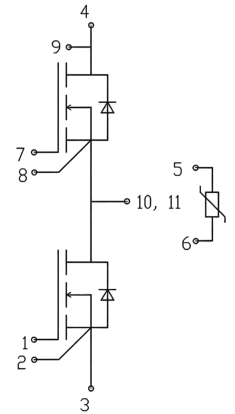


EconoDUAL3 Half Bridge SiC Module

Parameter	Value	Unit
V_{DS}	1700	V
I_D	600	A
$R_{DS(ON)}$	4.3	m Ω
Q_G	1008	nC



Features:

- Ultra Low Loss
- High-frequency Operation
- High Temperature, Humidity, and Bias Operation
- Zero Turn-off Tail Current from MOSFET

Applications:

- Motor Drives
- Servo Drives
- UPS Systems
- Wind Turbines
- High-Power Converters

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

Symbol	Parameter	Values	Unit
V_{DS}	Drain-source Voltage	1700	V
V_{GS}	Gate-source Voltage (dynamic)	-10/+22	V
I_D	Drain Current (continuous)	600	A
I_{DM}	Drain Current (pulsed)	1200	A
$T_{op}; T_{stg}$	Operating and Storage Temperature Range	-40 to +175	$^\circ\text{C}$
T_J	Junction Temperature	175	$^\circ\text{C}$
L_{Stray}	Stray Inductance	20	nH
V_{isol}	Isolation Test Voltage (DC; 2mA; t=10s)	4.2	kV
$R_{th(j-c)}$	Thermal Resistance, Junction-to-heatsink	0.13	$^\circ\text{C/W}$

MOSFET Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
Static characteristics (at $TC=25^\circ\text{C}$ unless otherwise specified)						
B_{VDS}	Drain-source Breakdown Voltage	1700	-	-	V	$V_{GS}=0V$
I_{DSS}	Zero Gate Voltage Drain Current	-	-	300	μA	$V_{DS}=1700V; V_{GS}=0V$
I_{GSS}	Gate-body Leakage Current	-	-	3	μA	$V_{GS}=-10/20V; V_{DS}=0V$
$V_{GS(th)}$	Gate Threshold Voltage	2.0	-	4.0	V	$V_{DS}=V_{GS}; I_D=60mA$
$R_{DS(on)}$	Static Drain-source on Resistance	-	4.3	5.0	m Ω	$V_{GS}=18V; I_D=300A$
$V_{GS(on)}$	Recommended Turn-on Voltage	-	18	-	V	Static
$V_{GS(off)}$	Recommended Turn-off Voltage	-	-5	-	V	
R_G	Gate Resistance	-	0.58	-	Ω	$V_{AC}=25mV; f=1MHz$

Dynamic characteristics (at TC=25°C unless otherwise specified)						
C _{iss}	Input Capacitance	-	38.8	-	nF	V _{DS} =1200V; f=100kHz; V _{AC} =25mV
C _{oss}	Output Capacitance	-	1.19	-		
C _{rss}	Reverse Transfer Capacitance	-	96	-		
E _{on}	Turn-on Energy	-	36.6	-	mJ	V _{DS} =1200V; V _{GS} =-5/+18V; I _D =300A; Load=100μH
E _{off}	Turn-off Energy	-	24.3	-		
Q _{GS}	Gate-source Charge	-	312	-	nC	V _{DD} =1200V; V _{GS} =-5/+20V; I _D =300A
Q _{GD}	Gate-drain Charge	-	300	-		
Q _G	Total Gate Charge	-	1008	-		
t _{d(on)}	Turn-on Delay Time	-	93.1	-	ns	V _{DD} =1200V; V _{GS} =-5/+18V; I _D =300A; R _{G(ext)} =5Ω; Load=100μH
t _r	Rise Time	-	70.6	-		
t _{d(off)}	Turn-off Delay Time	-	353.6	-		
t _f	Fall Time	-	106.1	-		

Body Diode Characteristics (T_J =25°C unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
V _{FSD}	Forward Voltage	-	3.6	6	V	V _{GS} =0V; I _F =300A
I _S	Continuous Diode Forward Current	-	300	-	A	V _{GS} =0V; T _C =25°C
T _{RR}	Reverse Recovery Time	-	89.9	-	ns	V _{GS} =-5/+18V; I _F =300A V _R =1200V; R _{G(ext)} =5Ω Load=100μH
Q _{RR}	Reverse Recovery Charge	-	5305	-	nC	
I _{RRM}	Peak Reverse Recovery Current	-	170	-	A	

NTC Thermistor Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
R ₂₅	Rated Resistance	-	5.00	-	kΩ	T _{NTC} =25°C
ΔR/R	Deviation of R ₁₀₀	-5	-	5	%	T _{NTC} =100°C; R ₁₀₀ =493.3Ω
B _{25/50}	Beta Value for 25°C to 50°C	-	3375	-	K	R ₂ =R ₂₅ exp[B _{25/50} (1/T ₂ -1/(298.15K))]
B _{25/80}	Beta Value for 25°C to 80°C	-	3414	-	K	R ₂ =R ₂₅ exp[B _{25/80} (1/T ₂ -1/(298.15K))]
B _{25/100}	Beta Value for 25°C to 100°C	-	3436	-	K	R ₂ =R ₂₅ exp[B _{25/100} (1/T ₂ -1/(298.15K))]

Typical Characteristics

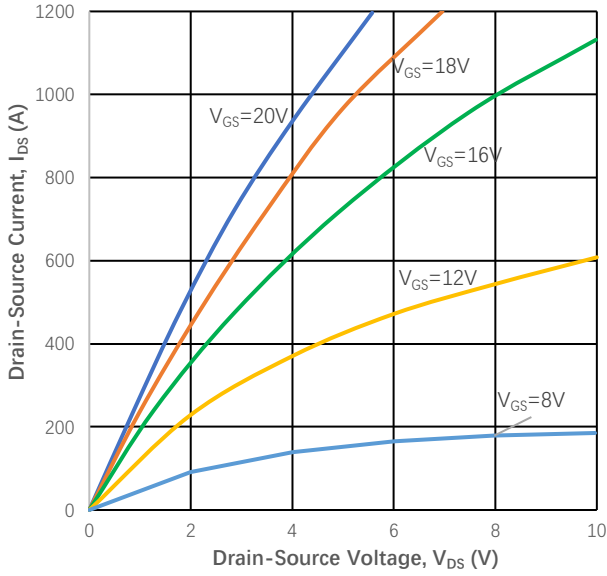


Figure 1
 Output Characteristics ($T_J = 25\text{ }^\circ\text{C}$)

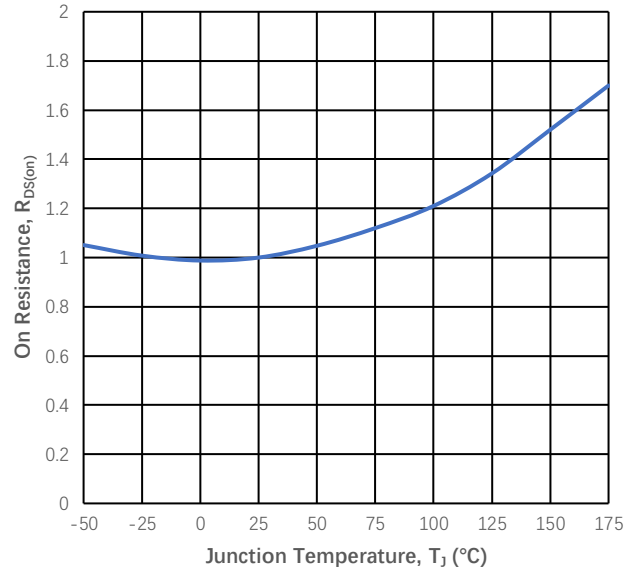


Figure 2
 Normalized On-Resistance vs. Temperature

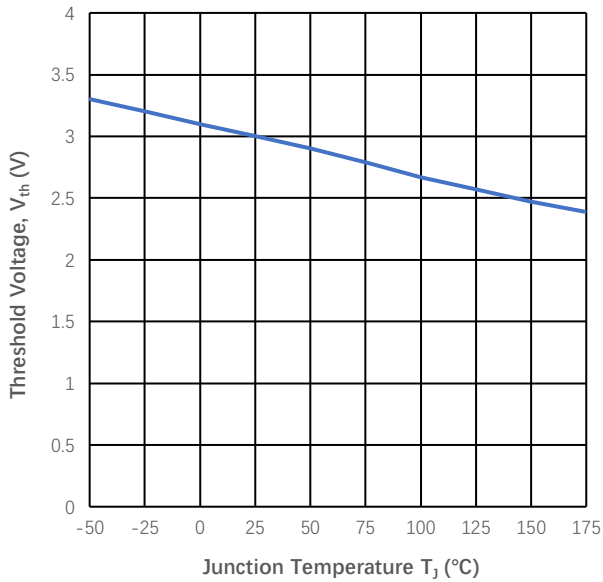


Figure 3
 Threshold Voltage vs. Temperature

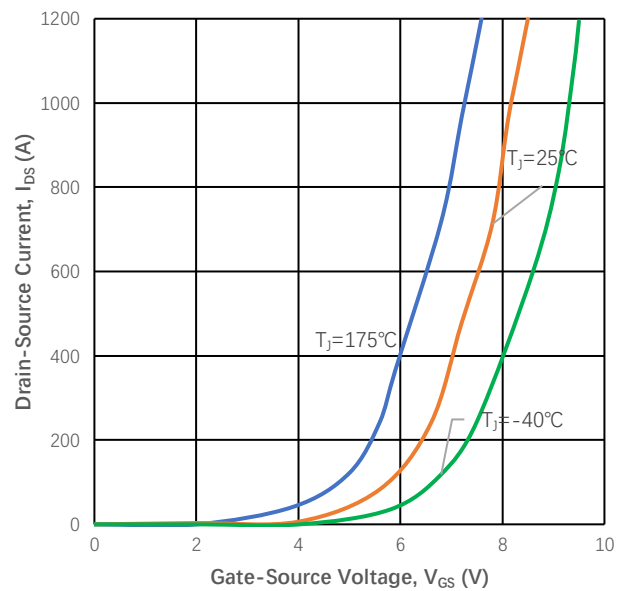


Figure 4
 Transfer Characteristic for Various T_J

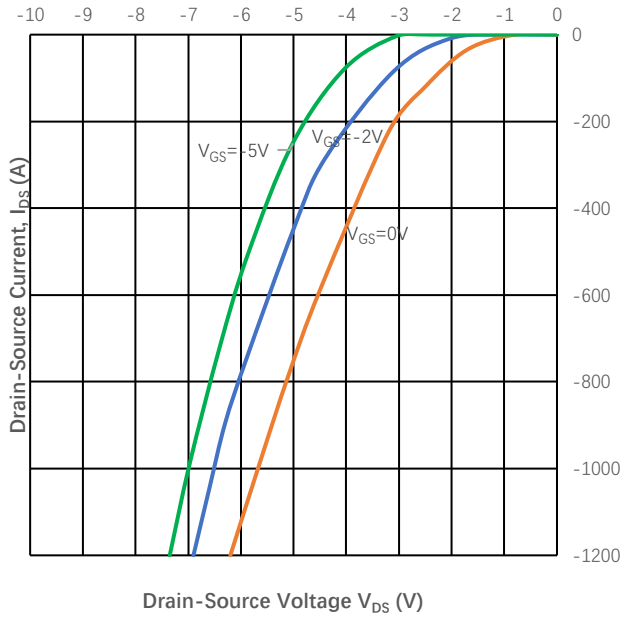


Figure 5
 Diode Characteristic ($T_J = 25\text{ }^\circ\text{C}$)

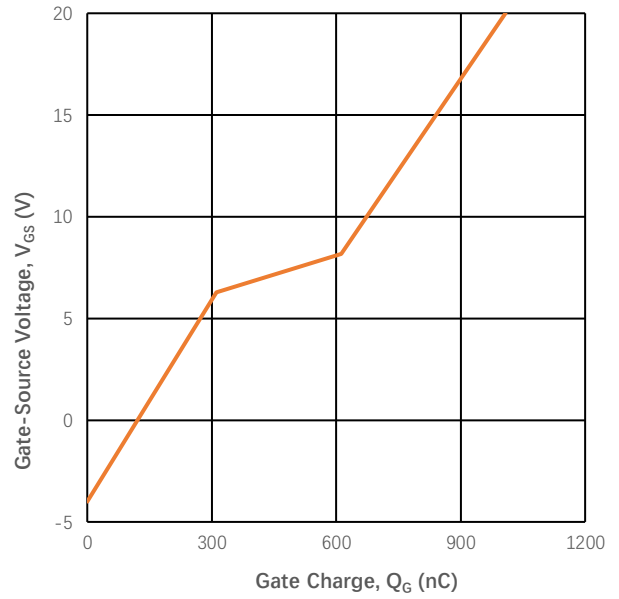


Figure 6
 Typical Gate Charge Characteristics

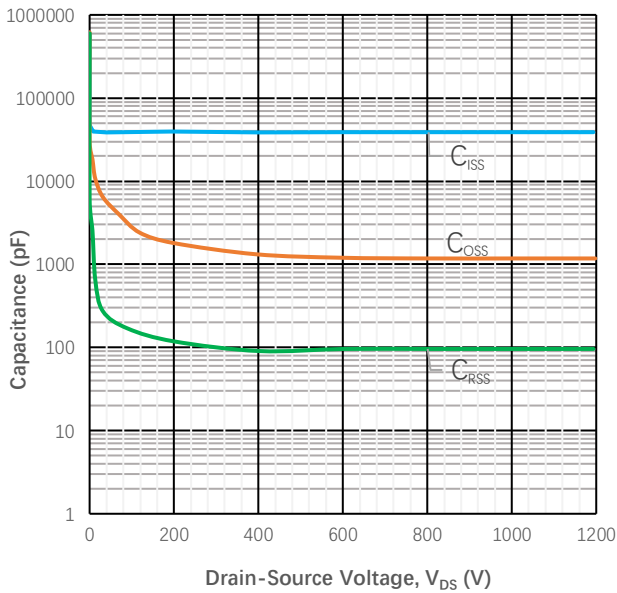


Figure 7
 Typical Capacitances vs. Drain-Source Voltage

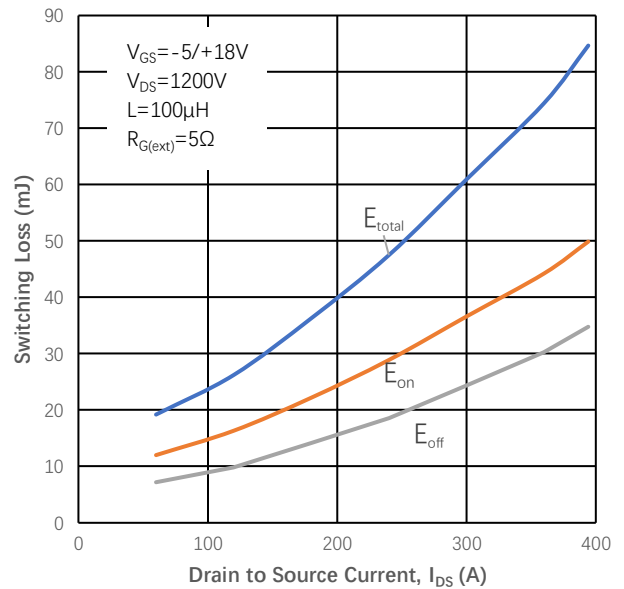


Figure 8
 Inductive Switching Energy vs. Drain Current

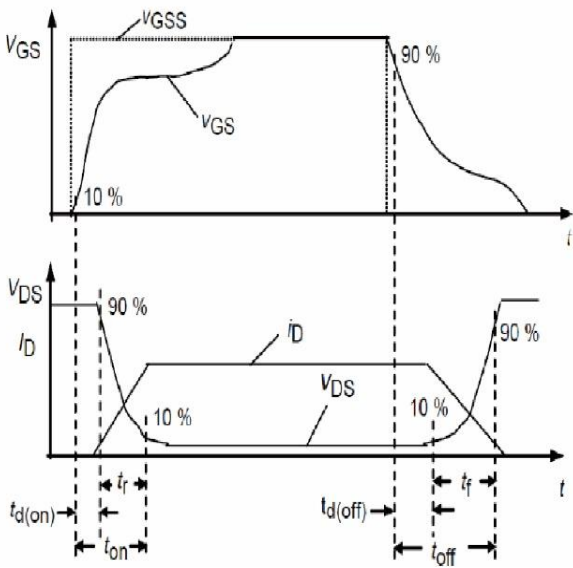


Figure 9
 Switching Time Description

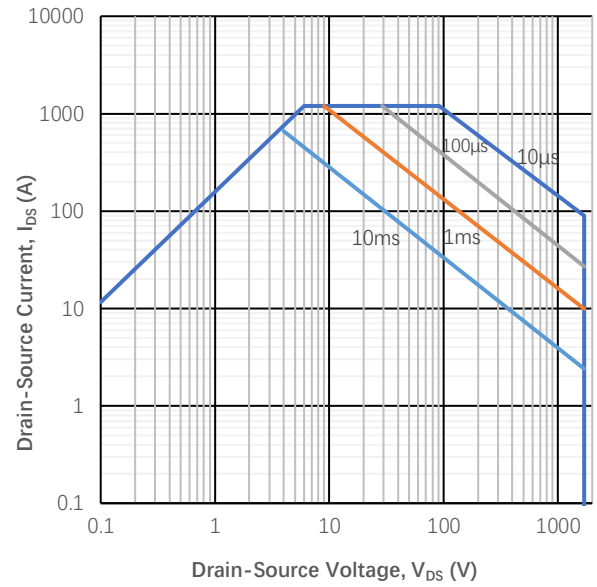
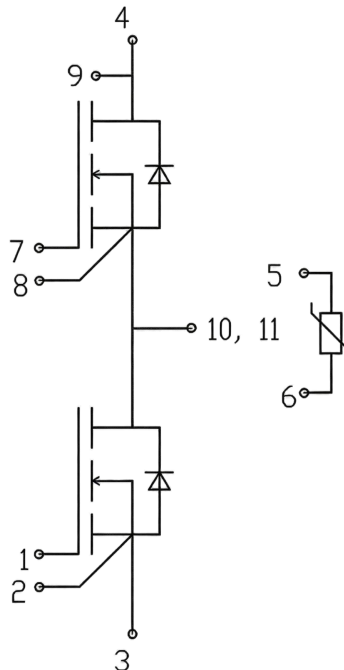
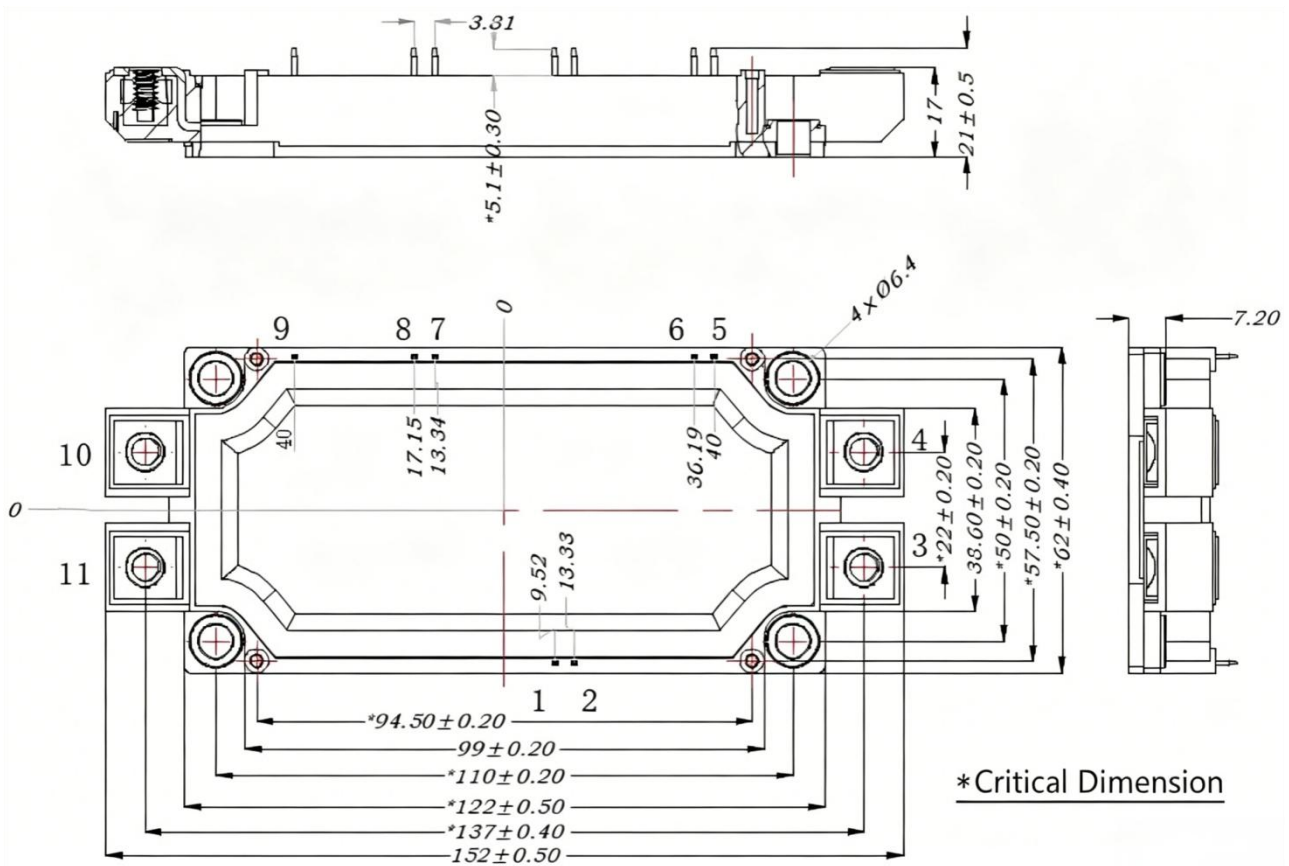


Figure 10
 Safe Operating Area

Circuit Diagram



Package Outlines(Unit: mm):



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