



## 40V P-Channel Trench Power MOSFET

### General Description

The SJD40P078 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

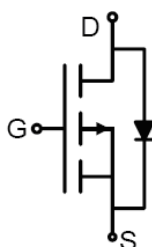
- Low Gate Charge
- High Power and current handling capability
- Lead free product is acquired

### Application

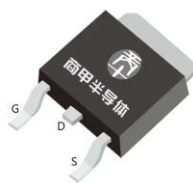
- PWM Applications
- Load Switch
- Power Management

### Key Performance Parameters

Parameter	Value	Unit
$V_{DS}$	-40	V
$R_{DS(ON\_TYP)}$	8	mΩ
$I_D$	-65	A
$Q_G$	60	nC



Schematic Diagram



TO-252 top&bottom view



### Package Marking and Ordering Information

Device/Ordering Code	Marking	Package	Packing	Reel Size	Tape width	Quantity
SJD40P078	SJD40P078	TO-252	Tape	\	\	2500 Pcs

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

Symbol	Parameter	Limit	Unit
$V_{DS}$	Drain-Source Voltage ( $V_{GS}=0\text{V}$ )	-40	V
$V_{GS}$	Gate-Source Voltage ( $V_{DS}=0\text{V}$ )	$\pm 20$	V
$I_D$	Drain Current-Continuous( $T_C=25^{\circ}\text{C}$ )	-65	A
	Drain Current-Continuous( $T_C=100^{\circ}\text{C}$ )	-41	A
$I_{DM}$ (pulse)	Drain Current-Continuous@ Current-Pulsed (Note 1)	-260	A
$P_D$	Maximum Power Dissipation( $T_C=25^{\circ}\text{C}$ )	75	W
	Maximum Power Dissipation( $T_C=100^{\circ}\text{C}$ )	30	W
$E_{AS}$	Avalanche energy (Note 2)	361	mJ
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 To 150	$^{\circ}\text{C}$

Table 2. Thermal Characteristic

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case		1.65	$^{\circ}\text{C/W}$



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**Table 3. Electrical Characteristics ( $T_J=25^{\circ}\text{C}$  unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V I <sub>D</sub> =-250μA	-40			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-40V, V <sub>GS</sub> =0V T <sub>J</sub> =25℃			-1	μA
		V <sub>DS</sub> =-40V, V <sub>GS</sub> =0V T <sub>J</sub> =125℃			-100	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V			±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1		-2.5	V
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =-5V, I <sub>D</sub> =-10A		48		S
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =-10V, I <sub>D</sub> =-20A T <sub>J</sub> =25℃		8	10.4	mΩ
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-20A T <sub>J</sub> =25℃		10	13.3	mΩ
Dynamic Characteristics						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-20V,V <sub>GS</sub> =0V, f=1.0MHz		3666		pF
C <sub>oss</sub>	Output Capacitance			317		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			226		pF
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1.0MHz		10.6		Ω
Switching Parameters						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-20V, R <sub>L</sub> =2Ω, R <sub>GEN</sub> =3Ω		16		nS
t <sub>r</sub>	Turn-on Rise Time			41.8		nS
t <sub>d(off)</sub>	Turn-Off Delay Time			173		nS
t <sub>f</sub>	Turn-Off Fall Time			99		nS
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-20V, I <sub>D</sub> =-10A		60		nC
Q <sub>gs</sub>	Gate-Source Charge			8.6		nC
Q <sub>gd</sub>	Gate-Drain Charge			13.9		nC
Source-Drain Diode Characteristics						
I <sub>SD</sub>	Source-Drain Current (Body Diode)				-65	A
V <sub>SD</sub>	Forward on Voltage (Note 3)	V <sub>GS</sub> =0V, I <sub>S</sub> =-10A			-1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>F</sub> =-10A, dI/dt=-100A/μs		14.8		ns
Q <sub>rr</sub>	Reverse Recovery Charge	I <sub>F</sub> =-10A, dI/dt=-100A/μs		4.7		nC

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

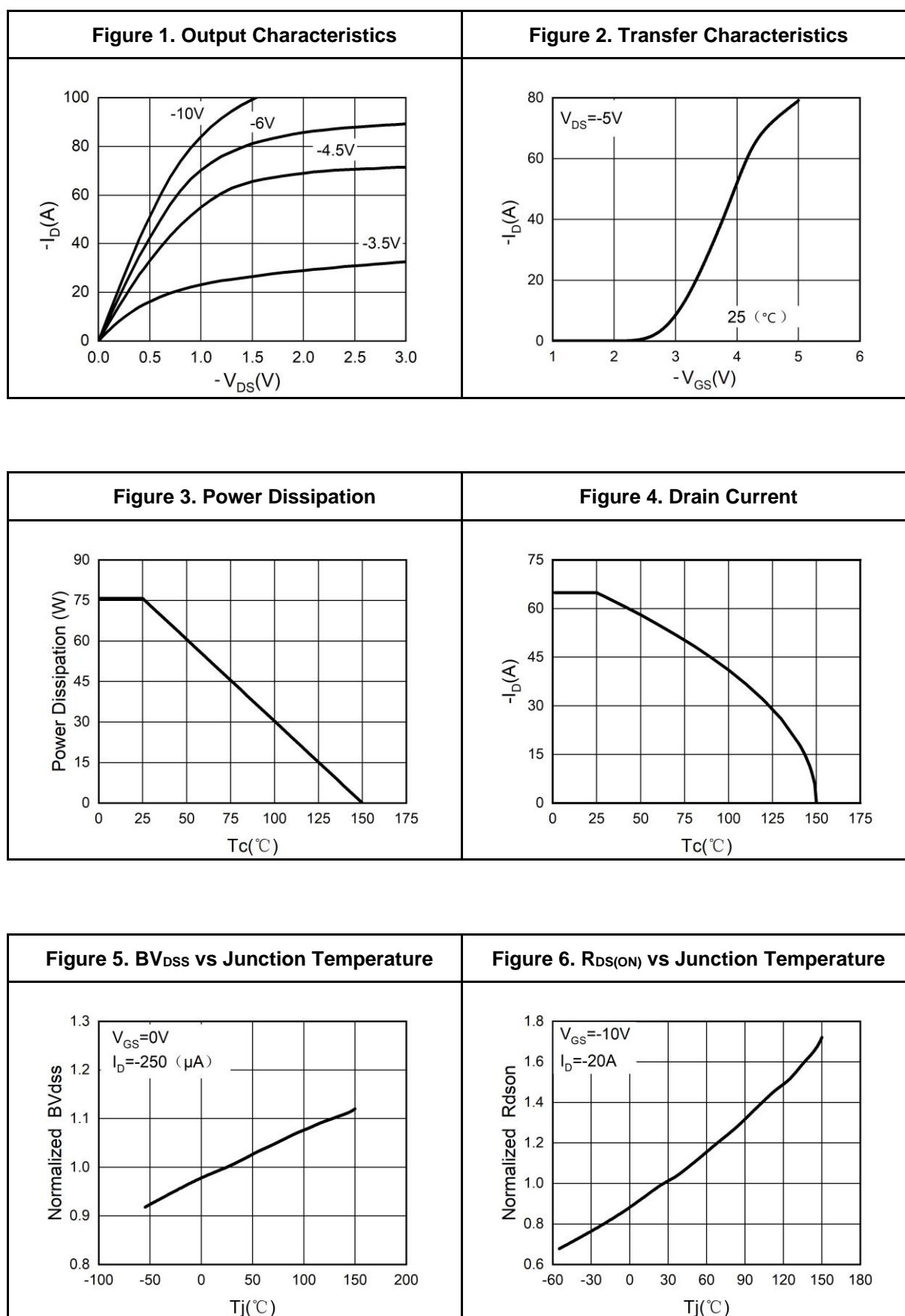
Notes 2.EAS condition:  $T_J=25^{\circ}\text{C}, V_{DD}=-40V, V_G=-10V, R_g=25\Omega, L=0.5\text{mH}$ .

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



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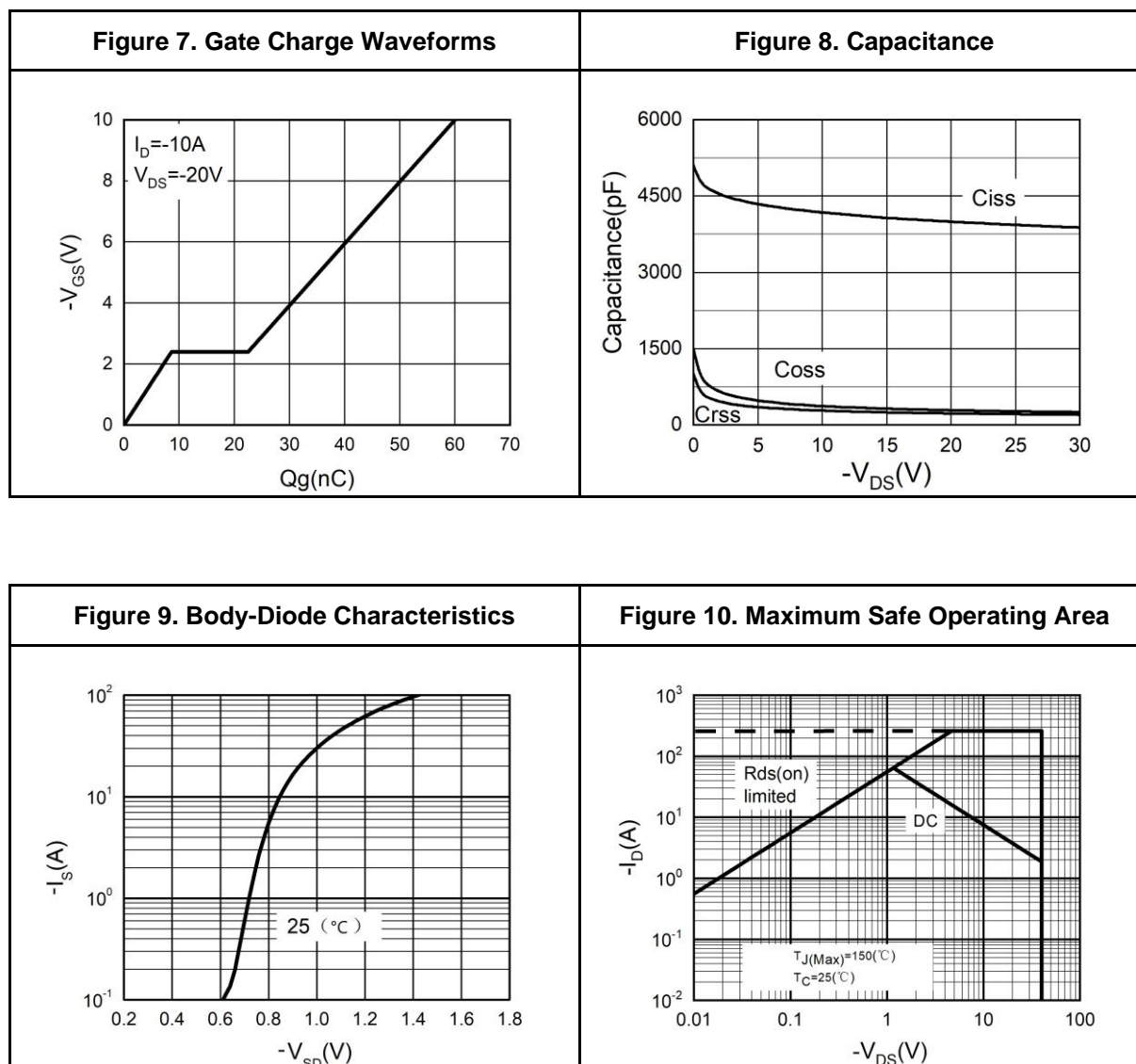
### Typical Electrical And Thermal Characteristics (Curves)





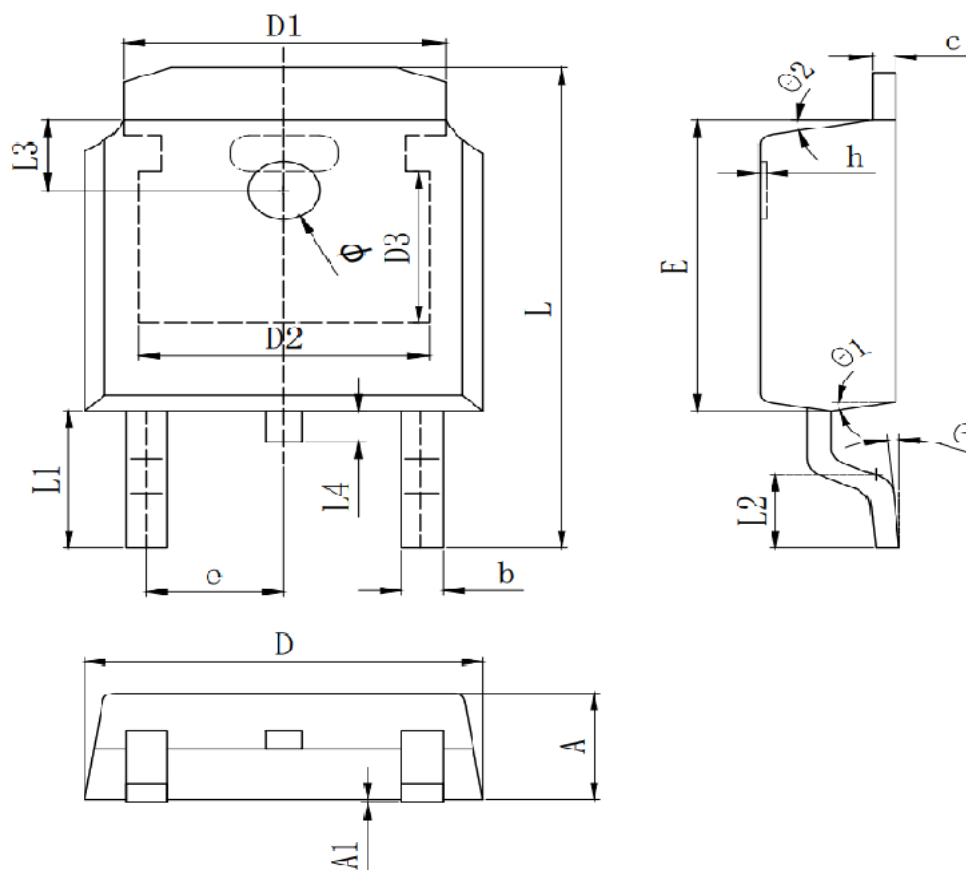
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### Typical Electrical And Thermal Characteristics (Curves)





## TO-252 Package Information



Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	2.200	2.300	2.400
A1	0.000		0.127
b	0.640	0.690	0.740
c(电镀后)	0.460	0.520	0.580
D	6.500	6.600	6.700
D1	5.334 REF		
D2	4.826 REF		
D3	3.166 REF		
E	6.000	6.100	6.200
e	2.286 TYP		
h	0.000	0.100	0.200
L	9.900	10.100	10.300
L1	2.888 REF		
L2	1.400	1.550	1.700
L3	1.600 REF		
L4	0.600	0.800	1.000
Φ	1.100	1.200	1.300
θ	0°		8°
θ1	9° TYP		
θ2	9° TYP		



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