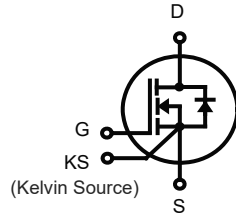




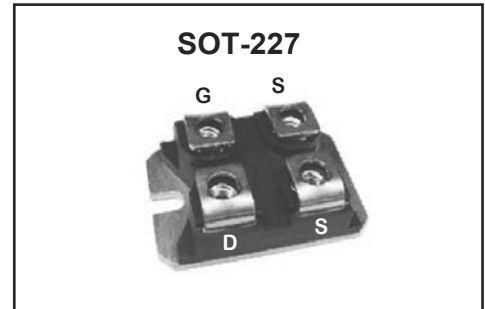
Silicon Carbide Enhancement Mode MOSFET

Features

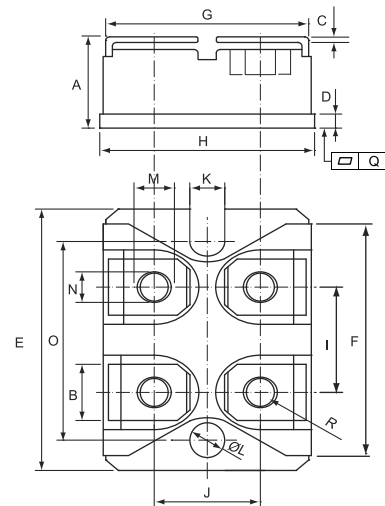
- ◆  $V_{DS} = 1700V$
- ◆  $R_{DS(ON)} < 70\text{ m}\Omega @ V_{GS} = 20\text{ V}$
- ◆ Fully Avalanche Rated
- ◆ Pb Free & RoHS Compliant
- ◆ Isolation Type Package
- ◆ Electrically Isolation Base Plate



Preliminary



Dimensions in inches and (millimeters)



Applications

- ◆ Solar Inverters
- ◆ Switch Mode Power Supplies
- ◆ Power Converters
- ◆ Battery Chargers
- ◆ Motor Drive

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

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	$V_{DS}$	1700	V
Gate-Source Voltage	$V_{GS}$	-10/+20	V
Drain Current-Continuous @ $T_c = 25^\circ\text{C}$ @ $T_c = 100^\circ\text{C}$	$I_D$	60 40	A
Drain Current-Pulsed @ $T_c = 25^\circ\text{C}$	$I_{DM}$	180	A
Maximum Power Dissipation	$P_D$	312	W
Storage Temperature Range	$T_{STG}$	-50 to +150	$^\circ\text{C}$
Operating Junction Temperature Range	$T_J$	-50 to +150	$^\circ\text{C}$
Thermal Resistance, Junction-to-Case	$R_{\theta_{JC}}$	0.40	$^\circ\text{C/W}$
Isolation Voltage (A.C. 1 minute) between All Terminals and Baseplate	$V_{iso}$	2500	V
Mounting Torque (M4 Screw) To heatsink To terminals	$M_d$	1.3 1.1	$\text{N}\cdot\text{m}$

	DIMENSIONS			
	INCHES		MM	
	MIN	MAX	MIN	MAX
A	0.460	0.483	11.68	12.28
B	0.307	0.323	7.80	8.20
C	0.030	0.033	0.75	0.85
D	0.071	0.081	1.80	2.05
E	1.488	1.504	37.80	38.20
F	1.248	1.260	31.70	32.00
G	0.917	0.957	23.30	24.30
H	0.996	1.008	25.30	25.60
I	0.579	0.602	14.70	15.30
J	0.492	0.516	12.50	13.10
K	0.161	0.169	4.10	4.30
L	0.161	0.169	4.10	4.30
M	0.181	0.197	4.60	5.00
N	0.165	0.181	4.20	4.60
O	1.181	1.197	30.00	30.40
Q	-0.002	0.004	-0.05	0.10
R	M4*8			



Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>OFF Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V , I <sub>DS</sub> =0.3mA	1700	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>GS</sub> =0V , V <sub>DS</sub> =1200V	-	-	100	uA
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =20V , V <sub>DS</sub> =0V	-	-	500	nA
<b>ON Characteristics</b>						
Gate Threshold Voltage	V <sub>TH</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =8mA	2.0	3.4	4	V
Drain-Source On-State Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =20V , I <sub>DS</sub> =50A	-	45	70	mΩ
Gate Resistance	R <sub>G</sub>		-	1.9	-	Ω
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub>   > 2   I <sub>D</sub>   R <sub>DS(on)M</sub> , I <sub>D</sub> = 50A <sup>Note1</sup>	-	15	-	S
<b>Dynamic Characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =1000V	-	4141	-	pF
Output Capacitance	C <sub>OSS</sub>	V <sub>GS</sub> =0V	-	145	-	
Reverse Transfer Capacitance	C <sub>rss</sub>	Freq.=1MHz	-	25	-	
Turn-On Switching Energy	E <sub>on</sub>	V <sub>DD</sub> =1200V , V <sub>GS</sub> =-5V/+20V	-	194	-	μ J
Turn-Off Switching Energy	E <sub>off</sub>	I <sub>D</sub> = 40A , R <sub>G(ext)</sub> = 2.7Ω	-	326	-	
<b>Switching Characteristics</b>						
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =1200V	-	51	-	ns
Rise Time	t <sub>r</sub>	V <sub>GS</sub> =-5V/+20V	-	53	-	
Turn-Off Delay Time	t <sub>d(off)</sub>	I <sub>DS</sub> =40A	-	59	-	
Fall Time	t <sub>f</sub>	R <sub>G</sub> =2.7Ω	-	22	-	
Total Gate Charge at 10V	Q <sub>g</sub>	V <sub>DS</sub> =1200V	-	304	-	nC
Gate to Source Charge	Q <sub>gs</sub>	V <sub>GS</sub> =20V	-	79	-	
Gate to Drain Charge	Q <sub>gd</sub>	I <sub>DS</sub> =40A	-	99	-	
<b>Body Diode Characteristics , at T<sub>J</sub> = 25°C , unless otherwise specified</b>						
Max Continuous Diode Fwd Current	I <sub>S</sub>	V <sub>GS</sub> =0V , T <sub>C</sub> =25°C	-	-	60	A
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V , I <sub>SD</sub> =20A	-	3.0	-	V
Reverse Recovery Time	t <sub>RR</sub>	I <sub>SD</sub> =40A , V <sub>R</sub> =400V	-	81	-	ns
Reverse Recovery Charge	Q <sub>RR</sub>	V <sub>GS</sub> =0V diF / dt=300A/ μ s	-	274	-	nC
Peak Reverse Recovery Current	I <sub>RRM</sub>		-	6.4	-	A



Typical Characteristics

Fig.1 Forward Output Characteristics at  $T_j=25^\circ\text{C}$

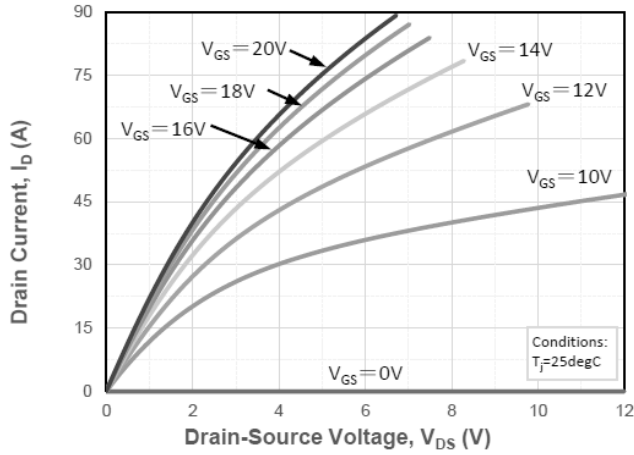


Fig.2 Forward Output Characteristics at  $T_j=175^\circ\text{C}$

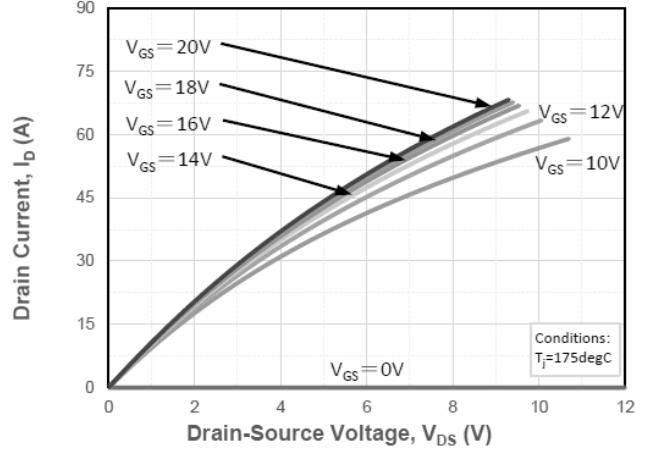


Fig.3 On-Resistance vs. Drain Current for Various  $T_j$

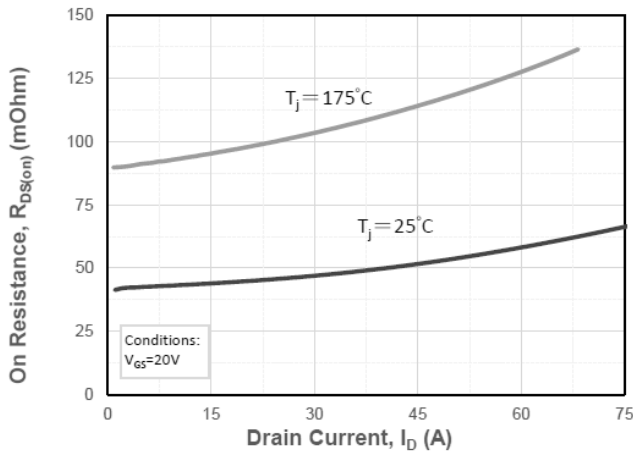


Fig.4 Transfer Characteristics for Various  $T_j$

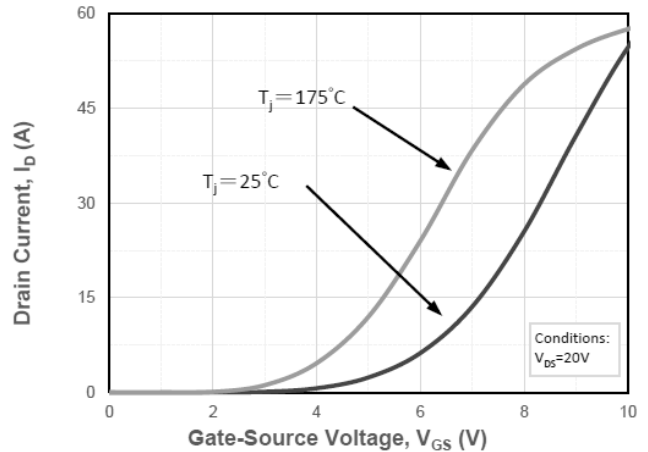


Fig.5 On-Resistance vs. Gate Voltage for Various  $T_j$

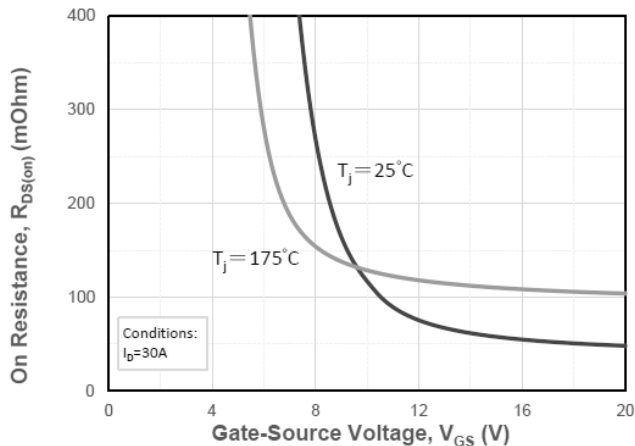
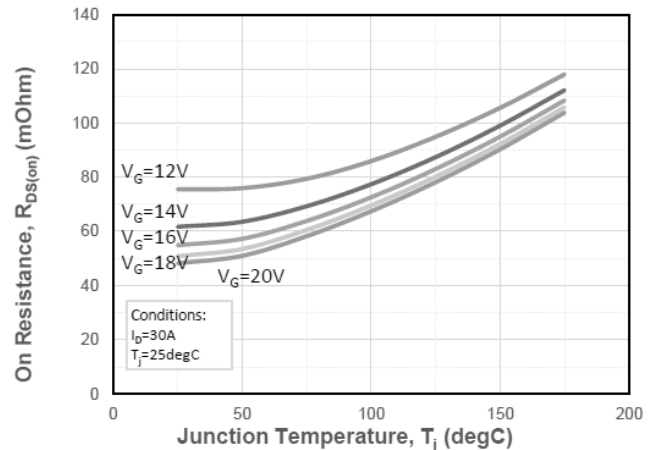


Fig.6 On-Resistance vs. Temperature for Various Gate Voltage





Typical Characteristics

Fig.7 Normalized On-Resistance vs. Temperature

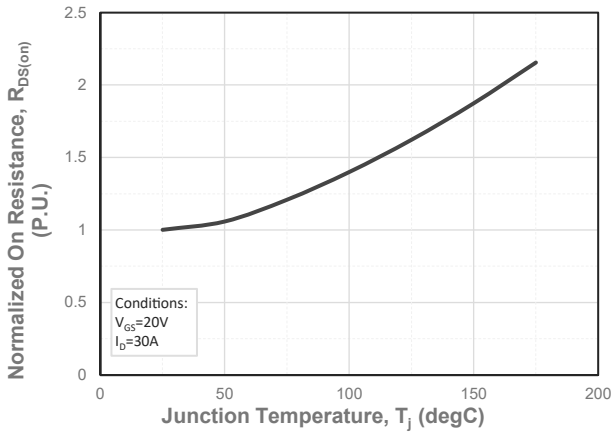


Fig.8 Reverse Output Characteristics at T\_j = 25°C

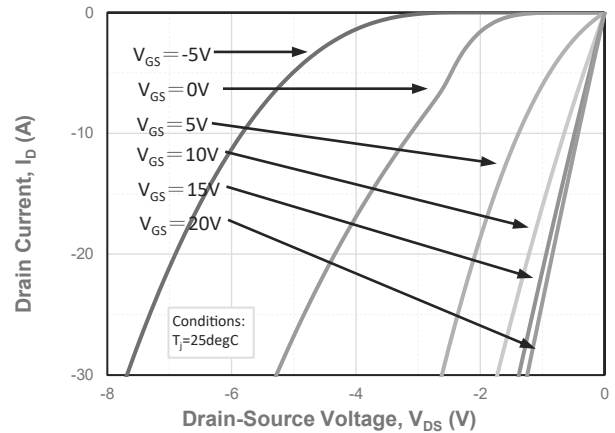


Fig.9 Reverse Output Characteristics at T\_j = 175°C

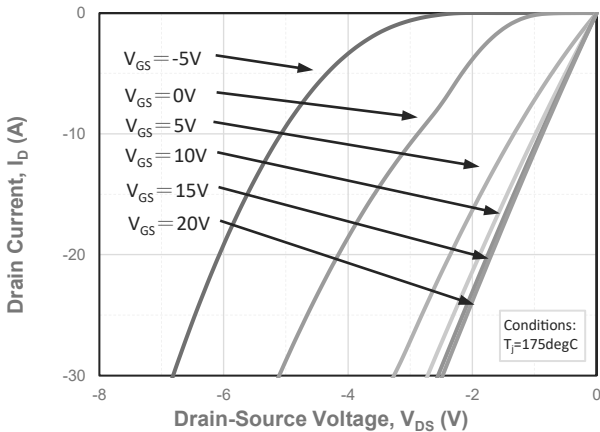


Fig.10 Capacitances vs. Drain to Source Voltage

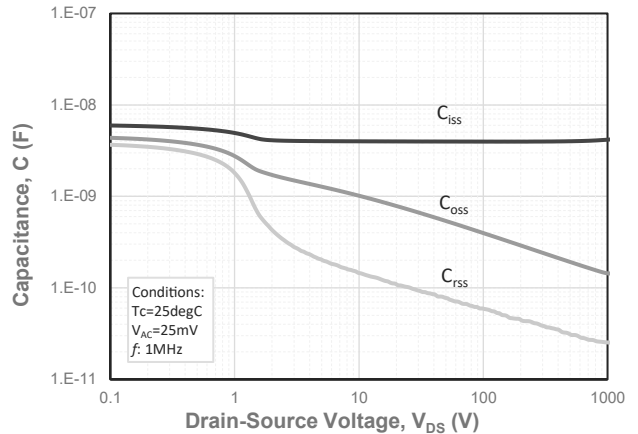


Fig.11 Threshold Voltage vs. Temperature

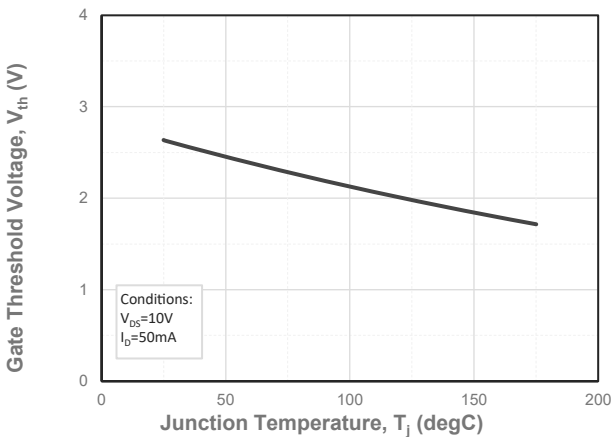
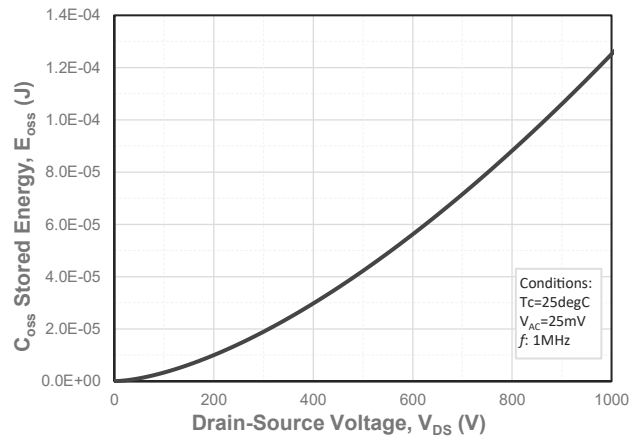


Fig.12 Output Capacitor Stored Energy





Typical Characteristics

Fig.13 Gate Charge Characteristics

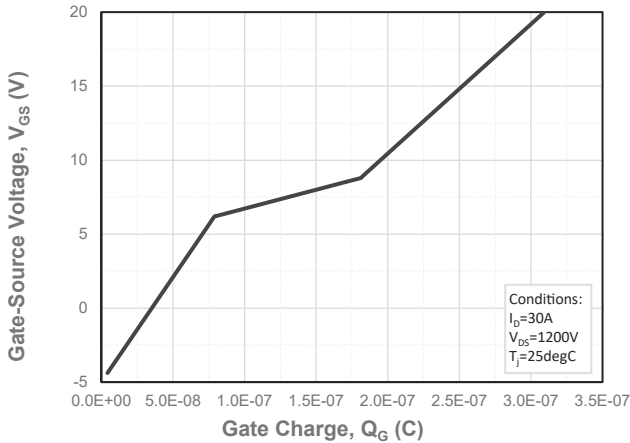


Fig.14 Clamped Inductive Switching Energy vs. Drain Current

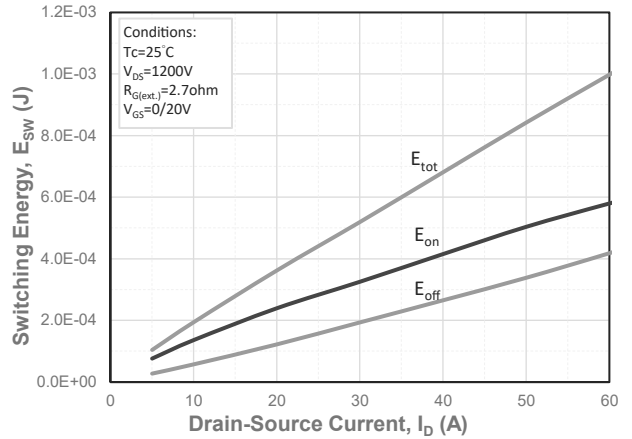


Fig.15 Clamped Inductive Switching Energy vs. External Gate Resistor (R\_G(ext.))

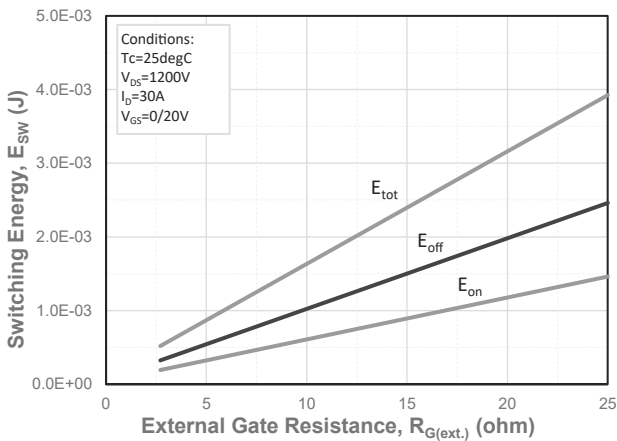


Fig.16 Schematic of Resistive Switching

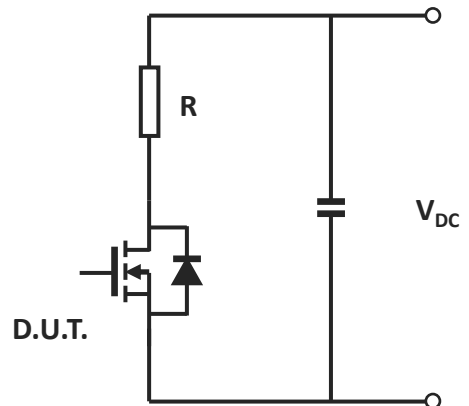
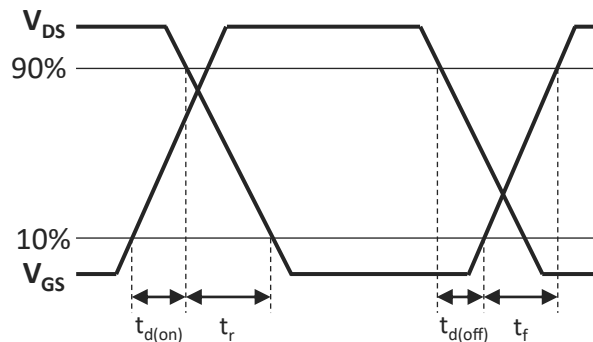
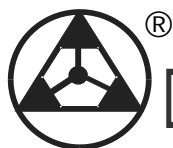


Fig.17 Switching Times Definition





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