



650V N-Channel SiC Power MOSFET

General Description

The SJD540R65 uses advanced SiC technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 13V. This device is suitable for use as a wide variety of applications.

Features

- Wide Bandgap SiC MOSFET Technology
- Low On-Resistance with High Blocking Voltage
- Low Capacitances with High-Speed Switching
- Low Reverse Recovery
- Easy to Parallel and Simple to Drive

Application

- Switch Mode Power Supplies
- High Voltage DC/DC Converters
- Battery Chargers
- Solar Inverters

Key Performance Parameters

Parameter	Value	Unit
V_{DS}	650	V
$R_{DS(ON_TYP)}$	584	m Ω
I_D	7.8	A
Q_G	12	nC



Package Marking and Ordering Information

Device/Ordering Code	Marking	Package	Packing	Reel Size	Tape width	Quantity
SJD540R65	SJD540R65	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 ($V_{GS}=0V$)	650	V
V_{GS}	Gate-Source Voltage ($V_{DS}=0V$)	-10/+18	V
I_D	Drain Current-Continuous($T_C=25^\circ\text{C}$)	7.8	A
	Drain Current-Continuous($T_C=100^\circ\text{C}$)	5	A
I_{DM} (pluse)	Drain Current-Continuous@ Current-Pulsed (Note 1)	31.2	A
P_D	Maximum Power Dissipation($T_C=25^\circ\text{C}$)	40	W
	Maximum Power Dissipation($T_C=100^\circ\text{C}$)	16	W
E_{AS}	Avalanche energy (Note 2)	20	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		3.1	$^\circ\text{C}/\text{W}$



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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_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=500\mu A$	650			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=650V, V_{GS}=0V$			1	μA
I_{GSS}	Gate-Body Leakage Current	$V_{GS}=18V, V_{DS}=0V$			± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	3		4	V
g_{FS}	Forward Transconductance	$V_{DS}=10V, I_D=8A$		38		S
$R_{DS(ON)}$	Drain-Source On-State Resistance	$V_{GS}=15V, I_D=3.6A$		584	730	m Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=500V, V_{GS}=0V, f=100KHz$		197		pF
C_{oss}	Output Capacitance			21		pF
C_{rSS}	Reverse Transfer Capacitance			6		pF
R_g	Gate resistance	$V_{GS}=0V, V_{DS}=0V, f=100KHz$		6		Ω
Switching Parameters						
$t_{d(on)}$	Turn-on Delay Time	$V_{GS}=15V, V_{DS}=500V, R_L=139\Omega, R_{GEN}=5\Omega$		15		nS
t_r	Turn-on Rise Time			39		nS
$t_{d(off)}$	Turn-Off Delay Time			16		nS
t_f	Turn-Off Fall Time			69		nS
Q_g	Total Gate Charge	$V_{GS}=15V, V_{DS}=500V, I_D=3.6A$		12		nC
Q_{gs}	Gate-Source Charge			2		nC
Q_{gd}	Gate-Drain Charge			7		nC
Source-Drain Diode Characteristics						
I_{SD}	Source-Drain Current (Body Diode)				7.8	A
V_{SD}	Forward on Voltage (Note 2)	$V_{GS}=0V, I_S=3.6A$			1.2	V
t_{rr}	Reverse Recovery Time	$I_F=3.6A, dI/dt=100A/\mu s$		11		ns
Q_{rr}	Reverse Recovery Charge	$I_F=3.6A, dI/dt=100A/\mu s$		35		nC

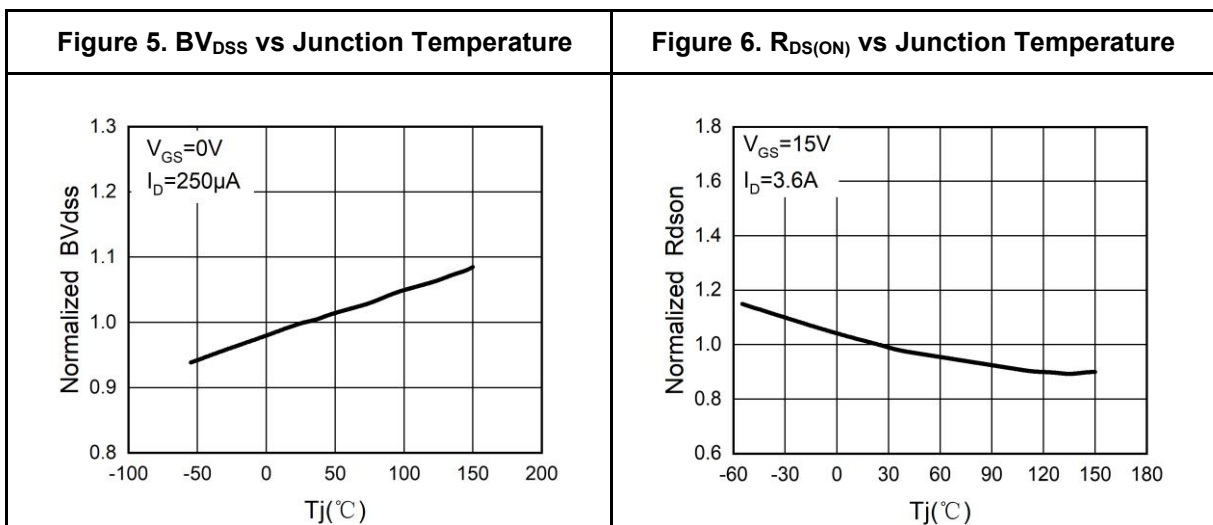
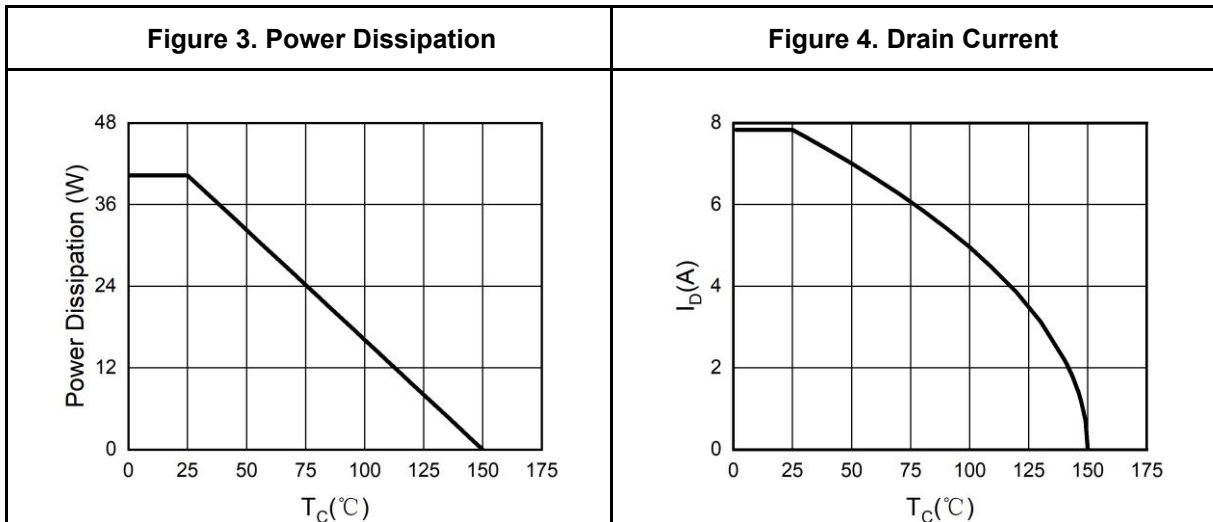
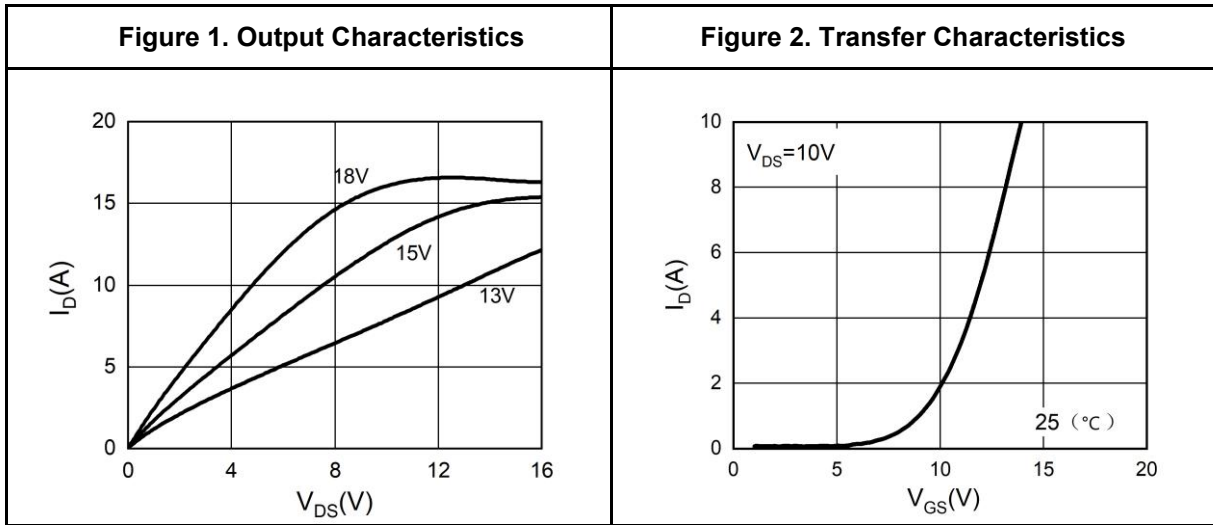
Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.

Notes 2.EAS condition: $T_J=25^{\circ}\text{C}, V_{DD}=60V, V_G=10V, R_g=25\Omega, L=0.5mH$.

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

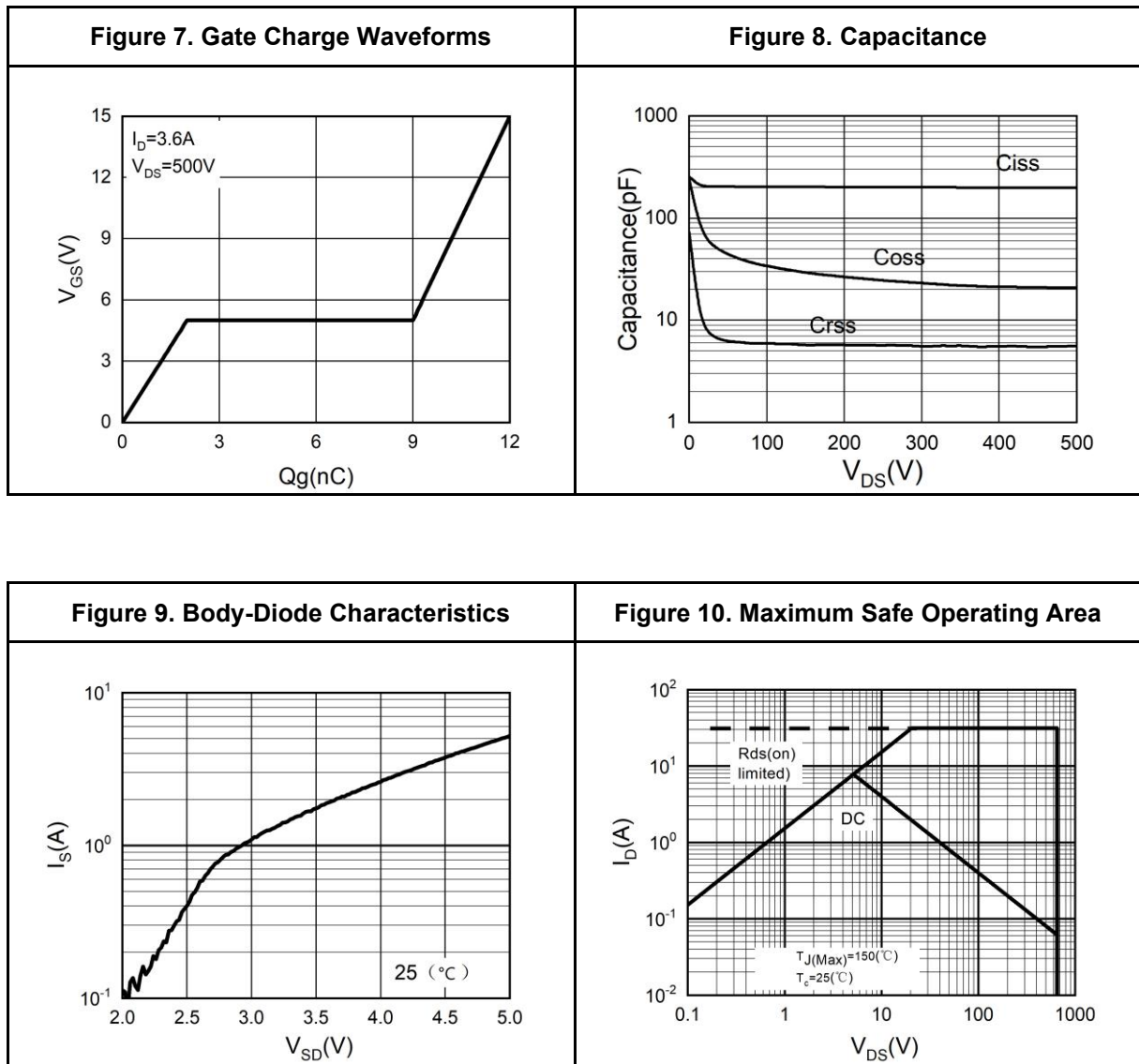


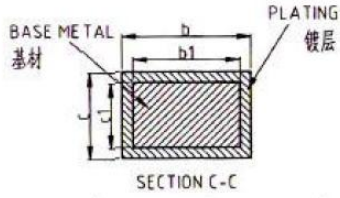
Typical Electrical And Thermal Characteristics (Curves)





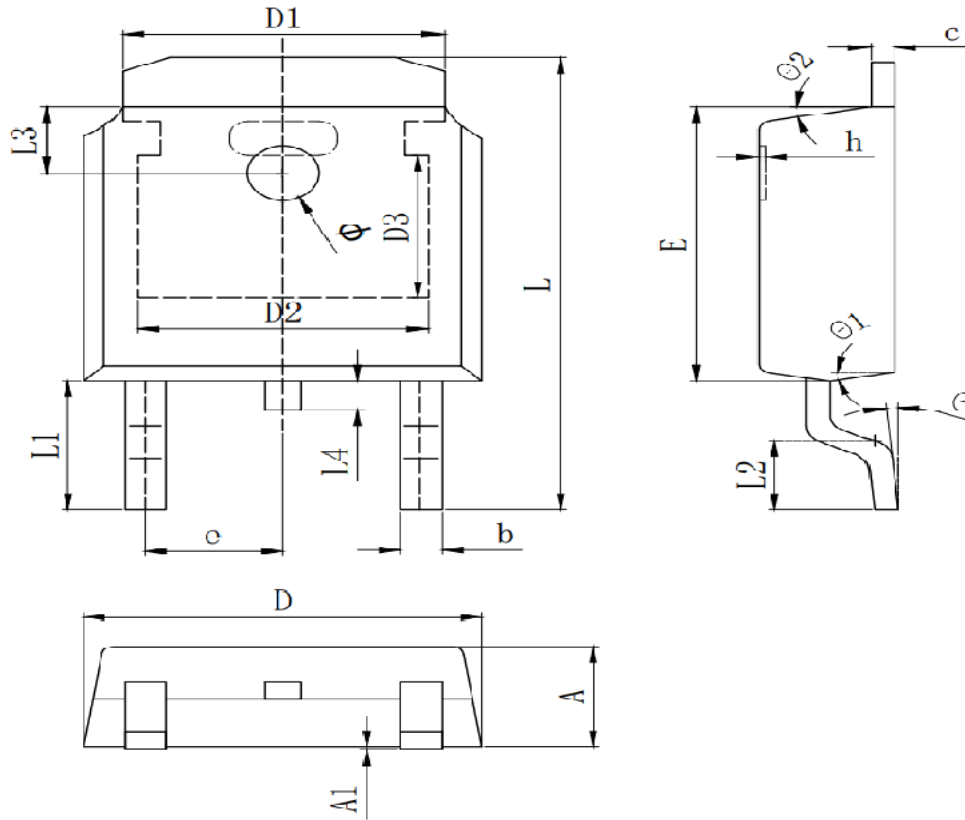
Typical Electrical And Thermal Characteristics (Curves)





NOTES
 1. ALL DIMENSIONS REFER TO JEDEC STANDARD TO-252 AA,
 DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.

L2	0.90	0.915	1.25
L4	0.60	0.80	1.00
L5	1.70	1.80	1.90
θ	0°	-	8°
θ1	5°	7°	9°
θ2	5°	7°	9°
K	0.10REF		



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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