



30V N&P-Channel Trench Power MOSFET

General Description

The SJD4606 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as $\pm 4.5V$. This device is suitable for use as a wide variety of applications.

Features

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

Application

- Battery Protection
- Power Management
- Load Switch

Key Performance Parametes

Parameter	Value	Value	Unit
V_{DS}	30	-30	V
$R_{DS(ON_TYP)}$	12.7	30.4	m Ω
I_D	33	-21	A
Q_G	14	16	nC



Package Marking and Ordering Information

Device/Ordering Code	Marking	Package	Packing	Reel Size	Tape width	Quantity
SJD4606	SJD4606	TO-252-4L	Tape	\	\	2500 Pcs

Table 1. Absolute Maximum Ratings ($T_A=25^{\circ}C$ 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($T_C=25^{\circ}C$)	33	-21	A
	Drain Current-Continuous($T_C=100^{\circ}C$)	21	-13	A
I_{DM} (pluse)	Drain Current-Continuous@ Current-Pulsed (Note 1)	132	-84	A
P_D	Maximum Power Dissipation($T_C=25^{\circ}C$)	27	26.6	W
	Maximum Power Dissipation($T_C=100^{\circ}C$)	11	10.6	W
E_{AS}	Avalanche energy (Note 2)	36	30	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150		$^{\circ}C$

Table 2. Thermal Characteristic

Symbol	Parameter	N Max	P Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to- Case	4.6	4.7	$^{\circ}C/W$



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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	1.0		2.5	V
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =3A		6.4		S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =3A T _J =25℃		12.7	15.9	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =4.5V, I _D =2A T _J =25℃		19.2	25.5	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1.0MHz		600		pF
C _{oss}	Output Capacitance			75		pF
C _{rss}	Reverse Transfer Capacitance			61		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1.0MHz		1.2		Ω
Switching Parameters						
t _{d(on)}	Turn-on Delay Time	V _{GS} =10V, V _{DS} =15V, R _L =5Ω, R _{GEN} =3Ω		4.5		nS
t _r	Turn-on Rise Time			2.5		nS
t _{d(off)}	Turn-Off Delay Time			14.5		nS
t _f	Turn-Off Fall Time			3.5		nS
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =15V, I _D =3A		14		nC
Q _{gs}	Gate-Source Charge			2		nC
Q _{gd}	Gate-Drain Charge			3		nC
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current (Body Diode)				33	A
V _{SD}	Forward on Voltage (Note 3)	V _{GS} =0V, I _S =3A			1.2	V
t _{rr}	Reverse Recovery Time	I _F =3A, dI/dt=500A/μs		10		ns
Q _{rr}	Reverse Recovery Charge	I _F =3A, dI/dt=500A/μs		5		nC

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

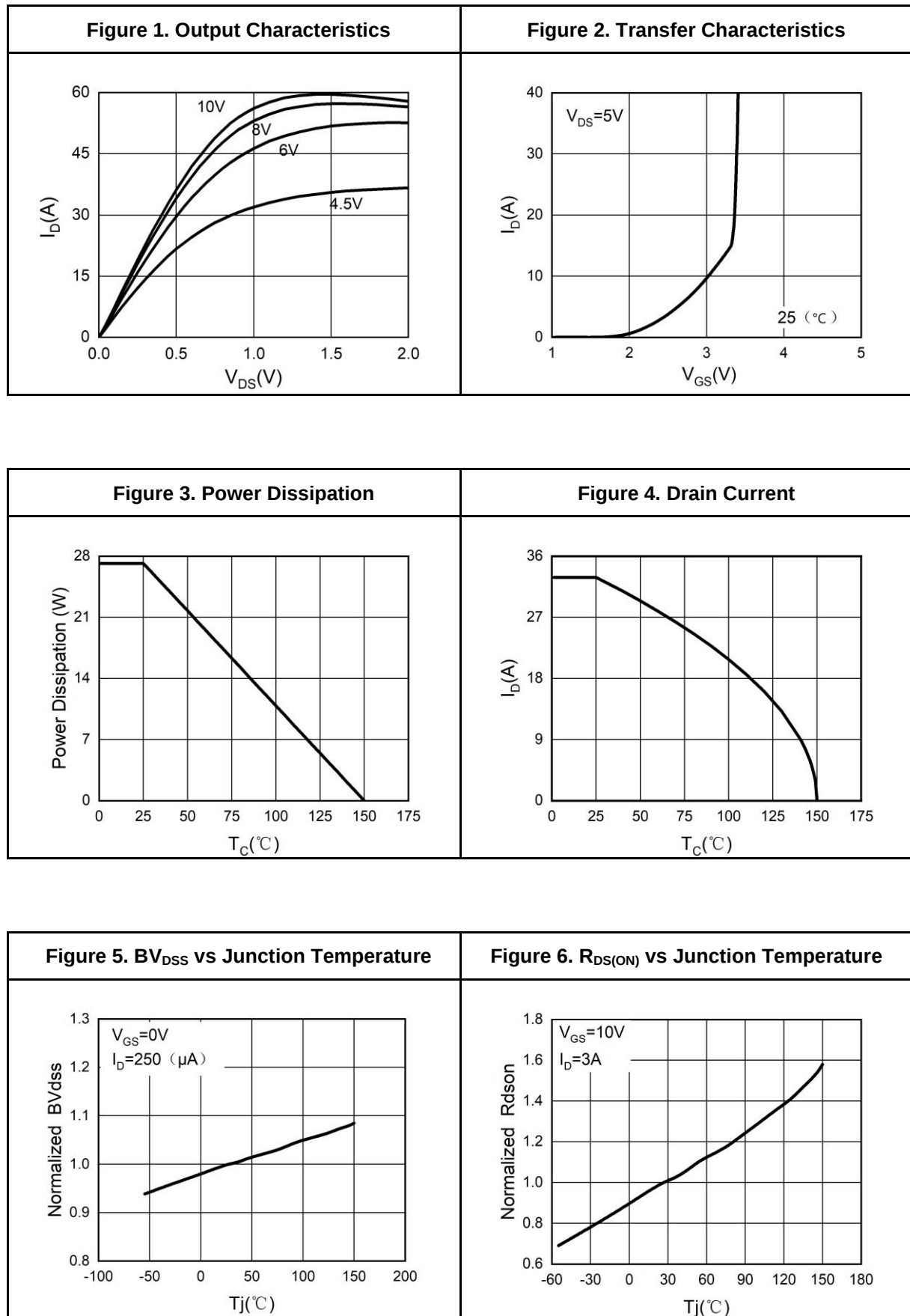
Notes 2.EAS condition: $T_J=25^{\circ}\text{C}, V_{DS}=30V, V_{GS}=10V, R_g=25\Omega, L=0.5mH$.

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



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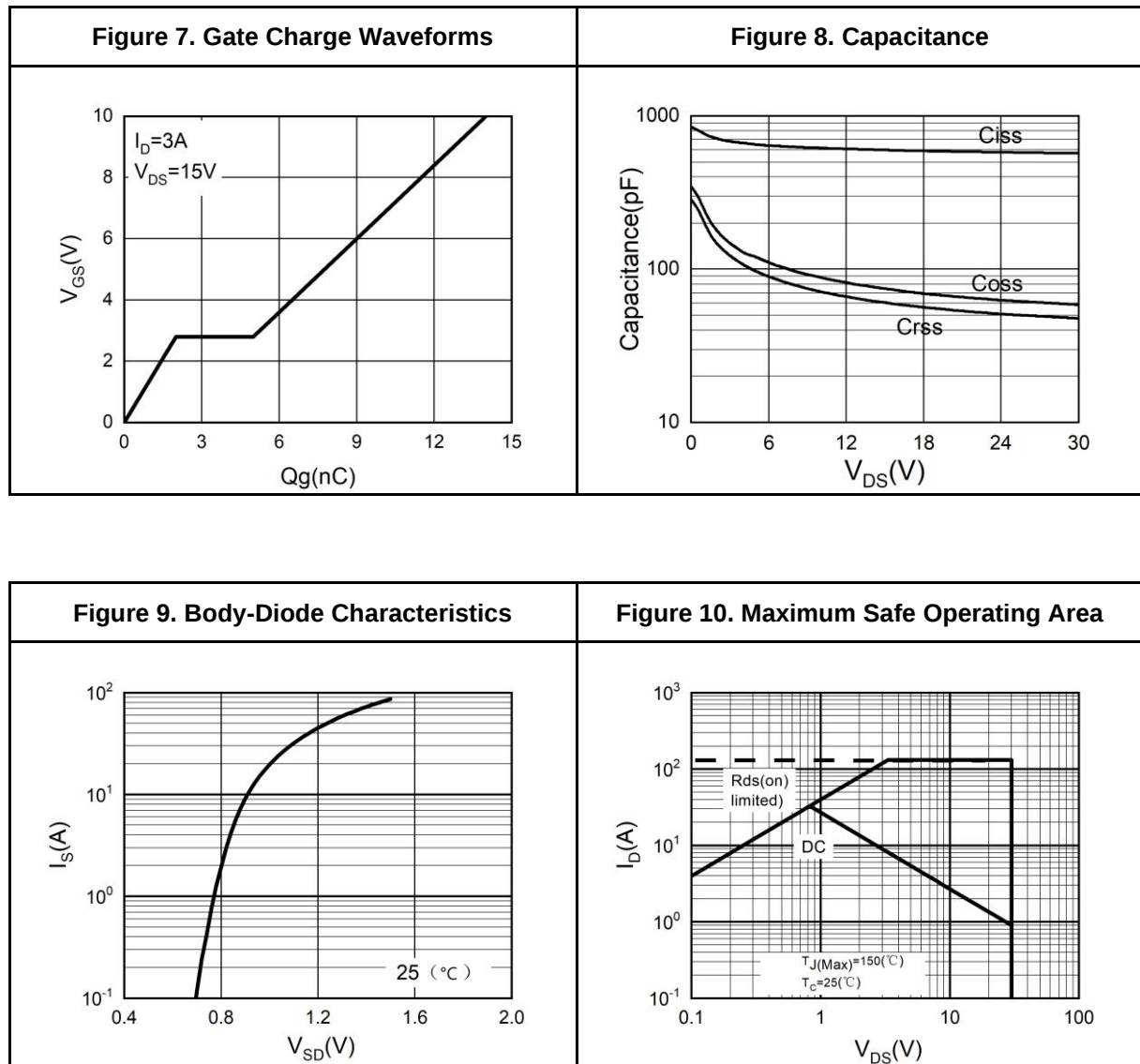
N-Channel Typical Electrical And Thermal Characteristics (Curves)





30V N&P-Channel Trench Power MOSFET

N-Channel Typical Electrical And Thermal Characteristics (Curves)





30V 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	-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 =-2A		4.8		S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =-10V, I _D =-2A T _J =25℃		30.4	38	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =-4.5V, I _D =-1.5A T _J =25℃		41.3	54.9	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-15V,V _{GS} =0V, f=1.0MHz		617		pF
C _{oss}	Output Capacitance			79		pF
C _{rss}	Reverse Transfer Capacitance			63		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1.0MHz		6.5		Ω
Switching Parameters						
t _{d(on)}	Turn-on Delay Time	V _{GS} =-10V, V _{DS} =-15V, R _L =7.5Ω, R _{GEN} =3Ω		7.5		nS
t _r	Turn-on Rise Time			5.5		nS
t _{d(off)}	Turn-Off Delay Time			19		nS
t _f	Turn-Off Fall Time			7		nS
Q _g	Total Gate Charge	V _{GS} =-10V, V _{DS} =-15V, I _D =-2A		16		nC
Q _{gs}	Gate-Source Charge			2		nC
Q _{gd}	Gate-Drain Charge			4		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 =-2A			-1.2	V
t _{rr}	Reverse Recovery Time	I _F =3A, dI/dt=500A/μs		15		ns
Q _{rr}	Reverse Recovery Charge	I _F =3A, dI/dt=500A/μs		10		nC

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

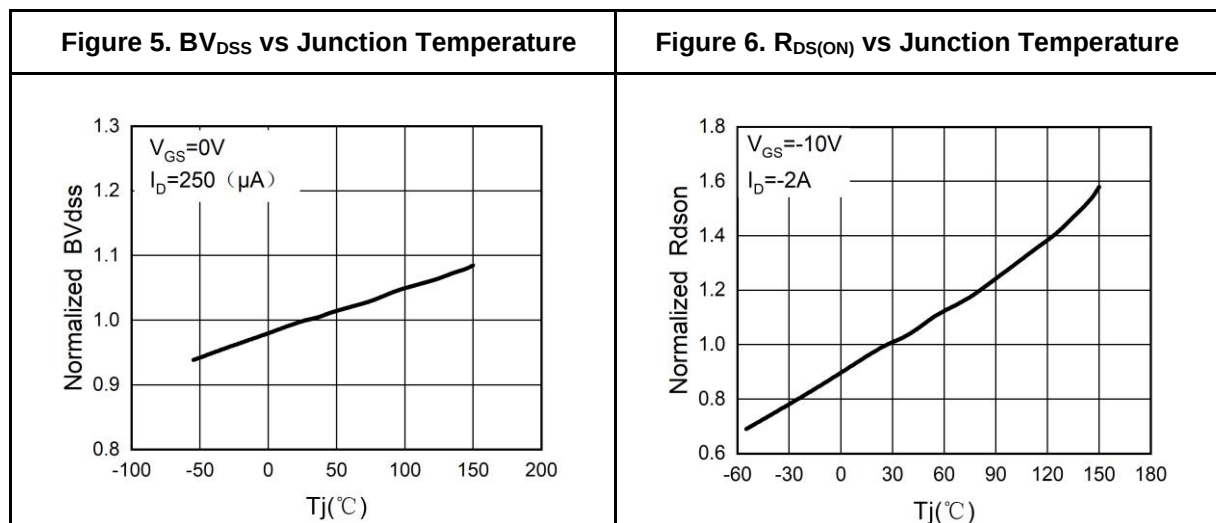
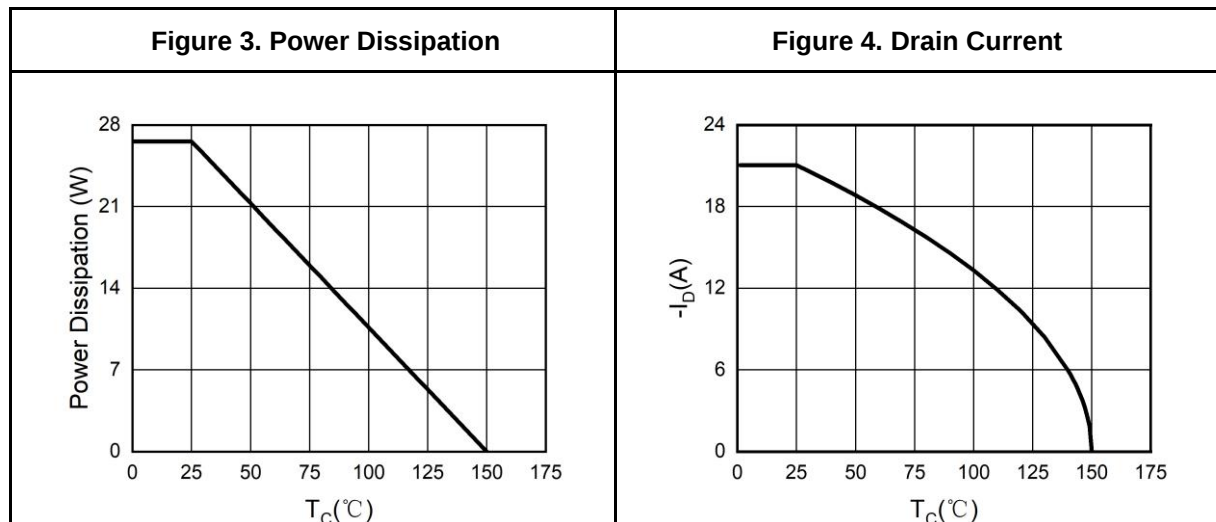
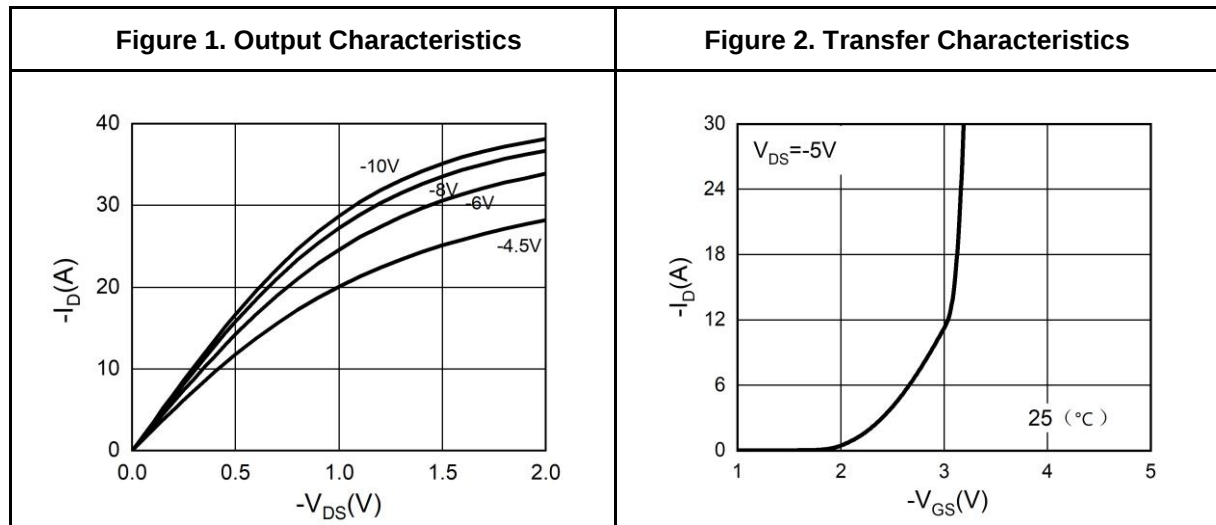
Notes 2.EAS condition: $T_J=25^{\circ}\text{C}, V_{DD}=-30V, V_G=-10V, R_g=25\Omega, L=0.5\text{mH}$.

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



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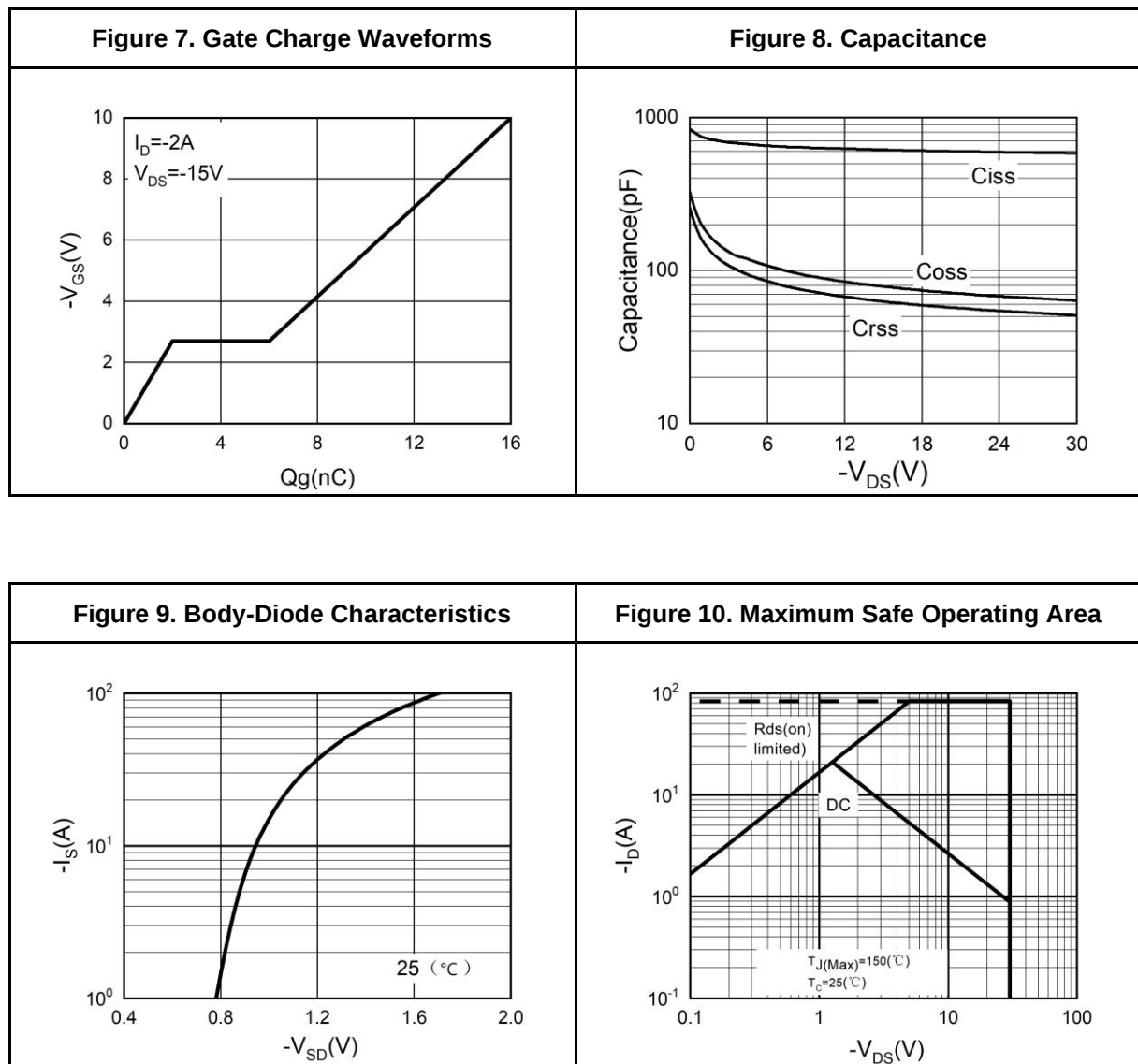
P-Channel Typical Electrical And Thermal Characteristics (Curves)





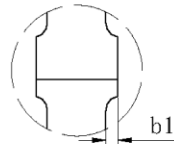
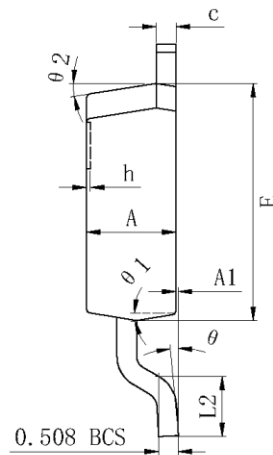
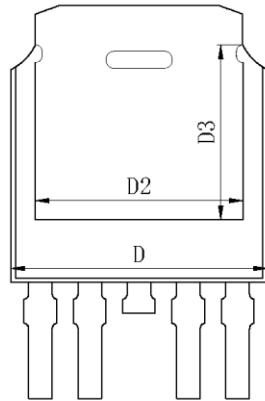
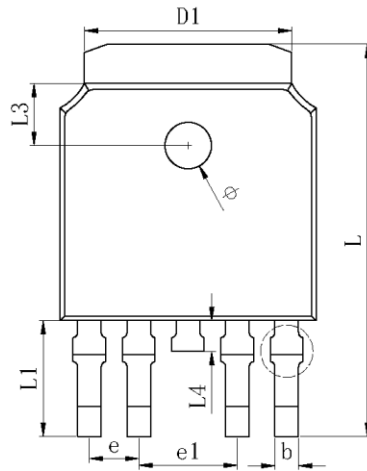
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P-Channel Typical Electrical And Thermal Characteristics (Curves)





TO-252-4L Package Information



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	2.200	2.300	2.400
A1	0.000		0.127
b	0.550	0.600	0.650
b1	0.000		0.120
c (电镀后)	0.460	0.520	0.580
D	6.500	6.600	6.700
D1		5.334 REF	
D2		5.346 REF	
D3		4.490 REF	
E	6.000	6.100	6.200
e		1.270 TYP	
e1		2.540 TYP	
h	0.000	0.100	0.200
L	9.900	10.100	10.300
L1		2.988 REF	
L2	1.400	1.550	1.700
L3		1.600 REF	
L4	0.700	0.800	0.900
phi	1.100	1.200	1.300
theta	0°		8°
theta 1		9° TYP	
theta 2		9° TYP	



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Attention

This product described in this document can not be used in life support devices or systems, aircraft's control systems, and other applications whose failure can be reasonably expected to result in serious physical and/or material damage, apart from that when an application agreement is signed between customer and Wuxi Shangjia Semiconductor.

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