

N-Channel 1700V (D-S) SiC MOSFET

Features

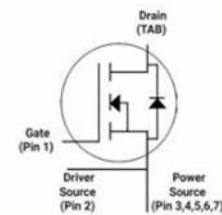
- Wide bandgap SiC MOSFET technology
- Low On-Resistance with High Blocking Voltage
- Low Capacitances with High-Speed switching
- Low reverse recovery(Qrr)
- Halogen free, RoHs compliant



TO-263-7

Applications

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



Absolute Maximum Ratings ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Drain Source Voltage	V_{DS}	1700	V
Gate Source Voltage	V_{GS}	-8/+22	V
Recommend Gate Source Voltage	V_{GSop}	-4/+18	V
Drain Current Continuous $V_{GS}=18\text{V}$	$T_C=25^{\circ}\text{C}$	I_D	6.7
	$T_C=100^{\circ}\text{C}$		5
Power Dissipation	$T_C=25^{\circ}\text{C}$	P_D	86
Operating Temperature and Storage Temperature Range	T_J/T_{STG}	-55 to +175	$^{\circ}\text{C}$

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance Junction to Case	R_{thJC}	1.7	$^{\circ}\text{C/W}$
Thermal Resistance Junction to Ambient	R_{thJA}	40	$^{\circ}\text{C/W}$

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	1700	--	--	V
Gate Leakage Current	I _{GSS}	V _{GS} =18V, V _{DS} =0V	--	--	100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =1700V, V _{GS} =0V	--	1	5	μA
Gate Threshold Voltage	V _{GS(TH)}	V _{DS} =V _{GS} , I _{DS} =380uA	2	3	4	V
		V _{DS} =V _{GS} , I _{DS} =380uA, T _J =175°C	--	2.2	--	
Drain-Source On-state Resistance	R _{DS(on)}	V _{GS} =18V, I _D =1A	--	700	910	mΩ
		V _{GS} =18V, I _D =1A, T _J =175°C	--	1280	--	
Total Gate Charge	Q _g	V _{GS(off)} =-4V, V _{GS(on)} =18V V _{DD} =1000V, I _D =1A	--	16.5	--	nC
Gate Source Charge	Q _{gs}		--	2.7	--	
Gate Drain Charge	Q _{gd}		--	12.5	--	
Turn-On Switching Energy	E _{ON}	V _{GS} =-4/+18V, V _{DD} =1000V · I _D =2A, R _G =10Ω, L=1880uH	--	73.9	--	μJ
Turn-Off Switching Energy	E _{OFF}		--	20.4	--	
Turn-on Delay Time	t _{d(on)}		--	6.2	--	ns
Turn-on Rise Time	t _r		--	13.7	--	
Turn-off Delay Time	t _{d(off)}		--	9.4	--	
Turn-off Fall Time	t _f		--	45.4	--	
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =1000V, V _{AC} =25mV, f=1MHz	--	285	--	pF
Output Capacitance	C _{oss}		--	15.3	--	
Reverse Transfer Capacitance	C _{rss}		--	2.2	--	
Gate resistance	R _G	V _{AC} = 25mV, f=1MHz	--	18	--	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}	$I_{SD}=1\text{A}, V_{GS}=0\text{V}$	--	4	--	V
		$I_{SD}=1\text{A}, V_{GS}=0\text{V}, T_J=175^{\circ}\text{C}$	--	3.8	--	
Continuous Diode Forward Current	I_{SD}	$V_{GS}=-4\text{V}$	--	6.7	--	A
Reverse Recovery Time	t_{rr}	$V_R=1000\text{V}, I_F=2\text{A},$ $V_{GS}=-4\text{V}/+18\text{V},$ $di/dt=1000\text{A}/\mu\text{s}$ $R_g=30\Omega, L=1880\mu\text{H}$	--	33.5	--	ns
Reverse Recovery Charge	Q_{rr}		--	56.1	--	nC

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

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

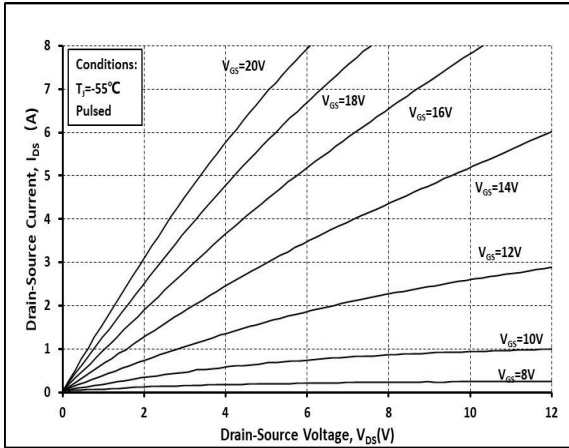


Figure 2. Output Characteristic ($T_J = 25^\circ\text{C}$)

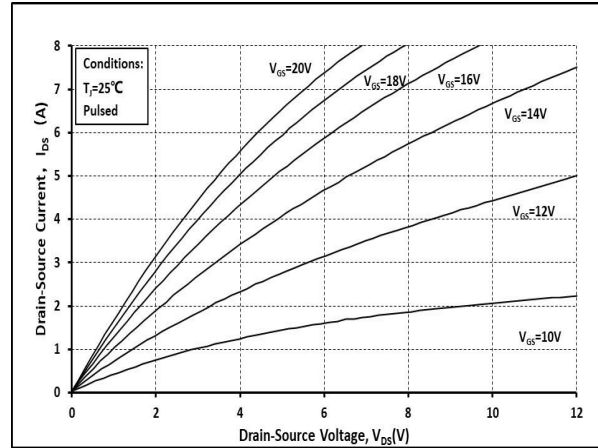


Figure 3. Output Characteristic ($T_J = 175^\circ\text{C}$)

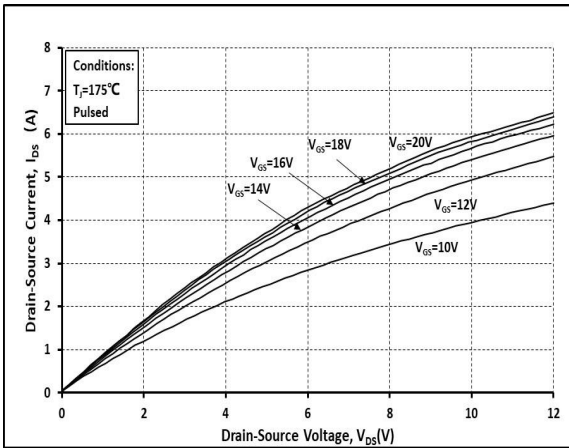


Figure 4. $R_{DS(on)}$ Vs I_{DS} Characteristic

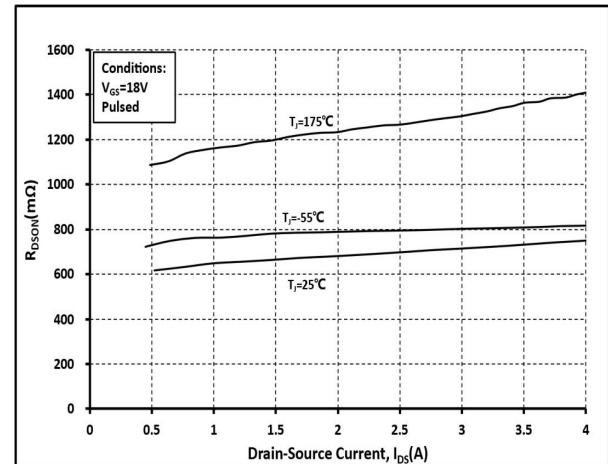


Figure 5. $R_{DS(on)}$ vs. Temperature

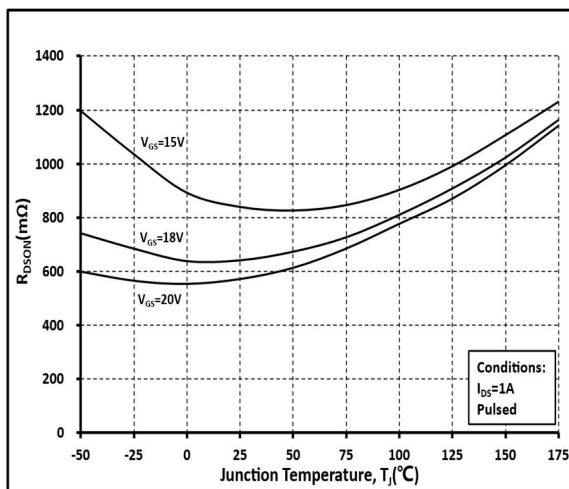
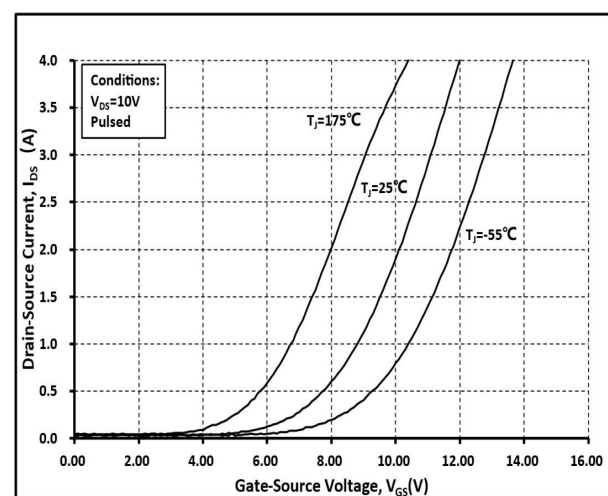


Figure 6. Transfer Characteristic



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

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

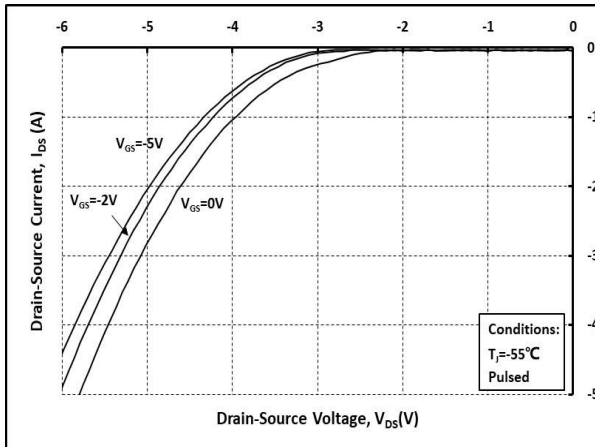


Figure 8: Body-diode Characteristic ($T_J = 25^\circ\text{C}$)

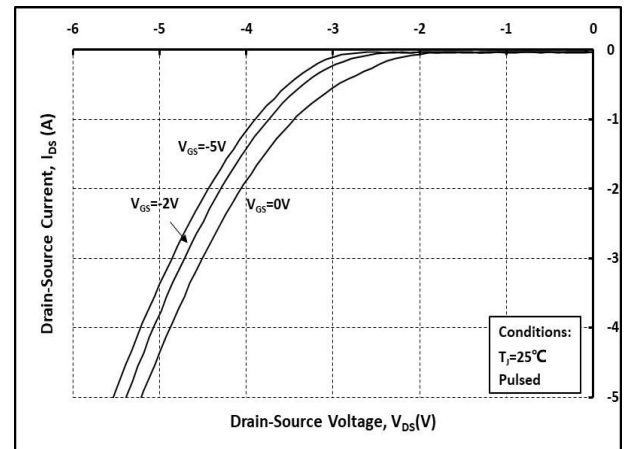


Figure 9: Body-diode Characteristic ($T_J = 175^\circ\text{C}$)

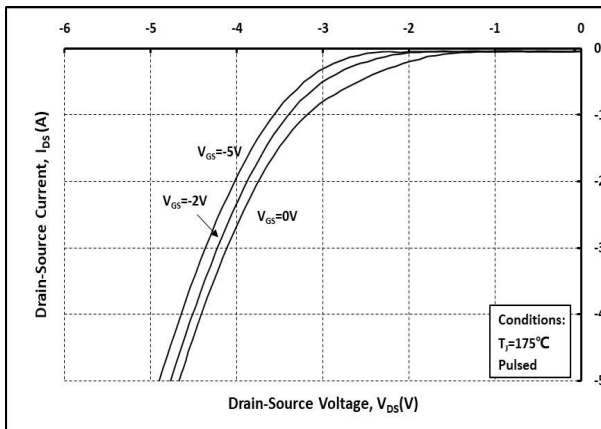


Figure 10: V_{TH} Vs T_J Temperature Characteristic

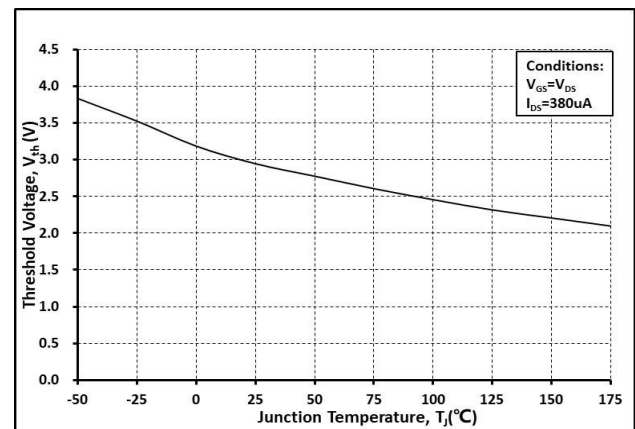


Figure 11: 3rd Quadrant Characteristic ($T_J = -55^\circ\text{C}$)

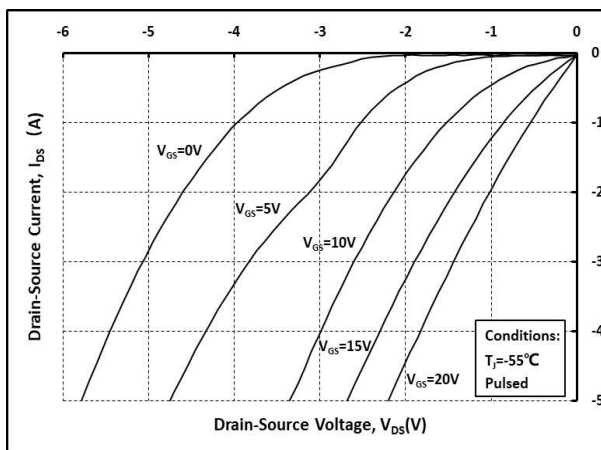
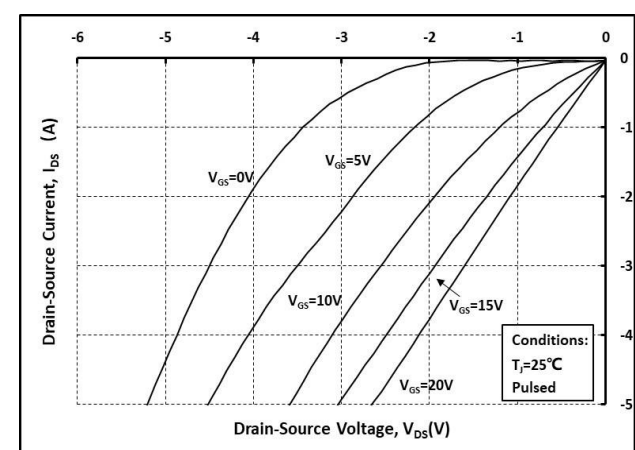


Figure 12: 3rd Quadrant Characteristic ($T_J = 25^\circ\text{C}$)



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

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

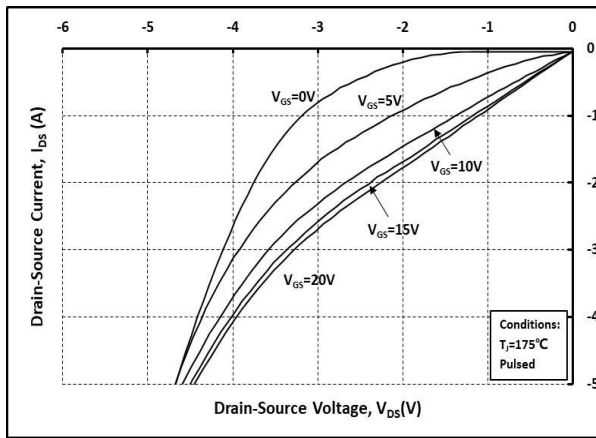


Figure 14: Gate Charge Characteristics

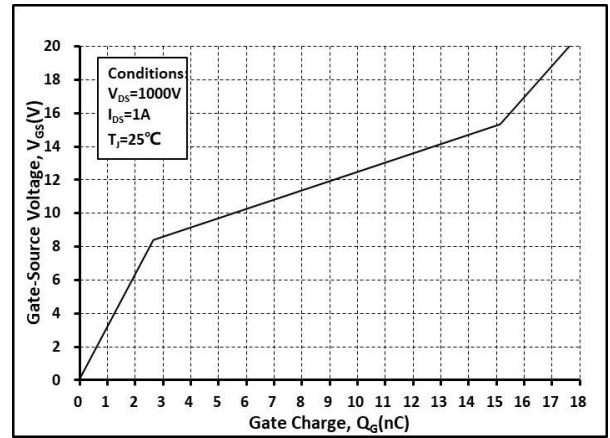


Figure 15: Safe Operating Area

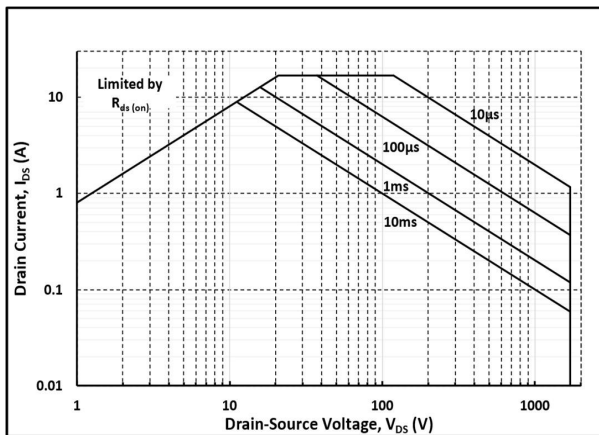


Figure 16: Capacitance Characteristic

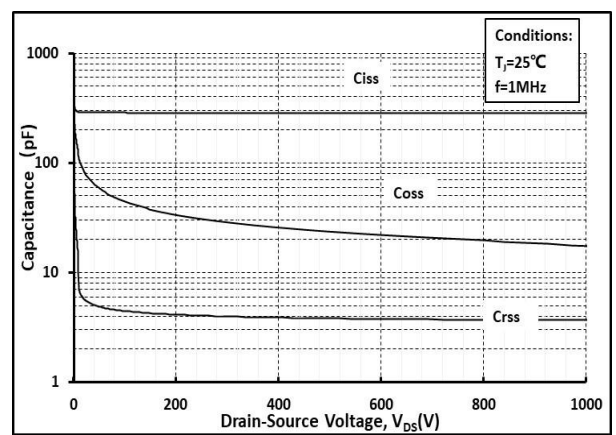
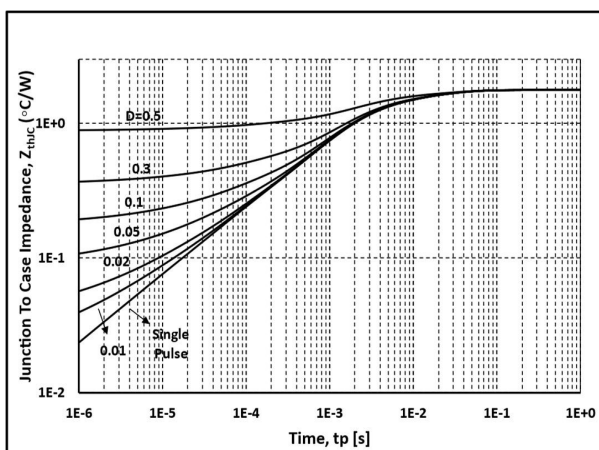


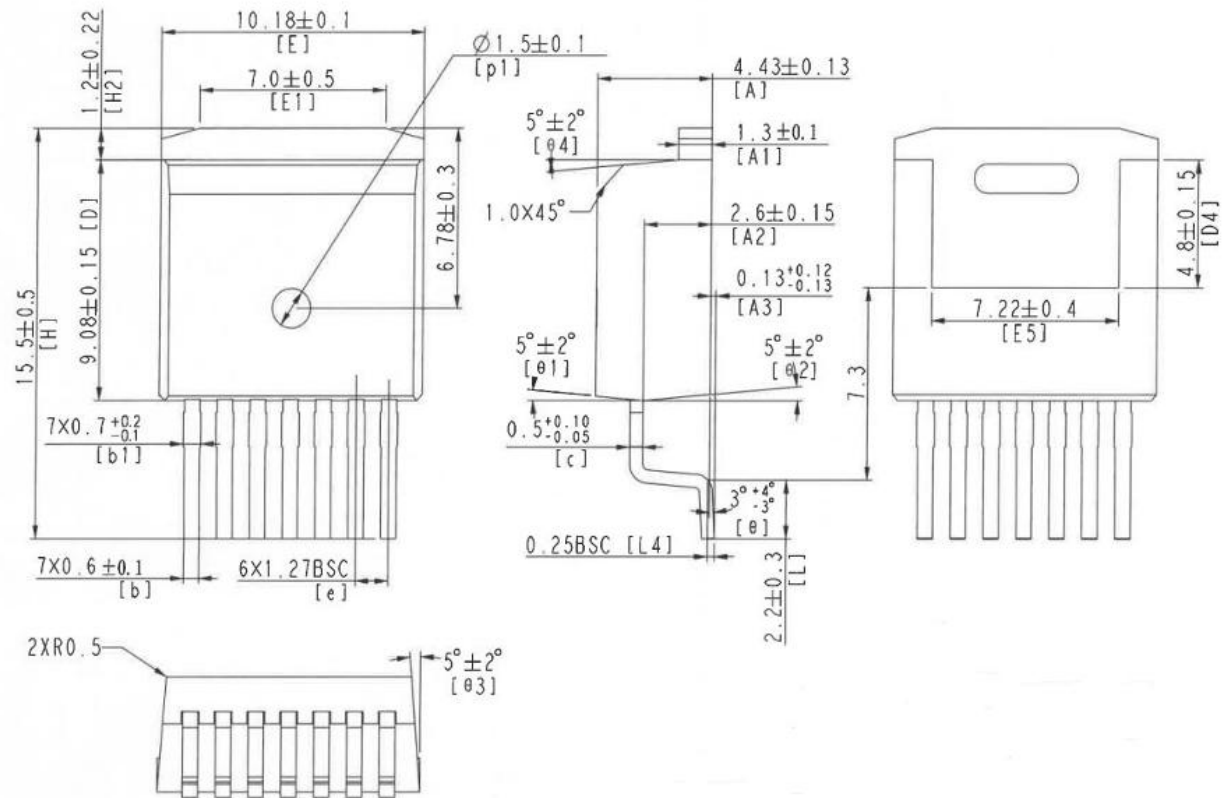
Figure 17: Transient Thermal Impedance



Package Outline Dimensions (Unit: millimeters)

TO-263-7L

UNIT:mm



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