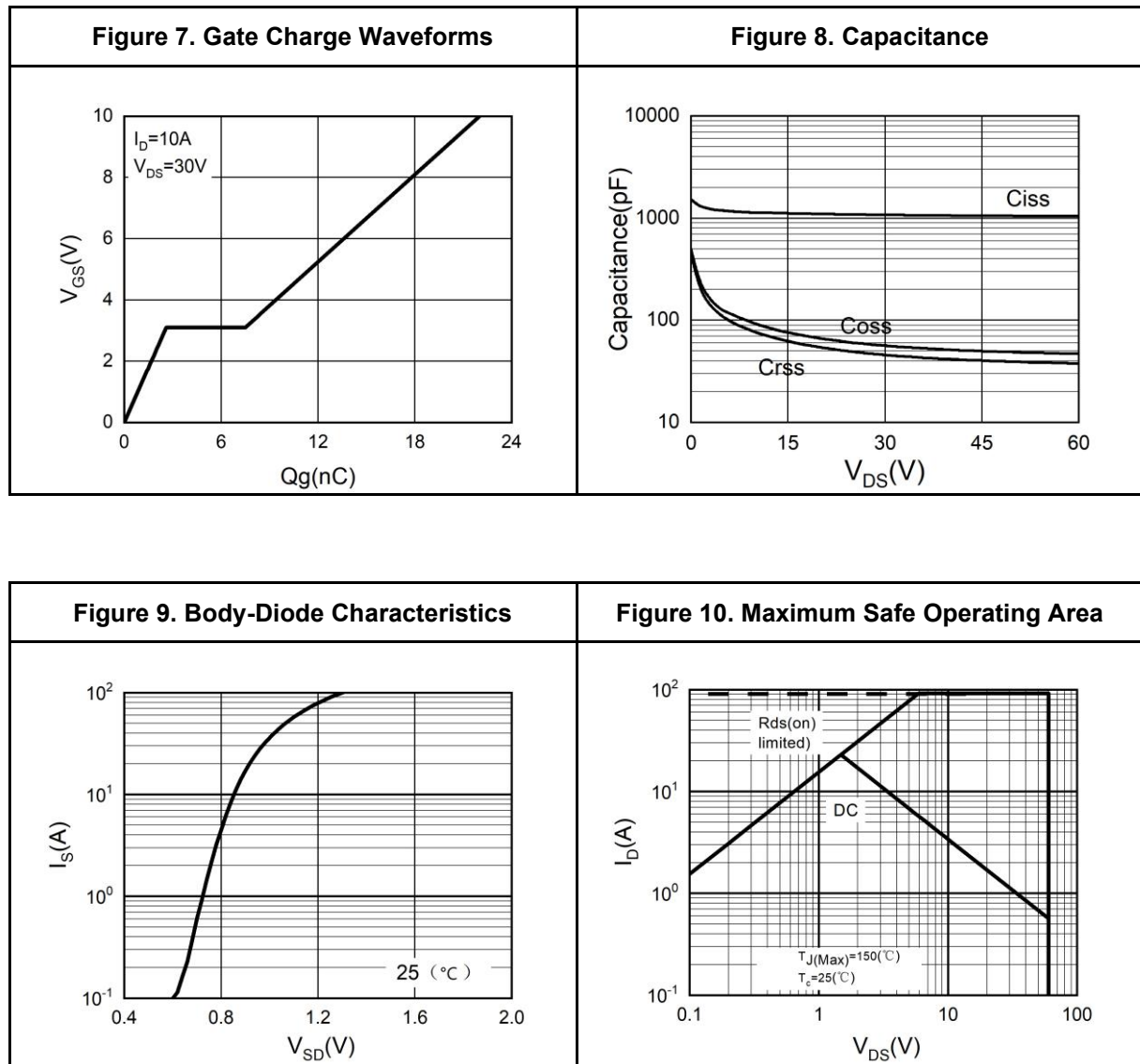
N-Channel Typical Electrical And Thermal Characteristics (Curves)





60V N&P-Channel Trench Power MOSFET

N-Channel Typical Electrical And Thermal Characteristics (Curves)





60V N&P-Channel Trench Power MOSFET

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	-60			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-60V, V _{GS} =0V T _J =25℃			-1	μA
		V _{DS} =-60V, 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 =-10A		18		S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =-10V, I _D =-10A T _J =25℃		43	54	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =-4.5V, I _D =-8A T _J =25℃		51	68	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-30V,V _{GS} =0V, f=1.0MHz		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=1.0MHz		4.2		Ω
Switching Parameters						
t _{d(on)}	Turn-on Delay Time	V _{GS} =-10V, V _{DS} =-30V, R _L =3Ω, R _{GEN} =3Ω		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)				-21	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/μs		24		ns
Q _{rr}	Reverse Recovery Charge	I _F =-10A, dI/dt=-100A/μs		16		nC

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

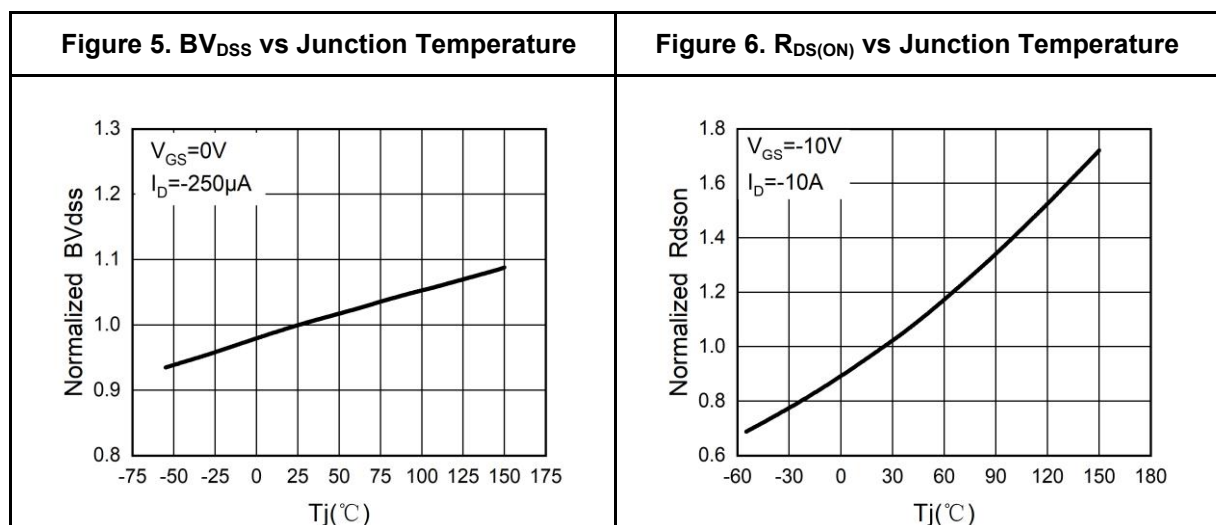
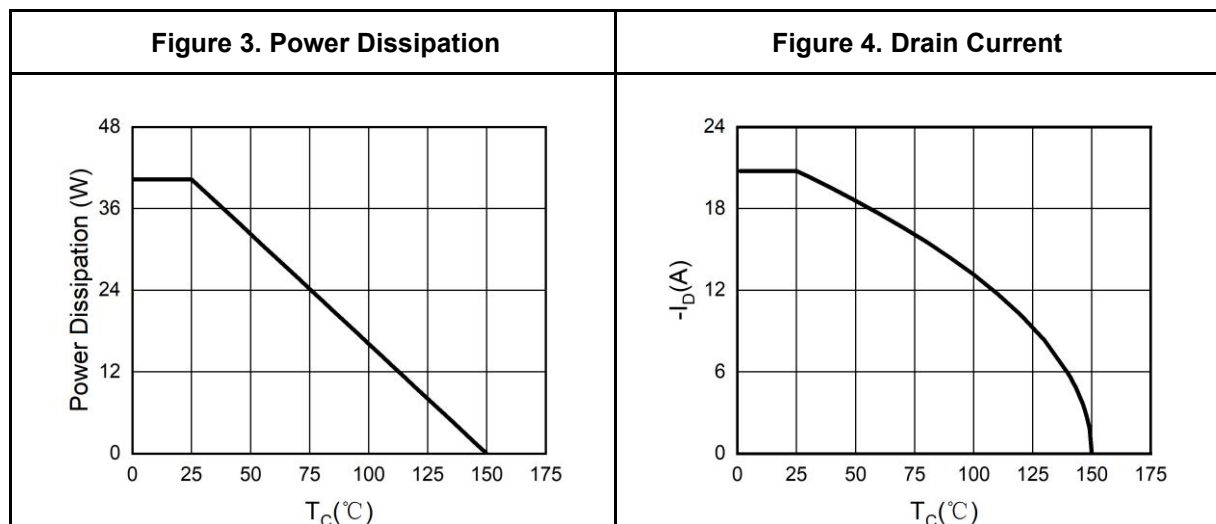
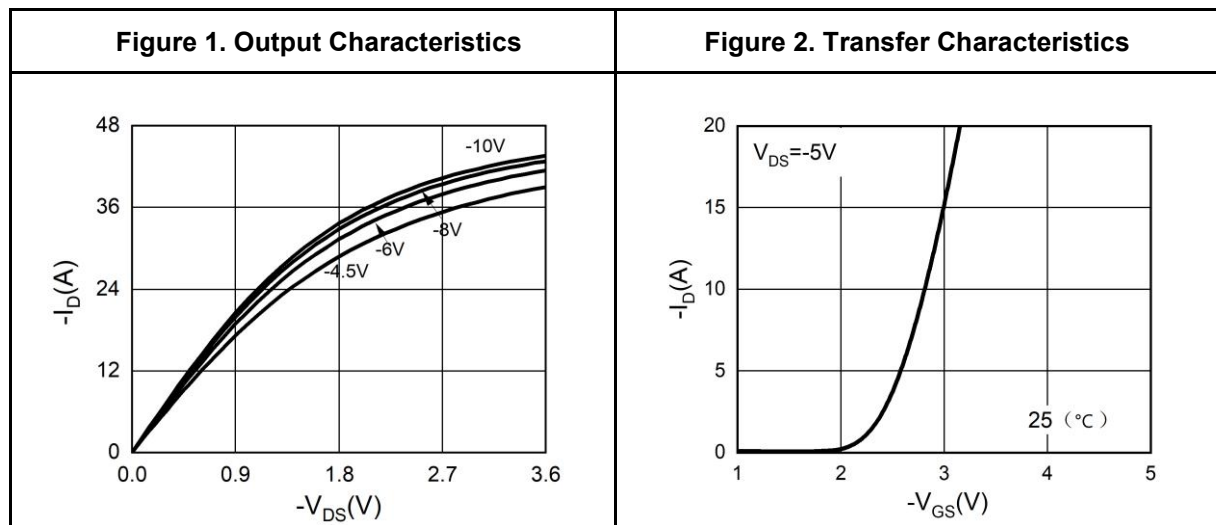
Notes 2.EAS condition: $T_J=25^{\circ}\text{C}, V_{DD}=-40V, V_G=-10V, R_g=25\Omega, L=0.5\text{mH}$.

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



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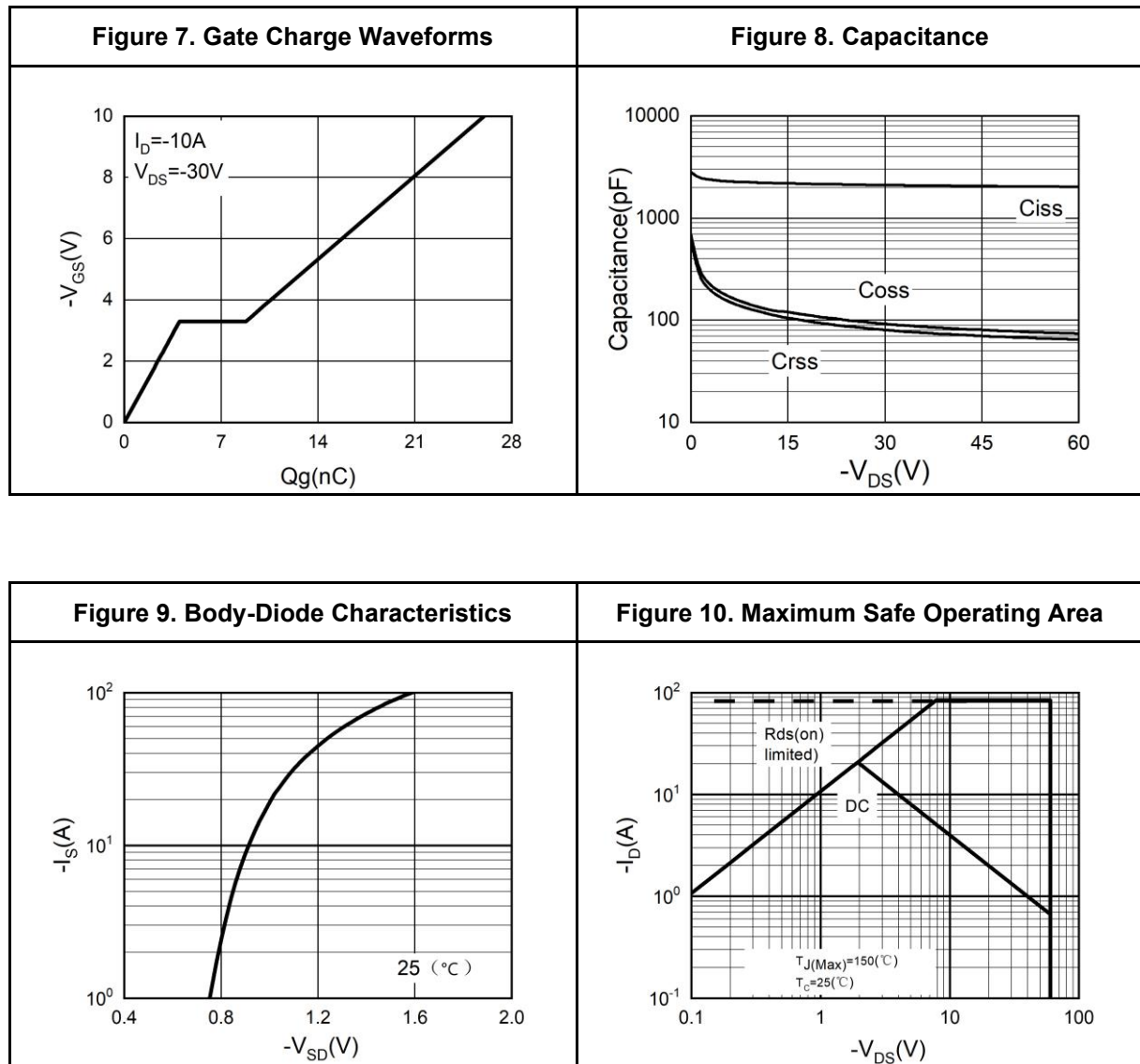
P-Channel Typical Electrical And Thermal Characteristics (Curves)





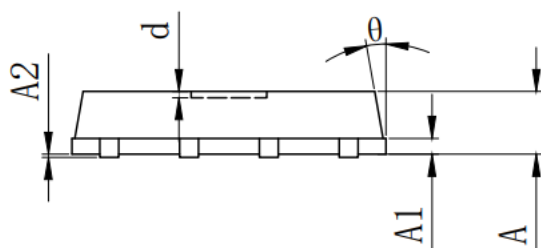
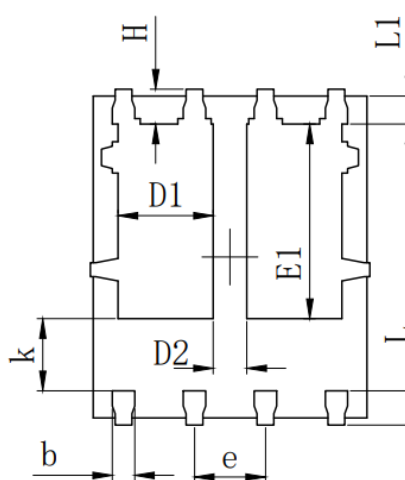
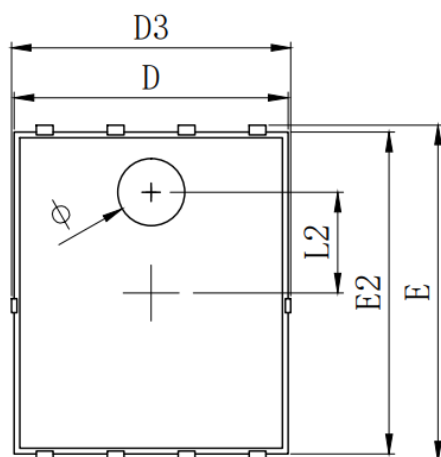
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P-Channel Typical Electrical And Thermal Characteristics (Curves)





PDFN5X6-8L Package Information



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	0.900	1.000	1.100
A1	0.254 REF.		
A2	0~0.05		
D	4.824	4.900	4.976
D1	1.605	1.705	1.805
D2	0.500	0.600	0.700
D3	4.924	5.000	5.076
E	5.924	6.000	6.076
E1	3.375	3.475	3.575
E2	5.674	5.750	5.826
b	0.350	0.400	0.450
e	1.270 TYP.		
L	0.534	0.610	0.686
L1	0.424	0.500	0.576
L2	1.800 REF.		
k	1.190	1.290	1.390
H	0.549	0.625	0.701
θ	8°	10°	12°
Φ	1.100	1.200	1.300
d			0.100



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