



30V N&P-Channel Trench Power MOSFET

General Description

The SJD30NP245 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

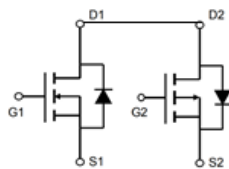
- Low Gate Charge
- 100% UIS Tested, 100% DVDS Tested
- High Power and current handling capability
- Lead free product is acquired

Application

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

Key Performance Parameters

Parameter	Value	Value	Unit
V_{DS}	30	-30	V
$R_{DS(ON_TYP)}$	8	21.2	mΩ
I_D	56	-27	A
Q_G	19.2	21.7	nC



Schematic Diagram



TO-252-4L top view



Package Marking and Ordering Information

Device/Ordering Code	Marking	Package	Packing	Reel Size	Tape width	Quantity
SJD30NP245	SJD30NP245	TO-252-4L	Tape	\	\	2500 Pcs

Table 1. Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ 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($T_C=25^{\circ}\text{C}$)	56	-27	A
	Drain Current-Continuous($T_C=100^{\circ}\text{C}$)	35	-27	A
I_{DM} (pulse)	Drain Current-Continuous@ Current-Pulsed (Note 1)	224	-108	A
P_D	Maximum Power Dissipation($T_C=25^{\circ}\text{C}$)	50	31	W
	Maximum Power Dissipation($T_C=100^{\circ}\text{C}$)	20	12.6	W
E_{AS}	Avalanche energy (Note 2)	64	95	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	2.5	3.97	$^{\circ}\text{C/W}$



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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 =10A		18		S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =10A T _J =25℃		8	10.4	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =4.5V, I _D =8A T _J =25℃		10.2	13.6	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1.0MHz		968		pF
C _{oss}	Output Capacitance			121		pF
C _{rss}	Reverse Transfer Capacitance			99.2		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1.0MHz		2.5		Ω
Switching Parameters						
t _{d(on)}	Turn-on Delay Time	V _{GS} =10V, V _{DS} =15V, R _L =1.5Ω, R _{GEN} =3Ω		7.6		nS
t _r	Turn-on Rise Time			15.8		nS
t _{d(off)}	Turn-Off Delay Time			27.6		nS
t _f	Turn-Off Fall Time			4		nS
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =15V, I _D =10A		19.2		nC
Q _{gs}	Gate-Source Charge			4.2		nC
Q _{gd}	Gate-Drain Charge			2.5		nC
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current (Body Diode)				56	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=500A/μs		19.4		ns
Q _{rr}	Reverse Recovery Charge	I _F =10A, dI/dt=500A/μs		11.6		nC

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

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

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



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N-Channel Typical Electrical And Thermal Characteristics (Curves)

Figure 1. Output Characteristics

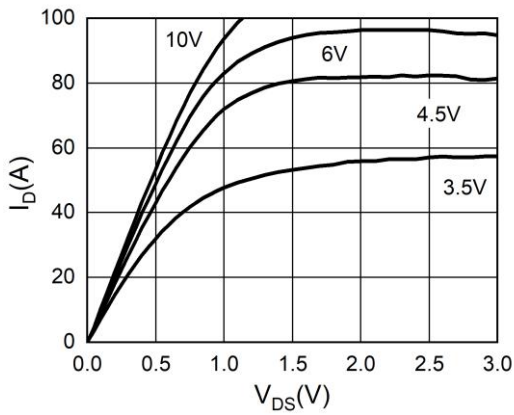


Figure 2. Transfer Characteristics

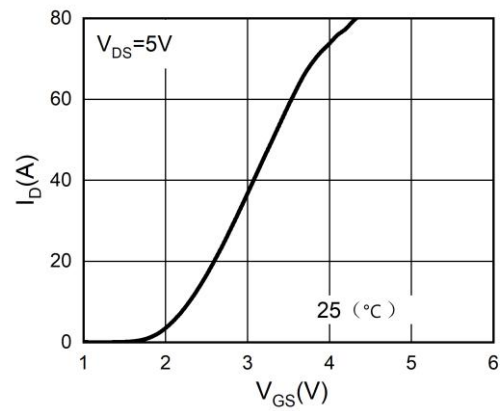


Figure 3. Power Dissipation

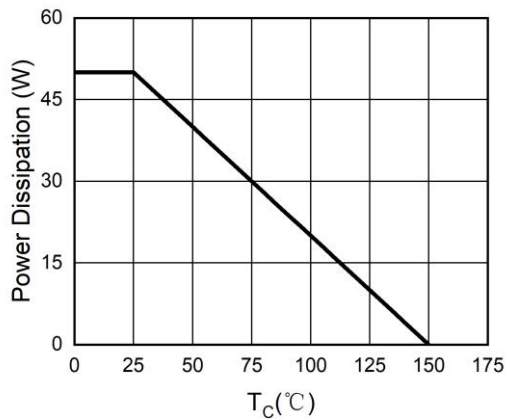


Figure 4. Drain Current

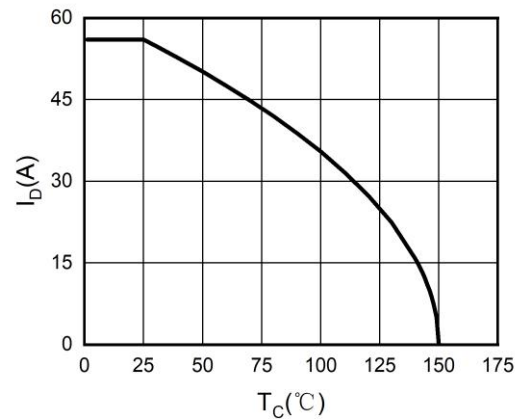


Figure 5. BV_{DSS} vs Junction Temperature

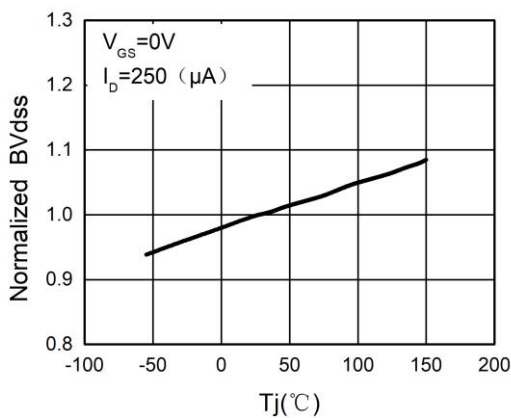
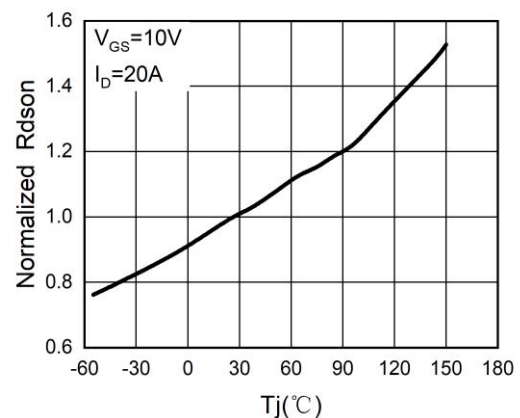


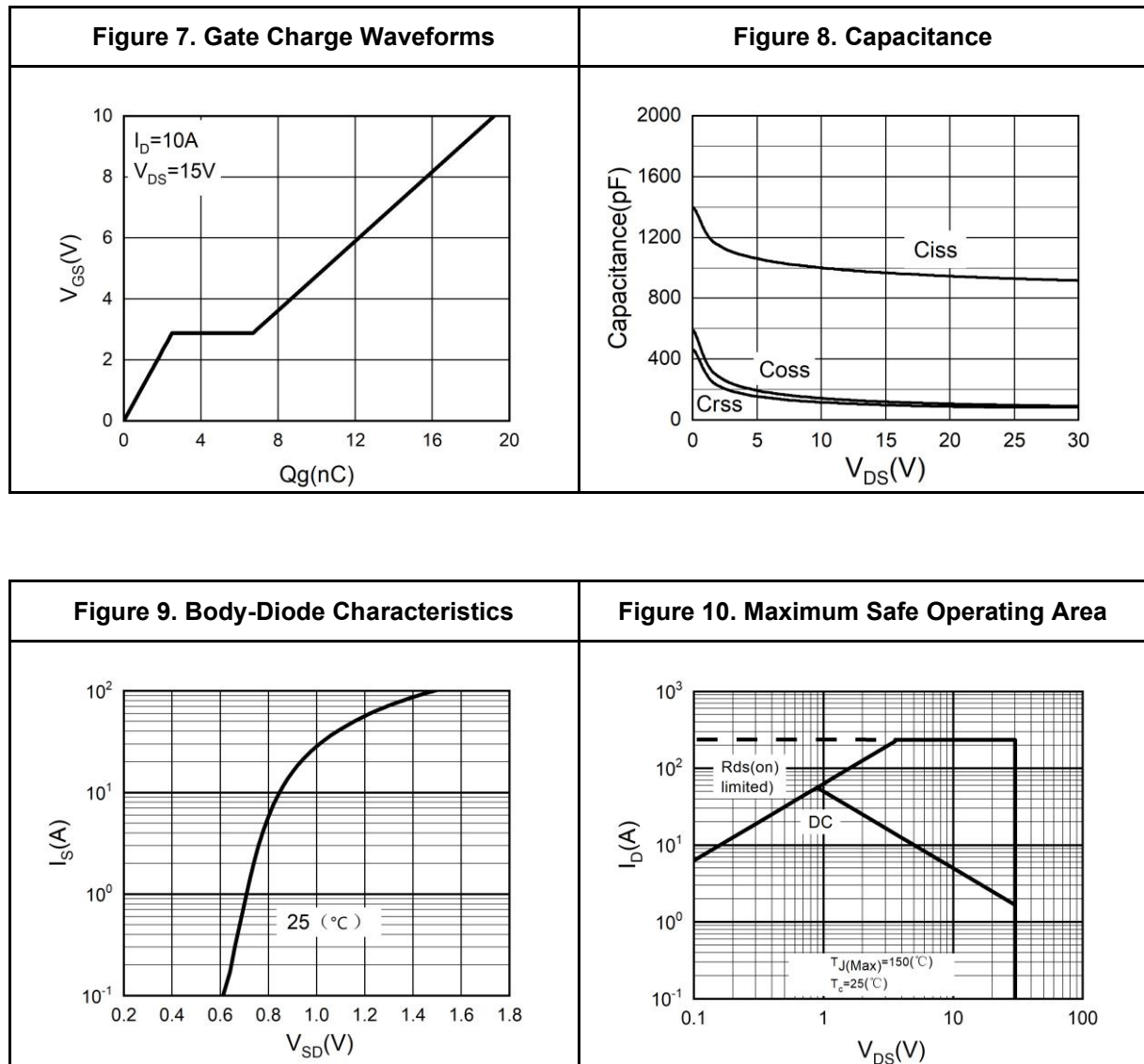
Figure 6. $R_{DS(ON)}$ vs Junction Temperature





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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		20		S
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =-10V, I _D =-7.5A T _J =25℃		21.2	27.5	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =-4.5V, I _D =-5A T _J =25℃		32.5	43.2	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-15V,V _{GS} =0V, f=1.0MHz		1135		pF
C _{oss}	Output Capacitance			184		pF
C _{rss}	Reverse Transfer Capacitance			117		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1.0MHz		4.9		Ω
Switching Parameters						
t _{d(on)}	Turn-on Delay Time	V _{GS} =-10V, V _{DS} =-15V, R _L =2Ω, R _{GEN} =3Ω		12		nS
t _r	Turn-on Rise Time			14		nS
t _{d(off)}	Turn-Off Delay Time			195		nS
t _f	Turn-Off Fall Time			95		nS
Q _g	Total Gate Charge	V _{GS} =-10V, V _{DS} =-15V, I _D =-7.5A		21.7		nC
Q _{gs}	Gate-Source Charge			1.4		nC
Q _{gd}	Gate-Drain Charge			4.1		nC
Source-Drain Diode Characteristics						
I _{SD}	Source-Drain Current (Body Diode)				-27	A
V _{SD}	Forward on Voltage (Note 3)	V _{GS} =0V, I _S =-7A			-1.2	V
t _{rr}	Reverse Recovery Time	I _F =-7A, dI/dt=-100A/μs		36		ns
Q _{rr}	Reverse Recovery Charge	I _F =-7A, dI/dt=-100A/μs		34		nC

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

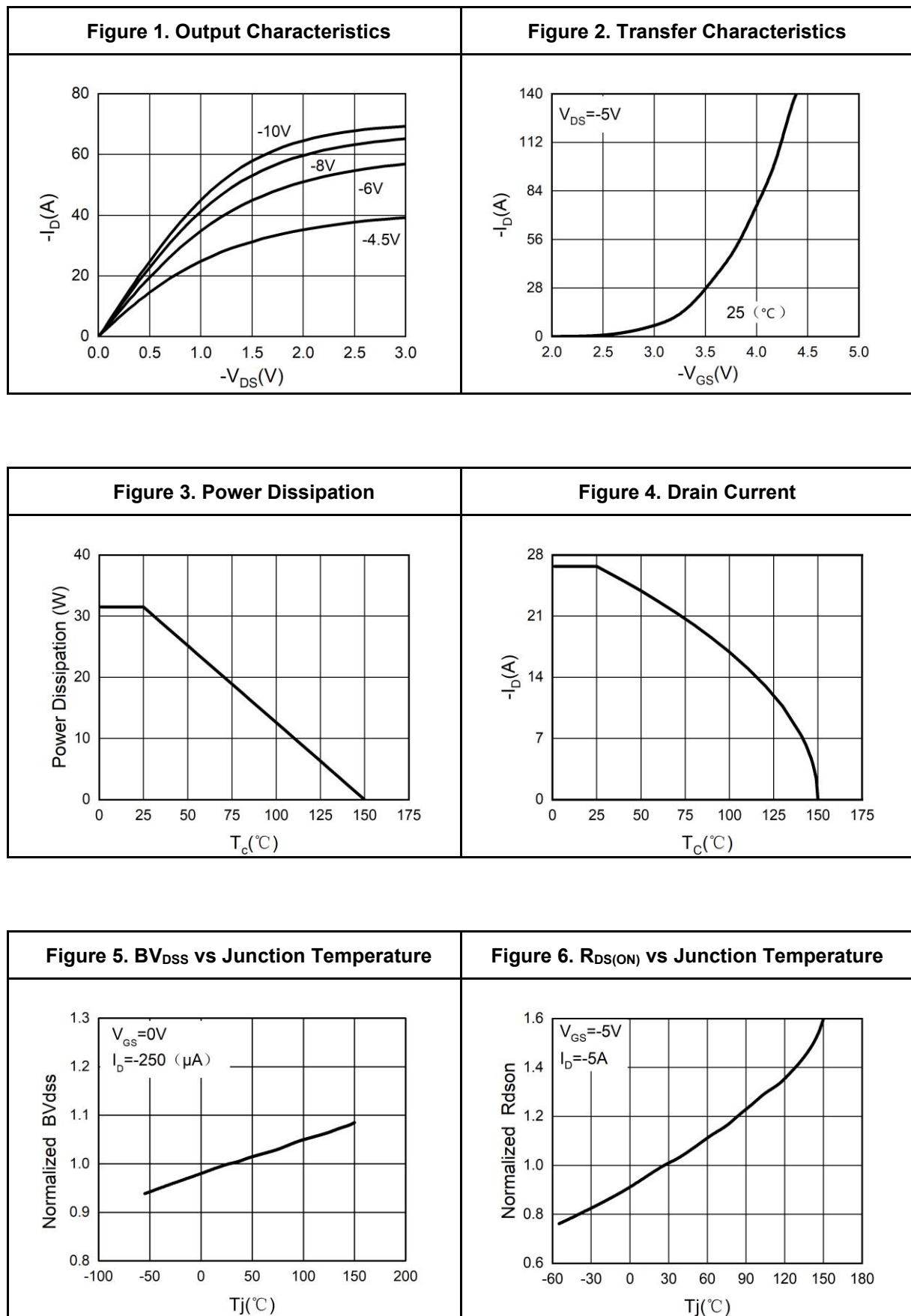
Notes 2.EAS condition: $T_J=25^{\circ}\text{C}, V_{DD}=-30V, V_G=-10V, R_g=25\Omega, L=0.5\text{mH}$.

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



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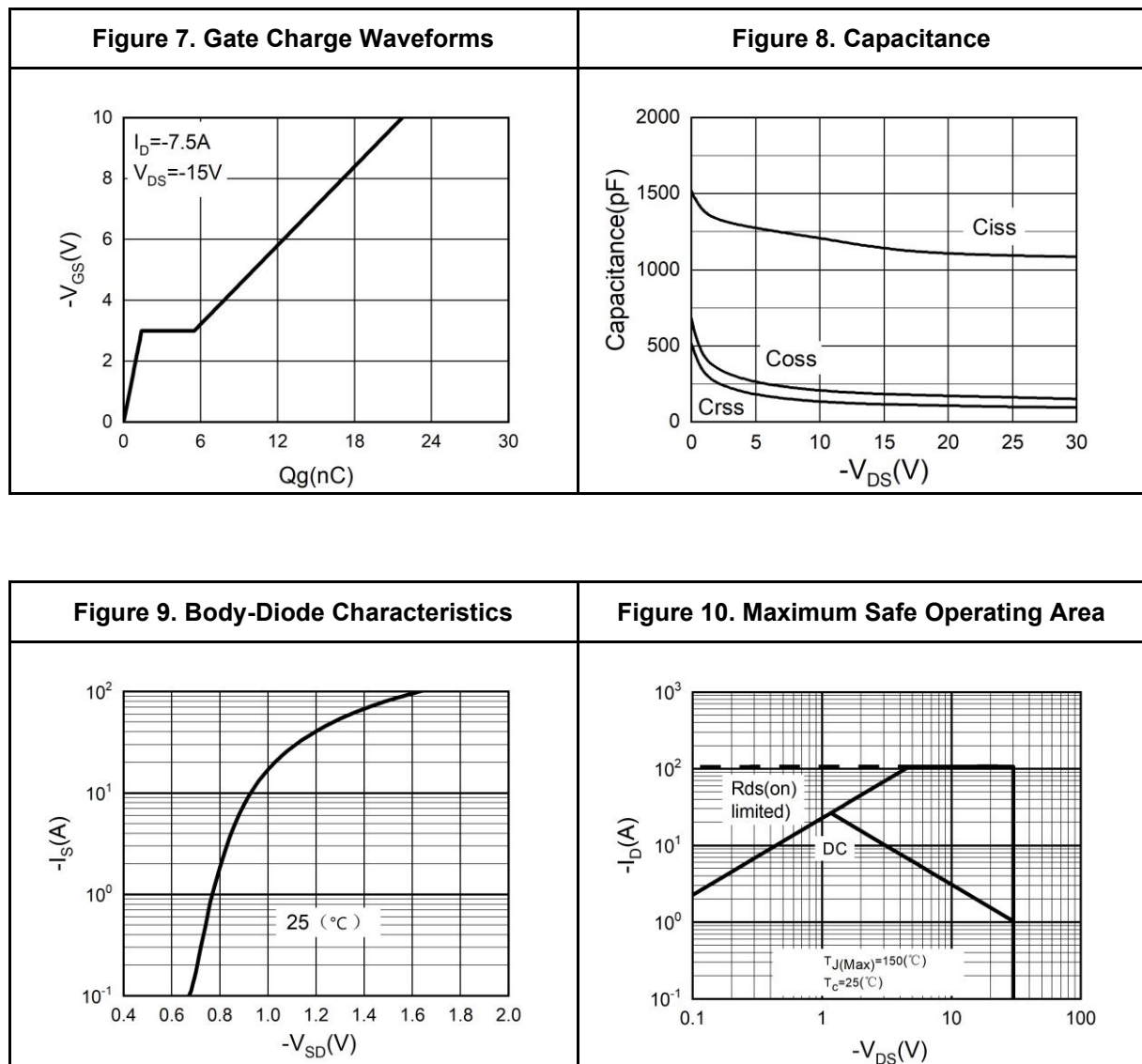
P-Channel Typical Electrical And Thermal Characteristics (Curves)





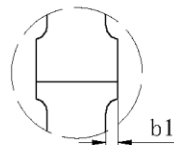
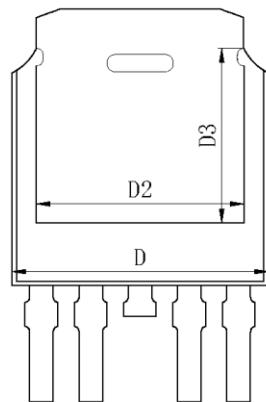
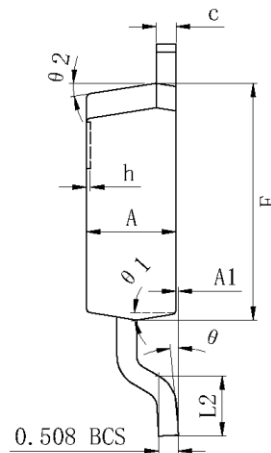
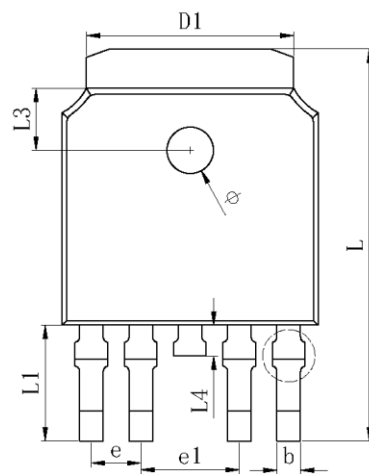
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P-Channel Typical Electrical And Thermal Characteristics (Curves)





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
φ	1.100	1.200	1.300
θ	0°		8°
θ 1	9° TYP		
θ 2	9° TYP		



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