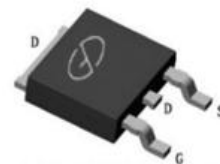


N-Channel 650V (D-S) SiC MOSFET

Features

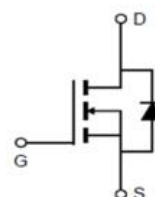
- Wide bandgap SiC MOSFET technology
- Low On-Resistance with High Blocking Voltage
- Low Capacitances with High-Speed switching
- Low reverse recovery(Qrr)
- Halogen free, RoHs compliant



TO-252

Applications

- Switch mode power supplies
- Renewable energy
- On Board Charger
- High voltage DC/DC converters



Absolute Maximum Ratings (T_J=25°C unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Drain Source Voltage	V _{DS}	650	V
Gate Source Voltage	V _{GS}	-8/+22	V
Recommend Gate Source Voltage	V _{GSop}	-4/+18	V
Drain Current Continuous V _{GS} =18V	I _D	T _C =25°C 6.8	A
		T _C =100°C 4.8	
Power Dissipation	P _D	T _C =25°C 41	W
Operating Temperature and Storage Temperature Range	T _J /T _{STG}	-55 to +175	°C

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance Junction to Case	R _{thJC}	3.7	°C/W
Thermal Resistance Junction to Ambient	R _{thJA}	40	°C/W

Electrical Characteristics (T_J=25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =100μA	650	--	--	V
Gate Leakage Current	I _{GSS}	V _{GS} =18V, V _{DS} =0V	--	--	100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =650V, V _{GS} =0V	--	1	10	μA
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _{DS} =0.43mA	2	2.8	4	V
		V _{DS} =V _{GS} , I _{DS} =0.43mA, T _J =175°C	--	1.9	--	
Drain-Source On-state Resistance	R _{DS(on)}	V _{GS} =18V, I _D =2A	--	460	610	mΩ
		V _{GS} =18V, I _D =2A, T _J =175°C	--	540	--	
Drain-Source On-state Resistance	R _{DS(on)}	V _{GS} =15V, I _D =2A	--	580	750	mΩ
		V _{GS} =15V, I _D =2A, T _J =175°C	--	680	--	
Total Gate Charge	Q _g	V _{GS(off)} =-4V, V _{GS(on)} =18V V _{DD} =400V, I _D =1.6A	--	8.5	--	nC
Gate Source Charge	Q _{gs}		--	2.6	--	
Gate Drain Charge	Q _{gd}		--	2.6	--	
Turn-On Switching Energy	E _{ON}	V _{GS} =-4/+18V, V _{DD} =400V · I _D =1.6A, R _G =5Ω, L=100uH	--	32.5	--	μJ
Turn-Off Switching Energy	E _{OFF}		--	0.53	--	
Turn-on Delay Time	t _{d(on)}		--	40	--	ns
Turn-on Rise Time	t _r		--	33.5	--	
Turn-off Delay Time	t _{d(off)}		--	49	--	
Turn-off Fall Time	t _f		--	54	--	
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =400V, V _{AC} =25mV, f=1MHz	--	176	--	pF
Output Capacitance	C _{oss}		--	17	--	
Reverse Transfer Capacitance	C _{rss}		--	2	--	
Gate resistance	R _G	V _{AC} = 25mV, f=1MHz	--	3.7	--	Ω

Reverse Diode Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Diode Forward Voltage	V_{SD}	$I_{SD}=1\text{A}$, $V_{GS}=-4\text{V}$	--	4.2	--	V
		$I_{SD}=1\text{A}$, $V_{GS}=-4\text{V}$, $T_J=175^{\circ}\text{C}$	--	3.8	--	
Continuous Diode Forward Current	I_{SD}	$V_{GS}=-4\text{V}$	--	6.8	--	A
Reverse Recovery Time	t_{rr}	$V_R=400\text{V}$, $I_F=1.6\text{A}$, $V_{GS}=-4\text{V}$, $di/dt=800\text{A}/\mu\text{s}$	--	15	--	ns
Reverse Recovery Charge	Q_{rr}		--	5.8	--	nC

Typical Characteristics Curves ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Figure 1. Output Characteristic ($T_J = -55^\circ\text{C}$)

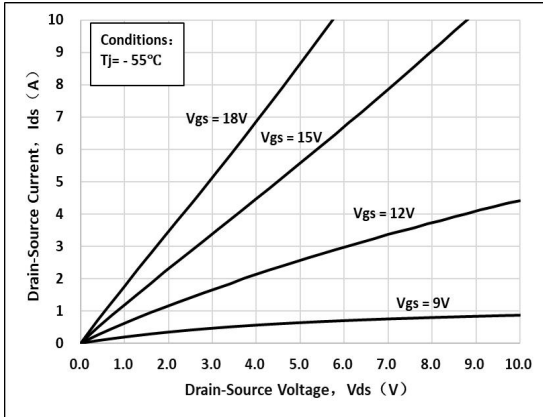


Figure 2. Output Characteristic ($T_J = 25^\circ\text{C}$)

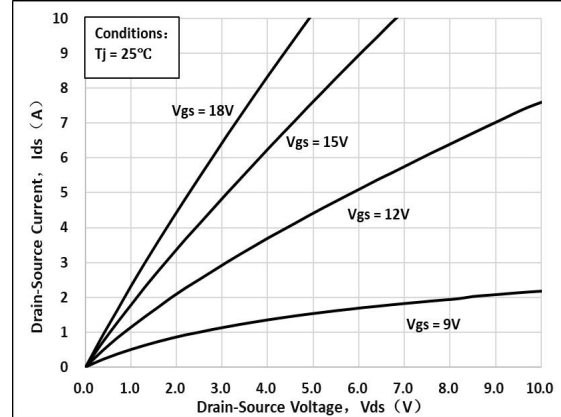


Figure 3. Output Characteristic ($T_J = 175^\circ\text{C}$)

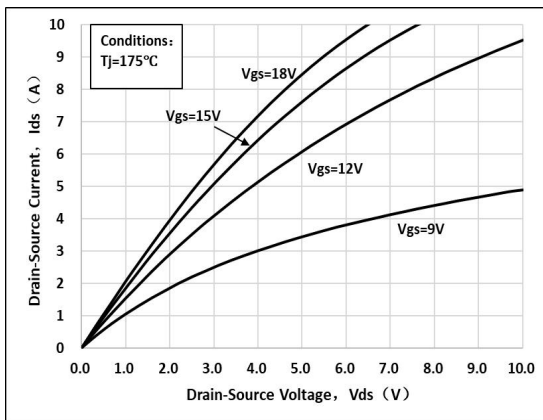


Figure 4. $R_{DS(on)}$ Vs I_{DS} Characteristic

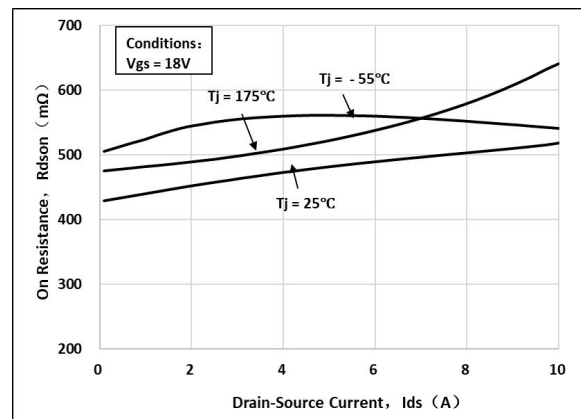


Figure 5. $R_{DS(on)}$ vs. Temperature

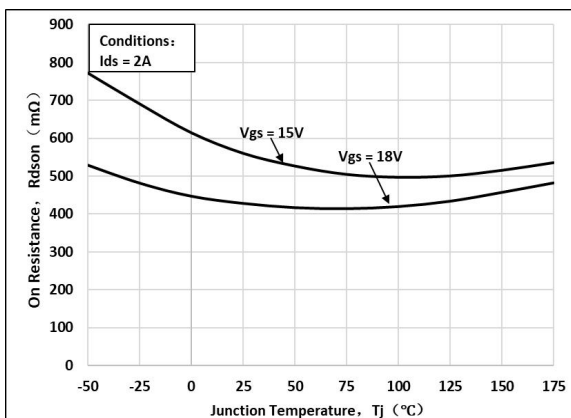
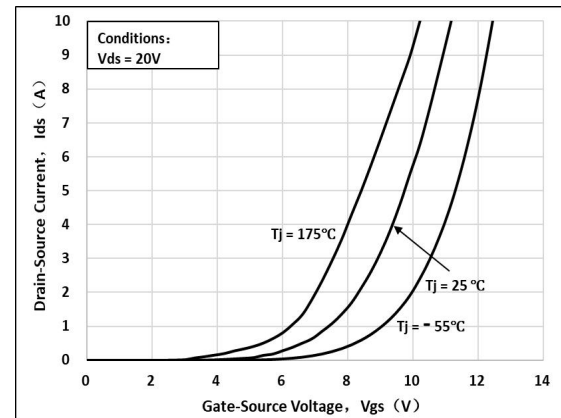


Figure 6. Transfer Characteristic



Typical Characteristics Curves ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Figure 7: Body-diode Characteristic ($T_J = -55^\circ\text{C}$)

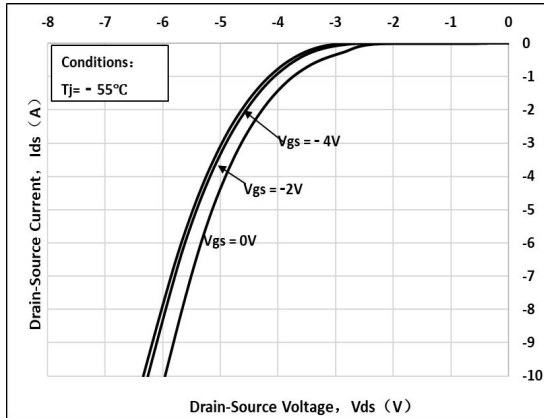


Figure 8: Body-diode Characteristic ($T_J = 25^\circ\text{C}$)

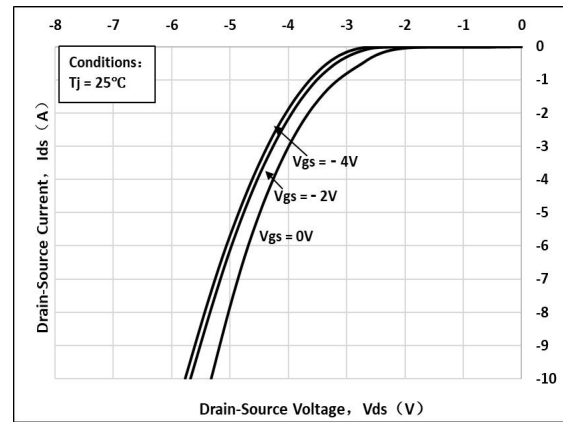


Figure 9: Body-diode Characteristic ($T_J = 175^\circ\text{C}$)

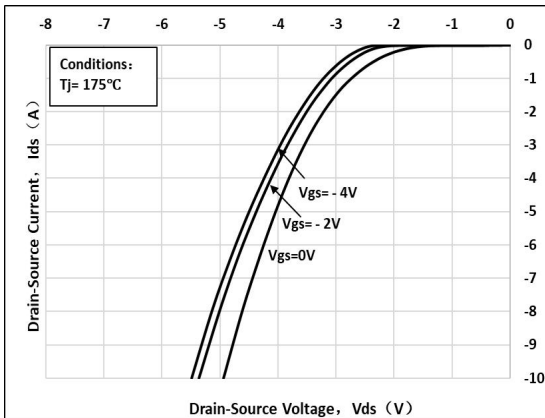


Figure 10: V_{TH} Vs T_J Temperature Characteristic

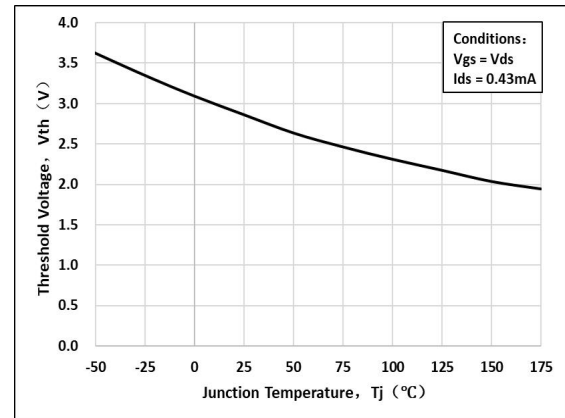


Figure 11: 3rd Quadrant Characteristic ($T_J = -55^\circ\text{C}$)

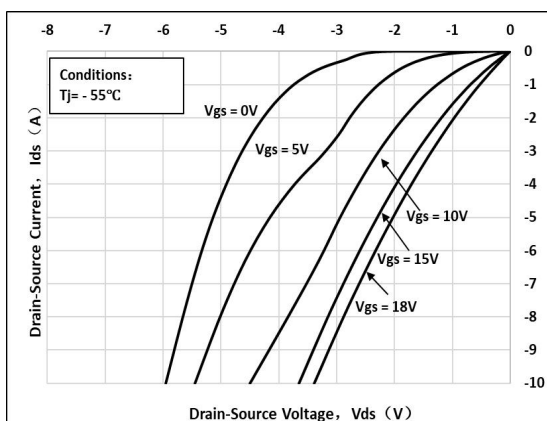
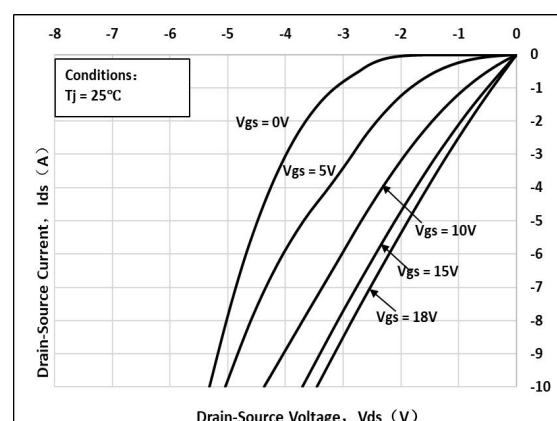


Figure 12: 3rd Quadrant Characteristic ($T_J = 25^\circ\text{C}$)



Typical Characteristics Curves ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Figure 13: 3rd Quadrant Characteristic($T_J=175^\circ\text{C}$)

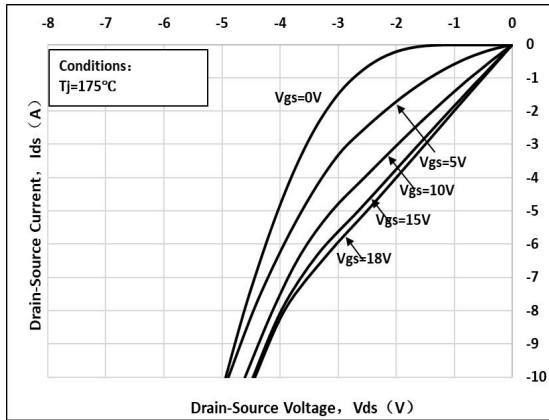


Figure 14: Gate Charge Characteristics

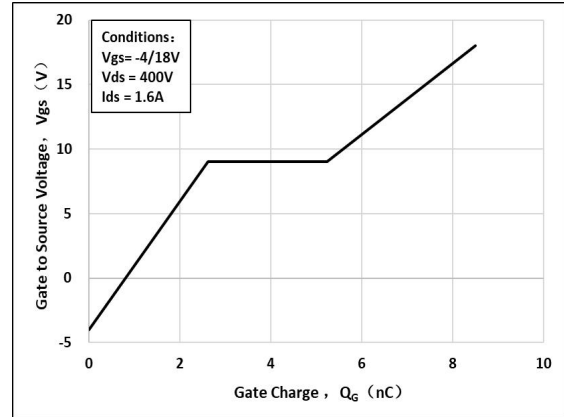


Figure 15: Drain Current vs. Case Temperature

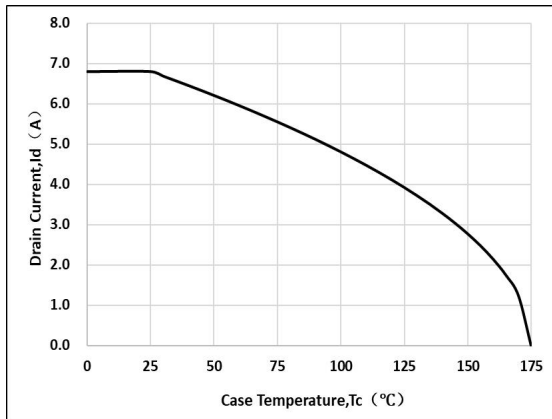


Figure 16: Safe Operating Area

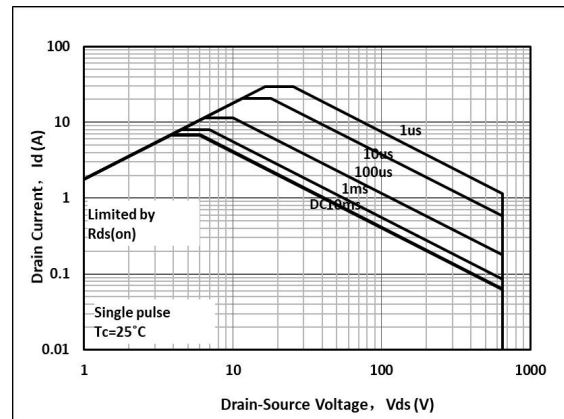


Figure 17: Capacitance Characteristics

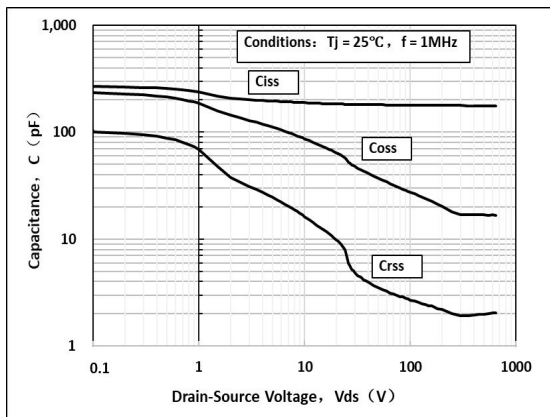
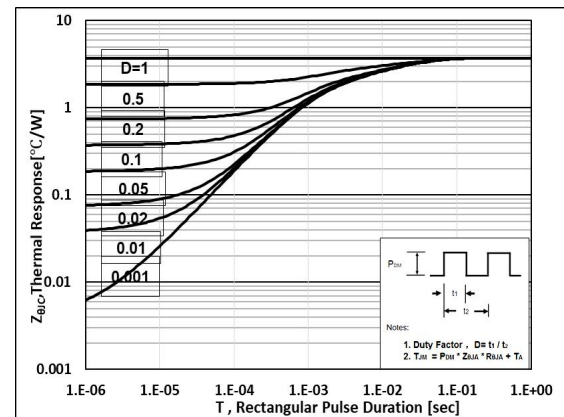
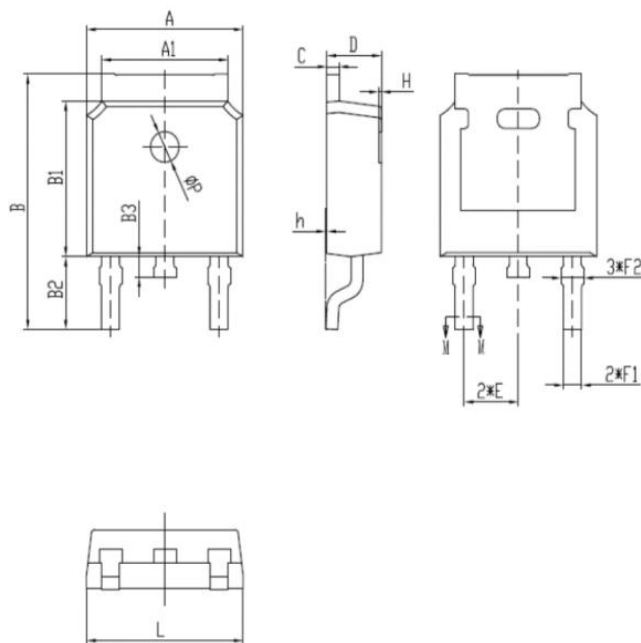


Figure 18: Transient Thermal Impedance



Package Outline Dimensions (Unit: millimeters)

TO-252



项目	规范(mm)	
	MIN	MAX
A	6.50	6.70
A1	5.16	5.46
B	9.77	10.17
B1	6.00	6.20
B2	2.60	3.00
B3	0.70	0.90
C	0.45	0.61
D	2.20	2.40
E	2.186	2.386
F1	0.67	0.87
F2	0.76	0.96
H	0.00	0.30
h	0.00	0.127
L	6.50	6.70
Φ P	1.10	1.30

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