DACO SEMICONDUCTOR

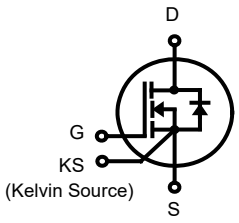
DACMI250N120BZK3

Silicon Carbide Enhancement Mode MOSFET

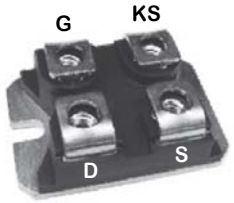
Preliminary

Features

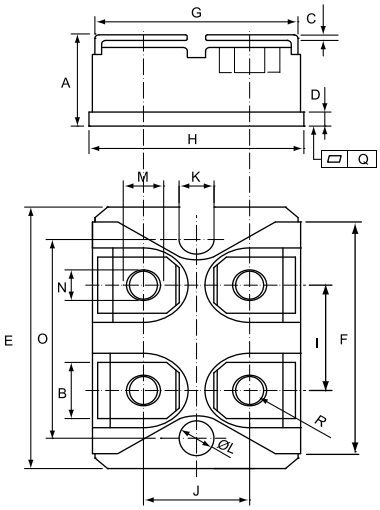
- V_{DSS} = 1200V
- $R_{DS(ON)}$ Tpy.13 mΩ@ V_{GS}= 15 V
- Fully Avalanche Rated
- Pb Free & RoHS Compliant
- Isolation Type Package
- Electrically Isolation base plate



SOT-227



Dimensions in inches and (millimeters)



Applications

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

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

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DS}	1200	V
Gate-Source Voltage		V_{GS}	-10/+20	V
Drain Current-Continuous	@ T_C =25°C @ T_C =100°C	I_D	250 180	A
Drain Current-Pulsed	@ T_C =25°C	I_{DM}	500	A
Maximum Power Dissipation		P_D	1000	W
Storage Temperature Range		T_{STG}	-55 to +175	°C
Operating Junction Temperature Range		T_{VJ}	-55 to +175	°C
Thermal Resistance, Junction-to-Case		$R\theta_{JC}$	0.15	°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	N 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_{VJ} =25°C (unless otherwise specified)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
OFF Characteristics							
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V I_{DS} =0.1mA		1200	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} =0V V_{DS} =1200V		-	-	200	uA
Gate-Body Leakage	I_{GSS}	V_{GS} =20V V_{DS} =0V		-	-	500	nA
ON Characteristics							
Gate Threshold Voltage	V_{TH}	V_{DS} =V_{GS}，I_{DS} =8mA		2.0	2.5	4.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS} =15V，I_{DS} =100A		-	13	-	mΩ
Internal Gate Resistance	$R_{G(int)}$			-	3.8	-	Ω
Dynamic Characteristics							
Input Capacitance	C_{iss}	V_{DS} =800V V_{GS} =0V V_{AC} =1V Freq.=1MHz		-	7	-	nF
Output Capacitance	C_{oss}			-	444	-	pF
Reverse Transfer Capacitance	C_{rss}			-	37	-	
Total Gate Charge	Q_g	V_{DS} =800V V_{GS} =-4V/+15V I_{DS} =125A		-	342	-	nC
Gate to Source Charge	Q_{gs}			-	77	-	
Gate to Drain Charge	Q_{gd}			-	166	-	
Switching Characteristics							
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 800V V_{GS} = -4/+15V I_{DS} = 125A R_G = 1.0Ω	T_{VJ} =25°C	-	64	-	ns
			T_{VJ} =125°C	-	63	-	
Rise Time	t_r		T_{VJ} =25°C	-	61	-	
			T_{VJ} =125°C	-	69	-	
Turn-Off Delay Time	$t_{d(off)}$		T_{VJ} =25°C	-	102	-	
			T_{VJ} =125°C	-	116	-	
Fall Time	t_f		T_{VJ} =25°C	-	16	-	
			T_{VJ} =125°C	-	16	-	
Turn-On Switching Energy	E_{on}	V_{DD} = 800V V_{GS} = -4V/+15V I_D = 125A $R_{G(ext)}$ = 1.0Ω	T_{VJ} =25°C	-	0.62	-	mJ
			T_{VJ} =125°C	-	0.90	-	
Turn-Off Switching Energy	E_{off}		T_{VJ} =25°C	-	5.10	-	
			T_{VJ} =125°C	-	5.20	-	
Body Diode Characteristics , at T_J = 25° C , unless otherwise specified							
Continuous Diode Fwd Current	I_{SDC}	V_{GS} = 0V		-	180	-	A
Drain-Source Reverse Voltage	V_{SD}	I_{SD} = 120A , V_{GS} = 0V		-	3.8		V
MOSFET Forward Recovery Charge	Q_{rr}	V_{DD} = 800V,I_{SD} = 125A, V_{GS} = 0V,di/dt = 3787A/μs		-	1080	-	nC
MOSFET Peak Forward Recovery Current	I_{rr}	V_{DD} = 800V,I_{SD} = 125A, V_{GS} = 0V,di/dt = 3787A/μs		-	46	-	A
MOSFET Reverse Recovery Time	T_{rr}	V_{DD} = 800 V,I_{SD} = 125A, V_{GS} = 0V,di/dt = 3787A/μs		-	36	-	ns

Notes:

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle > 2%.

Typical Characteristics

Fig.1 Output Characteristics at T_J = 25°C

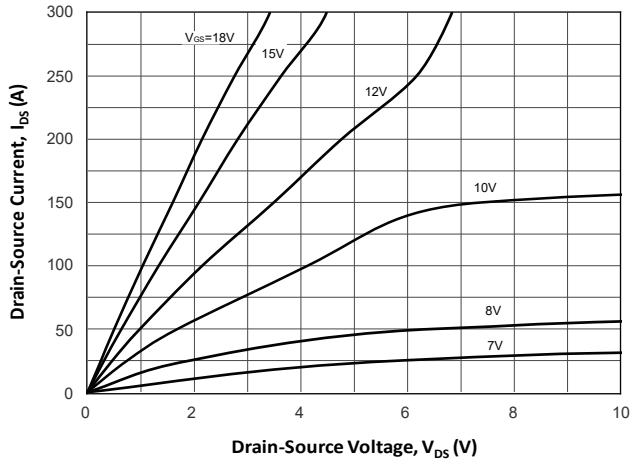


Fig.2 Output Characteristics at T_J =125°C

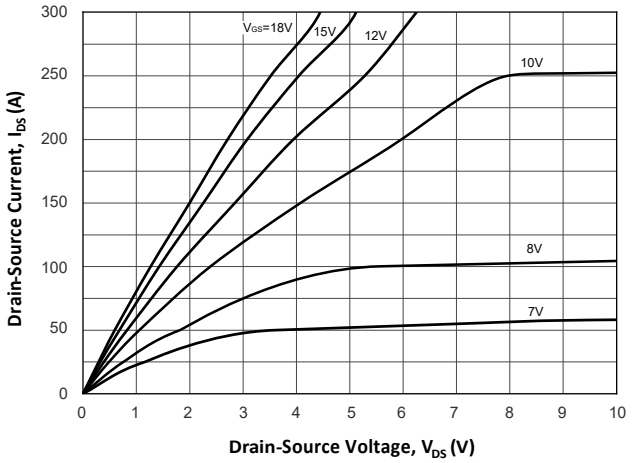


Fig.3 Drain Source on Resistance

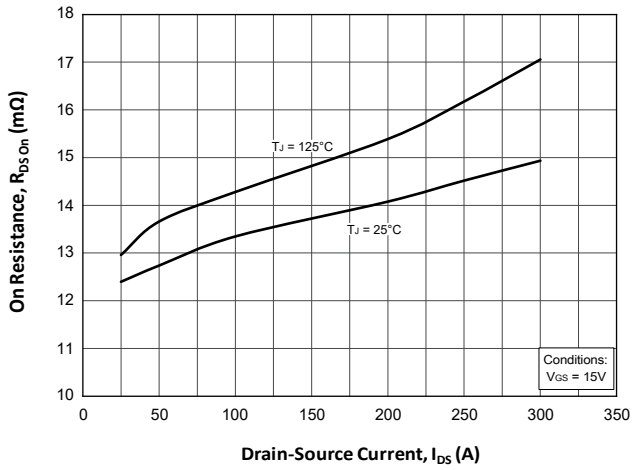


Fig.4 Transfer Characteristics

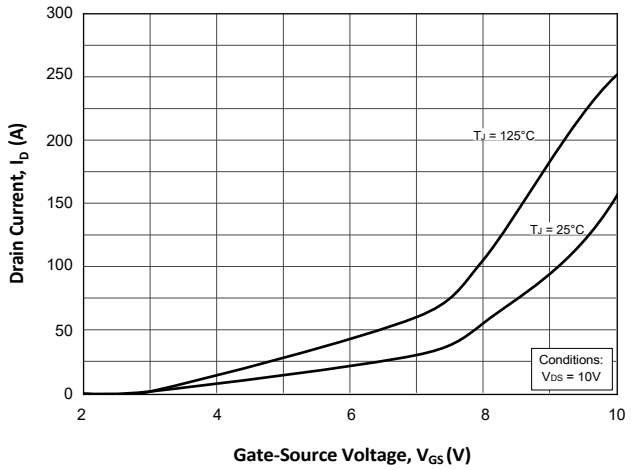


Fig.5 Capacitances vs. Drain-Source Voltage

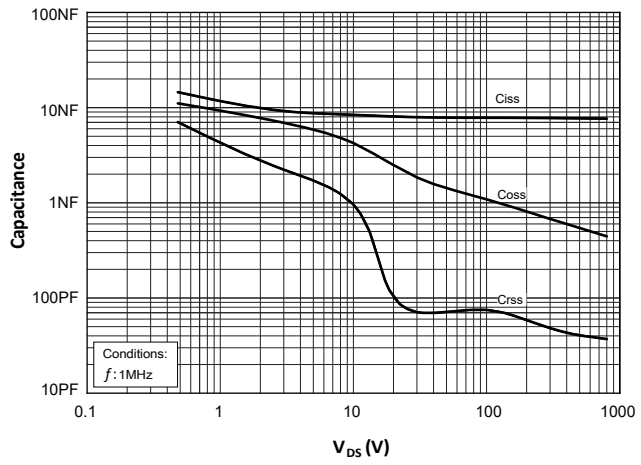
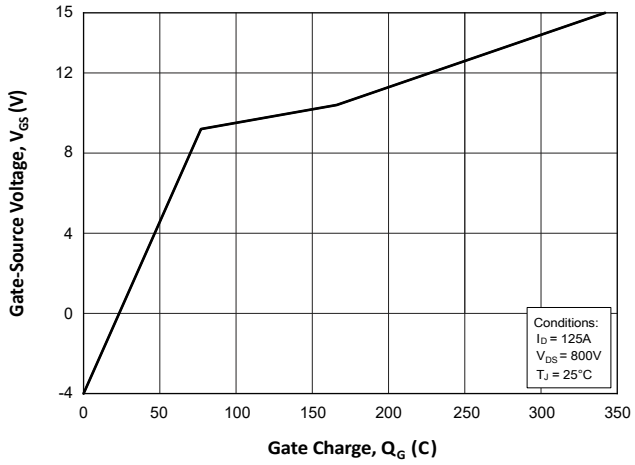


Fig.6 Gate Charge Characteristics



Typical Characteristics

Fig.7 Switching losses vs R_G change T_J=25°C

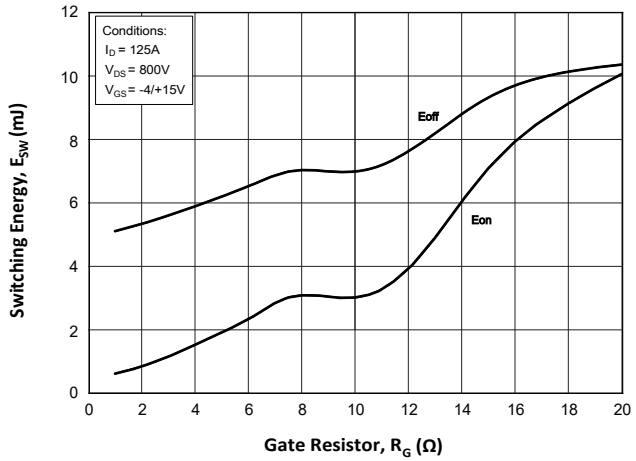


Fig.8 Switching losses vs R_G change T_J=125°C

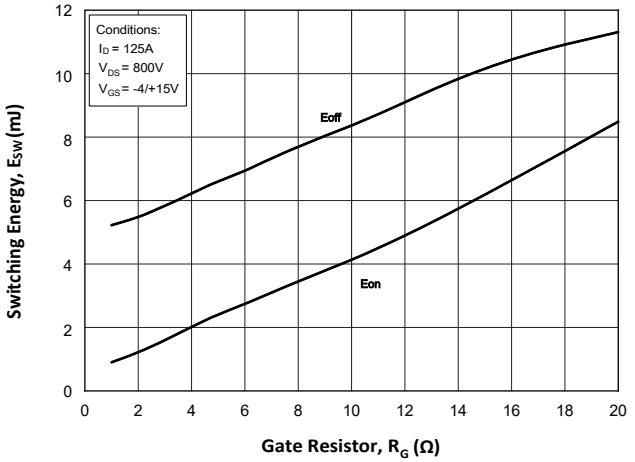


Fig.9 Switching Timer vs R_G Change T_J=25°C

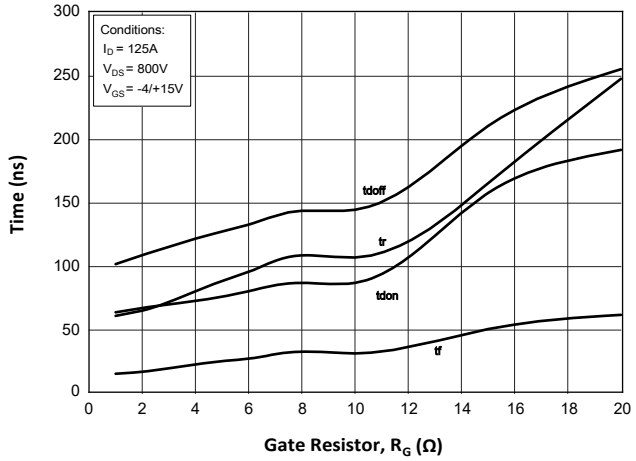


Fig.10 Switching Timer vs R_G Change T_J=125°C

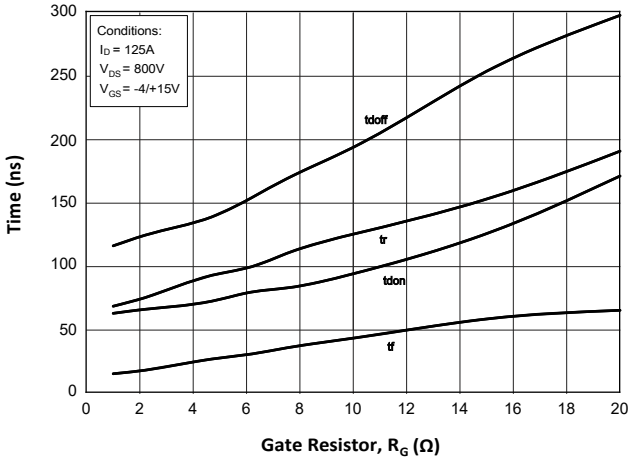


Fig.11 Clamped Inductive Switching Energy vs. Drain Current T_J=25°C

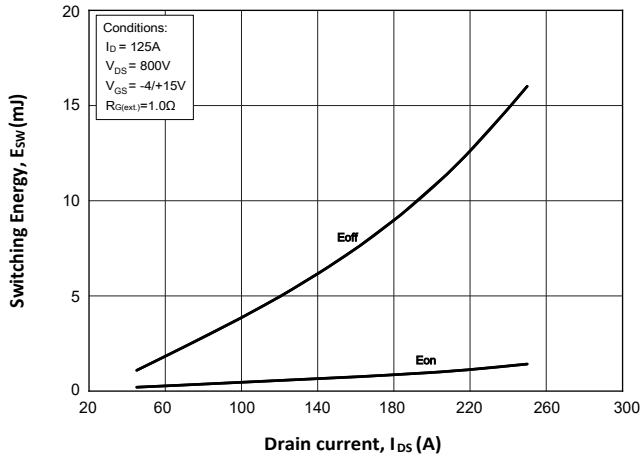
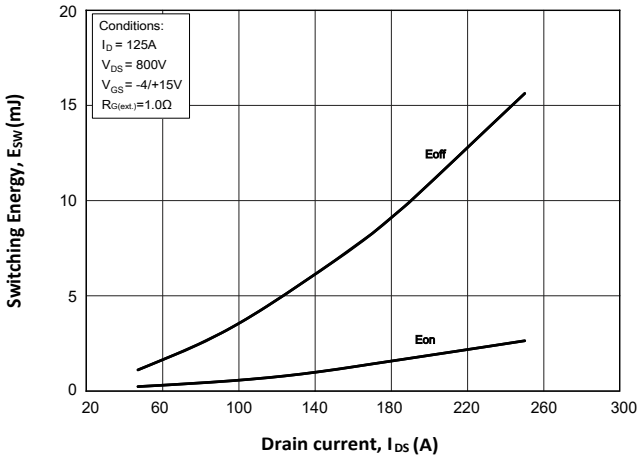


Fig.12 Clamped Inductive Switching Energy vs. Drain Current T_J=125°C



Typical Characteristics

Fig.13 Body Diode curves T_J =25°C

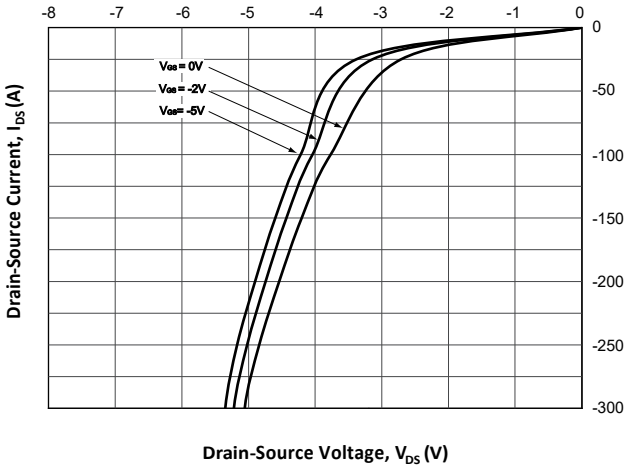


Fig.14 Body Diode curves T_J = 125°C

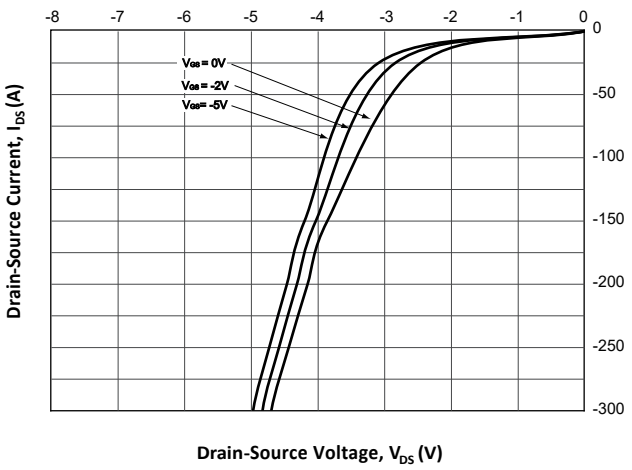


Fig.15 Continuous Drain Current (MOSFET) vs. Case Temperature

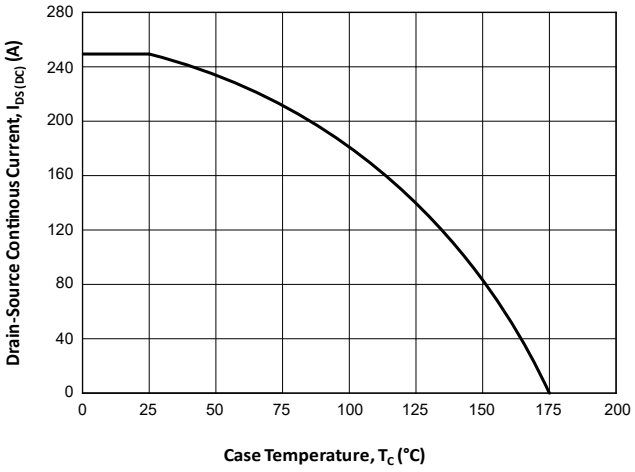
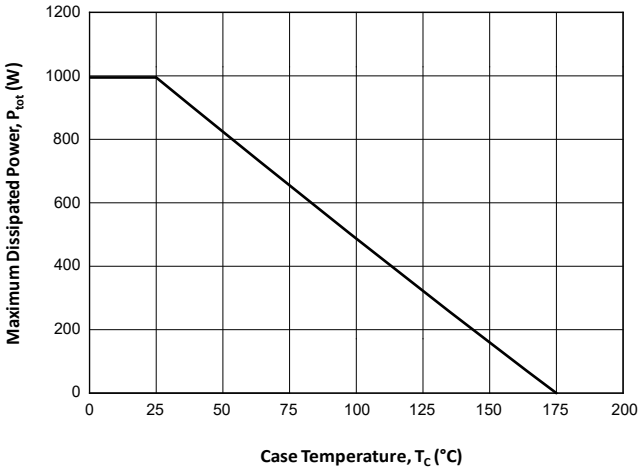


Fig.16 Max. Power Dissipation (MOSFET) Derating vs. Case Temperature



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