



General Description

The 1200V SiC MOSFETs has been especially tailored to minimize on-state resistance, provide superior switching performance, higher system efficiency, and faster operating frequency.

These devices are well suited for high efficiency fast switching applications.

BV_{DSS}	$R_{DS(ON)}$	I_D
1200 V	52 mΩ	63 A

Features

- $R_{DS(ON)} \leq 52m\Omega @ V_{GS}=10V$
- Improved dv/dt Capability
- High Speed Switching
- Green Device Available

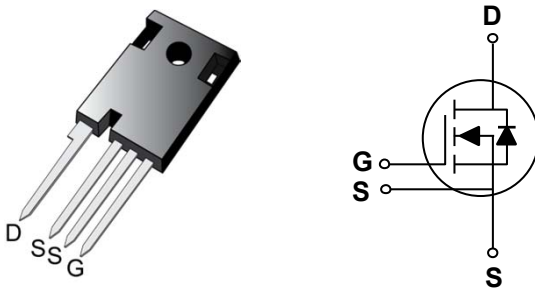
Benefits

- Lower Capacitance
- Higher System Efficiency
- Easy to Parallel

Applications

- Solar Inverters
- Switch Mode Power Supplies, UPS
- Induction Heating and Welding
- EV Charging Stations
- High Voltage DC/DC Converters
- Motor Drives

TO-247-4L Pin Configuration



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	1200	V
$V_{GS(max)}$	Gate-Source Voltage	-10 / +25	V
$V_{GS(op)}$	Gate-Source Voltage (Recommended operational)	-5 / +20	V
I_D	Drain Current – Continuous ($T_C=25^\circ\text{C}$, $T_J=175^\circ\text{C}$)	63	A
I_D	Drain Current – Continuous ($T_C=100^\circ\text{C}$, $T_J=175^\circ\text{C}$)	47	A
I_{DM}	Drain Current – Pulsed ($T_C=25^\circ\text{C}$) (NOTE 1)	160	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	400	mJ
P_D	Power Dissipation ($T_C=25^\circ\text{C}$)	322	W
T_J	Operating Junction Temperature Range	-55 to 175	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 175	$^\circ\text{C}$
Marking Code		SNAL052	

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	40	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	0.466	$^\circ\text{C}/\text{W}$



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

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=1mA$	1200	---	---	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=1200V, V_{GS}=0V$	---	---	1	uA
		$V_{DS}=1200V, V_{GS}=0V, T_J=175^\circ\text{C}$	---	1	---	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=20V, V_{DS}=0V$	---	---	100	nA
		$V_{GS}=-5V, V_{DS}=0V$	---	---	-100	

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=20V, I_D=40A$	---	---	52	m Ω
		$V_{GS}=20V, I_D=20A$	---	---	45	
		$V_{GS}=20V, I_D=40A, T_J=125^\circ\text{C}$	---	56	---	
		$V_{GS}=20V, I_D=40A, T_J=175^\circ\text{C}$	---	73	---	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=10mA$	2	---	4	V
		$V_{GS}=V_{DS}, I_D=10mA, T_J=125^\circ\text{C}$	---	1.8	---	
		$V_{GS}=V_{DS}, I_D=10mA, T_J=175^\circ\text{C}$	---	1.6	---	
gfs	Transconductance	$V_{DS}=20V, I_D=40A$	---	16	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	$V_{DD}=800V, V_{GS}=-5/+20V, I_D=20A$	---	118	---	nC
Q_{gs}	Gate-Source Charge		---	51	---	
Q_{gd}	Gate-Drain Charge		---	10	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=800V, R_G=2.5\Omega, I_D=40A, V_{GS}=-5/+20V$	---	14	---	nS
T_r	Rise Time		---	5	---	
$T_{d(off)}$	Turn-Off Delay Time		---	23	---	
T_f	Fall Time		---	14	---	
C_{iss}	Input Capacitance	$V_{DS}=1000V, V_{GS}=0V, F=200kHz$	---	3192	---	pF
C_{oss}	Output Capacitance		---	132	---	
C_{rss}	Reverse Transfer Capacitance		---	7	---	
E_{oss}	Coss Stored Energy		---	77	---	
$E_{(on)}$	Turn-On Switching Energy	$V_{DD}=800V, R_G=2.5\Omega, I_D=40A, V_{GS}=-5/+20V$	---	446	---	uJ
$E_{(off)}$	Turn-Off Switching Energy		---	68	---	
$E_{(tot)}$	Total Switching Energy		---	514	---	
R_g	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$	---	1.9	---	Ω



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

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Body Diode Current	$V_{GS} = -5V, T_C = 25^\circ\text{C}$	---	---	74	A
V_{SD}	Diode Forward Voltage	$V_{GS} = -5V, I_S = 20A$	---	3.8	---	V
t_{rr}	Reverse Recovery Time	$V_{GS} = -5V, I_S = 40A, V_R = 800V, di_f/dt = 9.6A/ns$	---	11	---	nS
Q_{rr}	Reverse Recovery Charge		---	316	---	nC
I_{RRM}	Peak Reverse Recovery Current		---	46	---	A

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $I_{AS} = 28.3A, V = 50V, L = 1.0mH$.

Typical Performance

FIG. 1-Output Characteristics $T_J=25^\circ\text{C}$

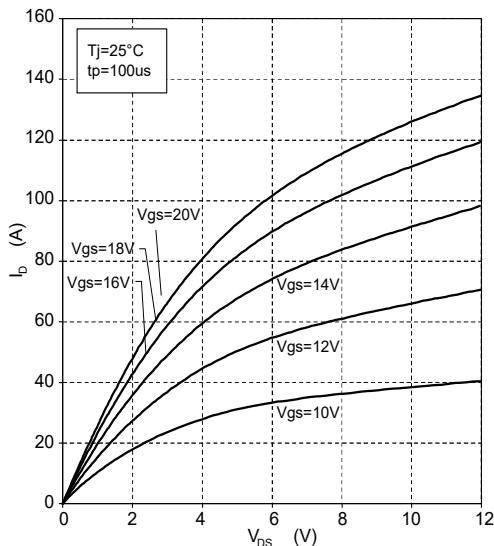
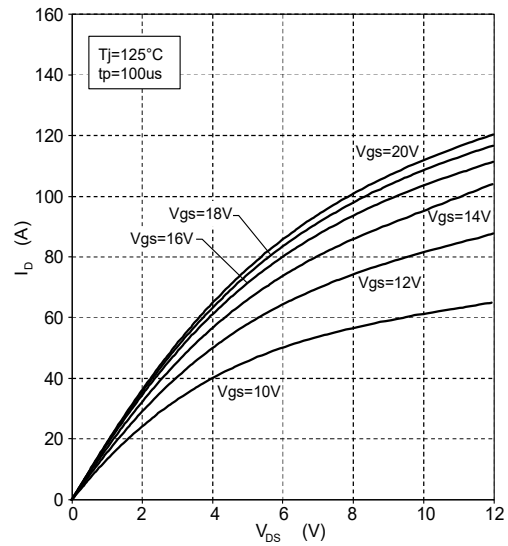


FIG. 2-Output Characteristics $T_J=125^\circ\text{C}$





Typical Performance

FIG. 3-Output Characteristics $T_J=175^\circ\text{C}$

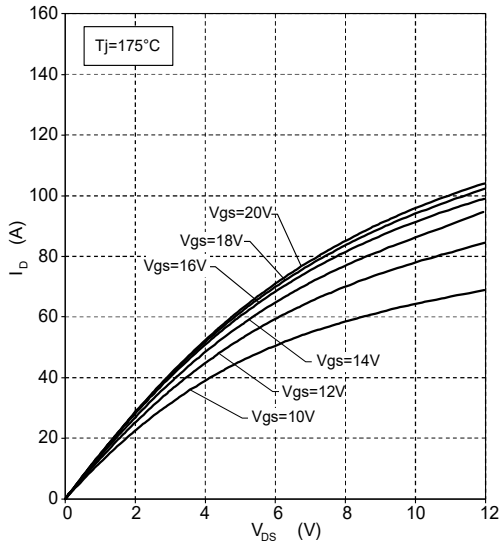


FIG. 4-Normalized $R_{DS(ON)}$ vs T_J

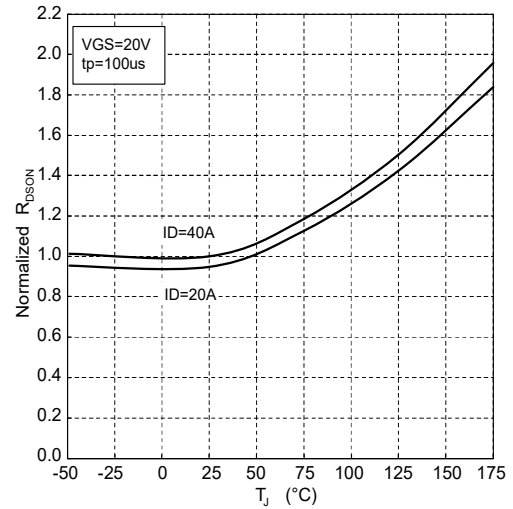


FIG. 5-Transfer Characteristic

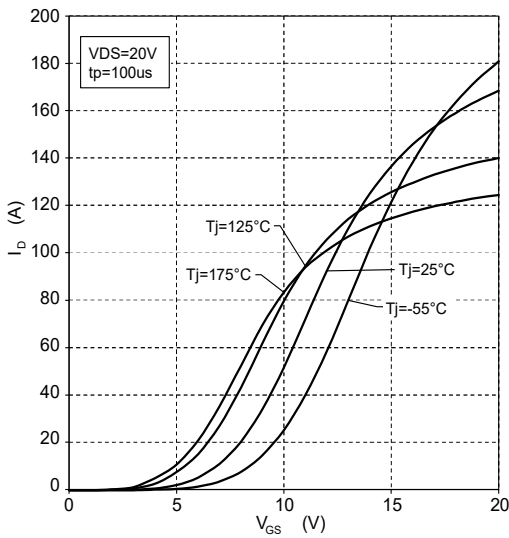


FIG. 6-Body Diode Characteristics

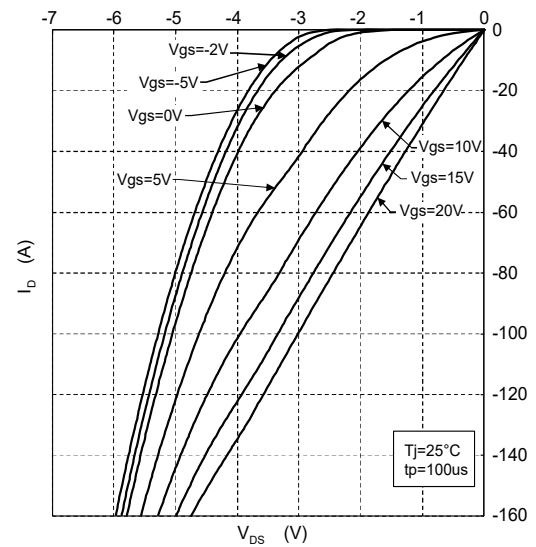


FIG. 7- $V_{GS(th)}$ vs T_J

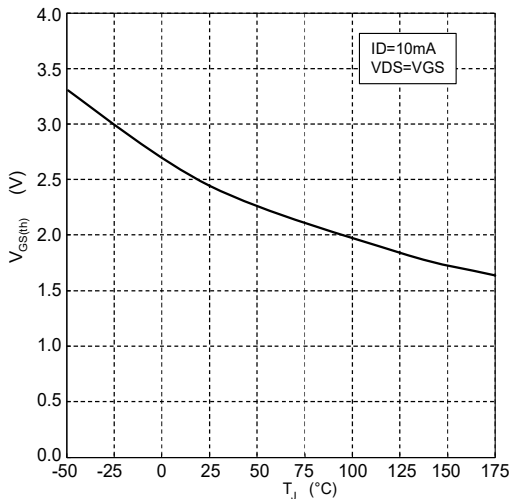
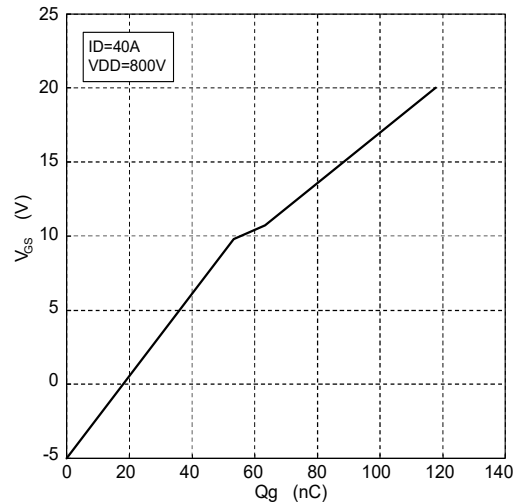


FIG. 8-Gate Charge Characteristics





Typical Performance

FIG. 9- I_D vs T_C

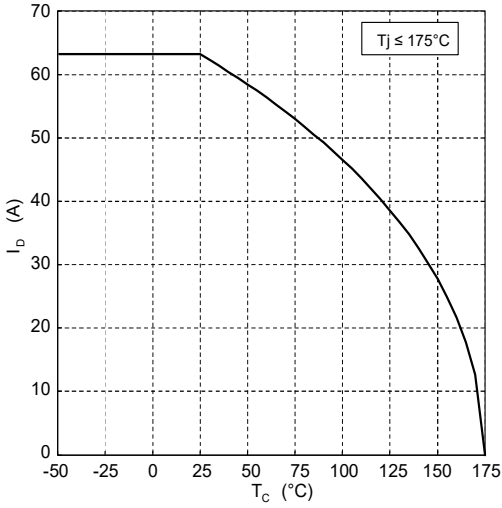


FIG. 10-Transient Thermal Impedance (Junction to Case)

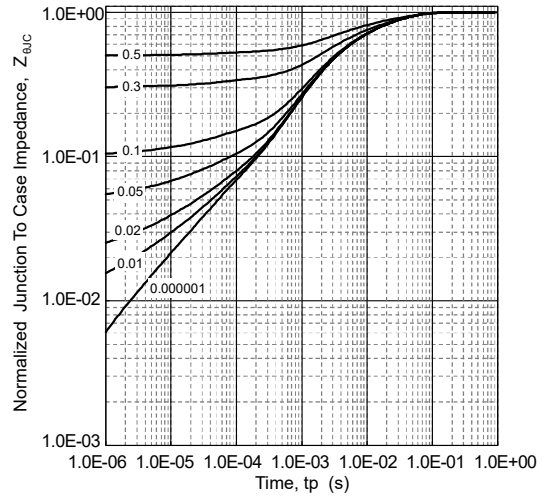
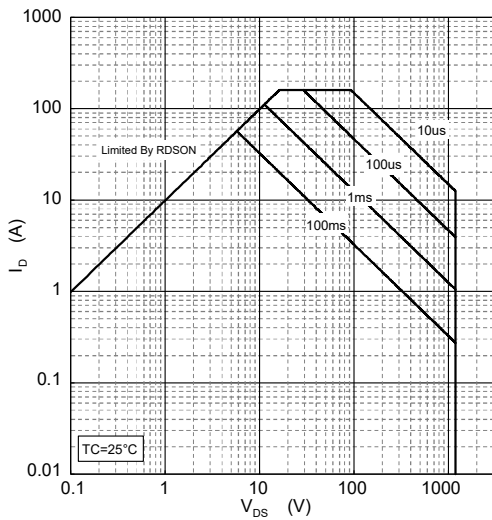
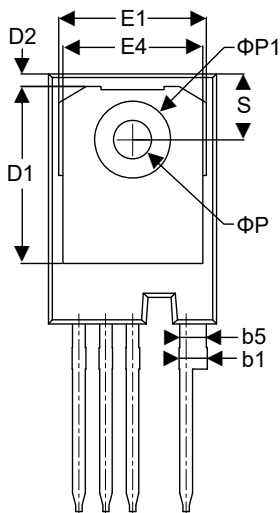
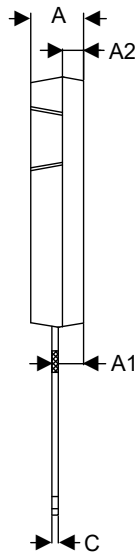
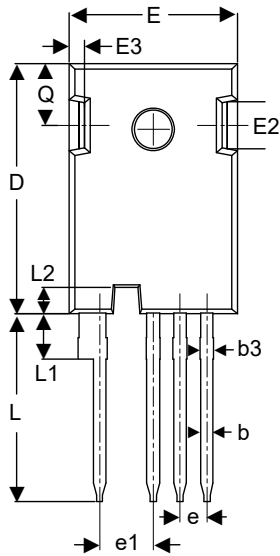


FIG. 11-Safe Operating Area





Package Outline Dimensions



Symbol	Dimensions in millimeters		Dimensions in inches	
	Min.	Max.	Min.	Max.
A	4.83	5.21	0.190	0.206
A1	2.29	2.54	0.090	0.100
A2	1.91	2.16	0.075	0.086
b	1.07	1.33	0.042	0.053
b1	2.39	2.94	0.094	0.116
b3	1.07	1.60	0.042	0.063
b5	2.39	2.69	0.094	0.106
C	0.55	0.68	0.021	0.027
D	23.30	23.60	0.917	0.930
D1	16.25	17.65	0.639	0.695
D2	0.95	1.25	0.037	0.050
E	15.75	16.13	0.620	0.636
E1	13.10	14.15	0.515	0.558
E2	3.68	5.10	0.144	0.201
E3	1.00	1.90	0.039	0.075
E4	12.38	13.43	0.487	0.529
e	2.54 BSC		0.100 BSC	
e1	5.08 BSC		0.200 BSC	
L	17.31	17.82	0.681	0.702
L1	3.97	4.37	0.156	0.173
L2	2.35	2.65	0.092	0.105
ΦP	3.51	3.65	0.138	0.144
ΦP1	7.19 REF		0.284 REF	
Q	5.49	6.00	0.216	0.237
S	6.04	6.30	0.237	0.249

TO-247-4L

Dimensions in inches and (millimeters)



LEGAL DISCLAIMER

- The product is provided “AS IS” without any guarantees or warranty. In association with the product, Eris Technology Corporation, its affiliates, and their directors, officers, employees, agents, successors and assigns (collectively, the “Eris”) makes no warranties of any kind, either express or implied, including but not limited to warranties of merchantability, fitness for a particular purpose, of title, or of non-infringement of third party rights.
- The information in this document and any product described herein are subject to change without notice and should not be construed as a commitment by Eris. Eris assumes no responsibility for any errors that may appear in this document.
- Eris does not assume any liability arising out of the application or use of this document or any product described herein, any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Eris and all the companies whose products are represented on Eris website, harmless against all damages.
- No license, express or implied, by estoppels or otherwise, to any intellectual property is granted by this document or by any conduct of Eris. Product name and markings notes herein may be trademarks of their respective owners.
- Eris does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel.
- Should Customers purchase or use Eris products for any unintended or unauthorized application, Customers shall indemnify and hold Eris and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.
- The official text is written in English and the English version of this document is the only version endorsed by Eris. Any discrepancies or differences created in the translations are not binding and have no legal effect on Eris for compliance or enforcement purposes.