DACO SEMICONDUCTOR

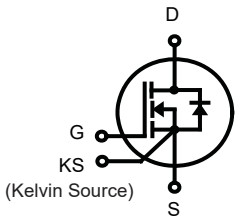
DACMI150N120BZK3

Silicon Carbide Enhancement Mode MOSFET

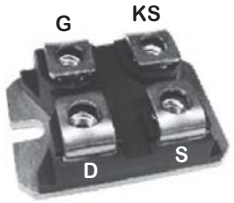
Preliminary

Features

- V_{DSS} = 1200V
- $R_{DS(ON)}$ Tpy. 14 mΩ@ V_{GS} = 15V
- Fully Avalanche Rated
- Pb Free & RoHS Compliant
- Isolation Type Package
- Electrically Isolation base plate



SOT-227



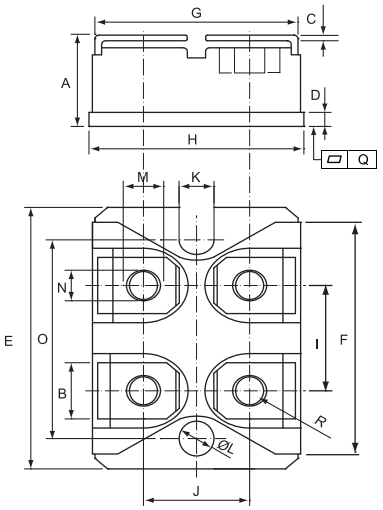
Applications

- 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}	-4/+15	V
Drain Current-Continuous	@ T_C =25°C @ T_C =100°C	I_D	150 100	A
Drain Current-Pulsed	@ T_C =25°C	I_{DM}	300	A
Maximum Power Dissipation		P_D	600	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		$R\theta_{JC}$	0.25	°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 in inches and (millimeters)



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_C =25°C (unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
OFF Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V，I_D=0.1mA	1200	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS}=0V，V_{DS}=1200V	-	1	50	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=15V，V_{DS}=0V	-	1	200	nA
ON Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}，I_D=27mA	2.0	2.5	3.8	V
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS}=15V，I_D=80A	-	14	18	mΩ
Transconductance	g_{fs}	V_{DS} = 20V，I_D=80A	-	68	-	S
Internal Gate Resistance	$R_{G(int.)}$		-	1.2	-	Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=1000V V_{GS}=0V Freq.=100kHz	-	6300	-	pF
Output Capacitance	C_{oss}		-	260	-	
Reverse Transfer Capacitance	C_{rss}		-	16	-	
C_{oss} Stored Energy	E_{oss}		-	150	-	μJ
Turn-On Switching Energy	E_{on}	V_{DS}=800V，V_{GS}=-4V/+15V I_D=80A，$R_{G(ext)}$=2.0Ω L=100μH	-	1380	-	μJ
Turn-Off Switching Energy	E_{off}		-	210	-	
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	V_{DS}=800V V_{GS}=-4/+15V I_D=80A $R_{G(ext)}$=2.0Ω L=100μH	-	34	-	ns
Rise Time	t_r		-	33	-	
Turn-Off Delay Time	$t_{d(off)}$		-	50	-	
Fall Time	t_f		-	11	-	
Total Gate Charge	Q_g	V_{DS}=800V V_{GS}=-4/+15V I_D=80A	-	250	-	nC
Gate to Source Charge	Q_{gs}		-	76	-	
Gate to Drain Charge	Q_{gd}		-	98	-	
Body Diode Characteristics						
Inverse Diode Forward Voltage	V_{SD}	V_{GS}=-4V，I_{SD}=40A	-	4.0	-	V
Continuous Diode Forward Current	I_S	V_{GS}=-4V	-	-	100	A
Reverse Recovery Time	T_{rr}	V_{GS}=-4V I_{SD}=80A，V_R=800V, dif/dt=4200A/μs	-	24	-	ns
Reverse Recovery Charge	Q_{rr}		-	630	-	nC
Peak Reverse Recovery Current	I_{rrm}		-	48	-	A

Typical Performance

Fig 1. Output Characteristics, T_J = -55°C

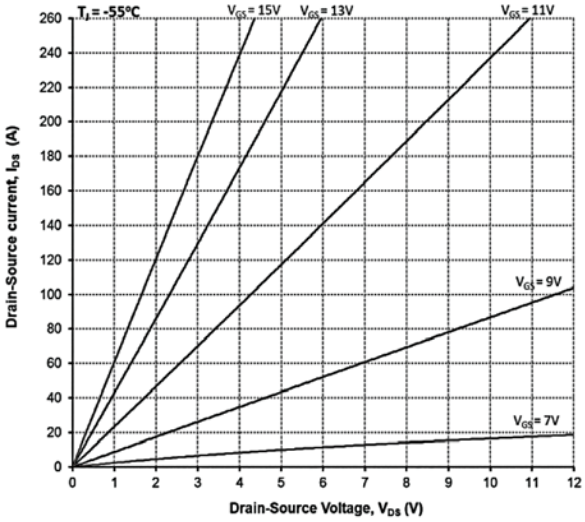


Fig 2. Output Characteristics, T_J = 25°C

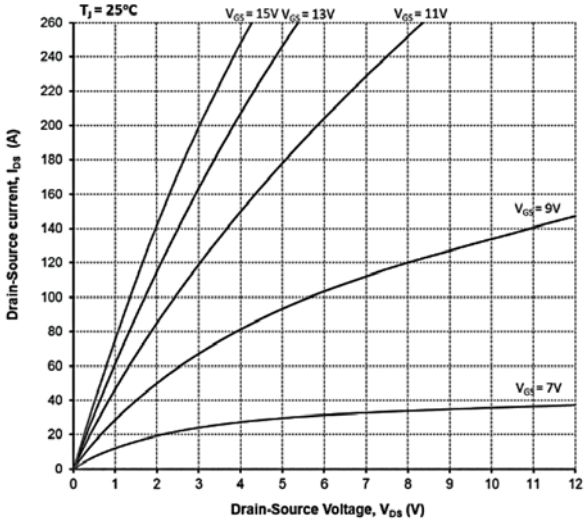


Fig 3. Output Characteristics, T_J = 175°C

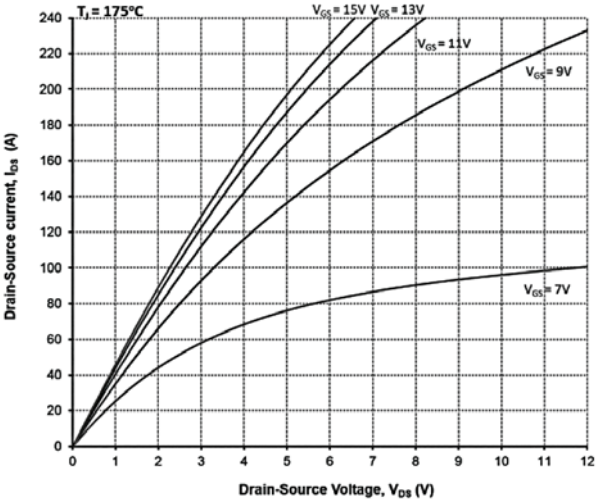


Fig 4. On-Resistance vs. Temperature

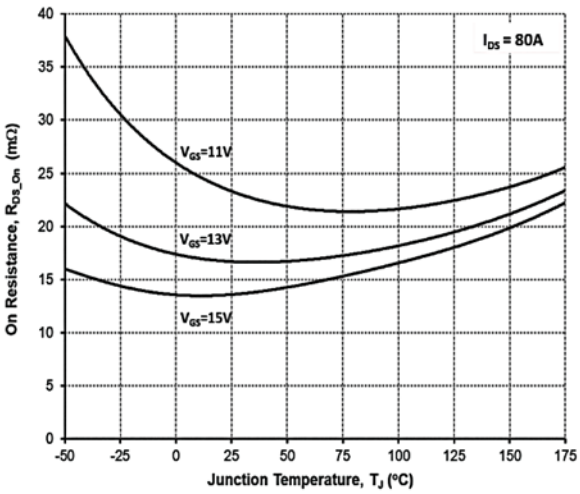


Fig 5. On-Resistance vs. Drain Current For Various Temperatures

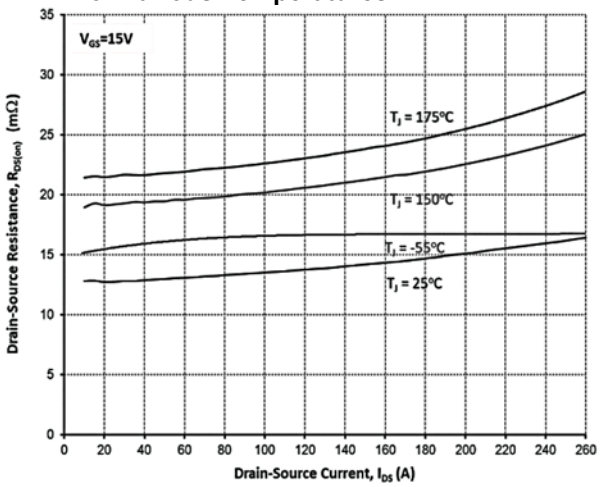
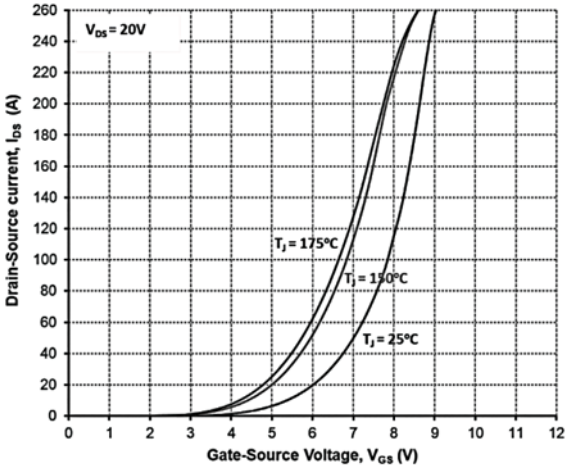


Fig 6. Transfer Characteristic For Various Junction Temperatures



Typical Performance

Fig 7. Threshold Voltage vs. Temperature

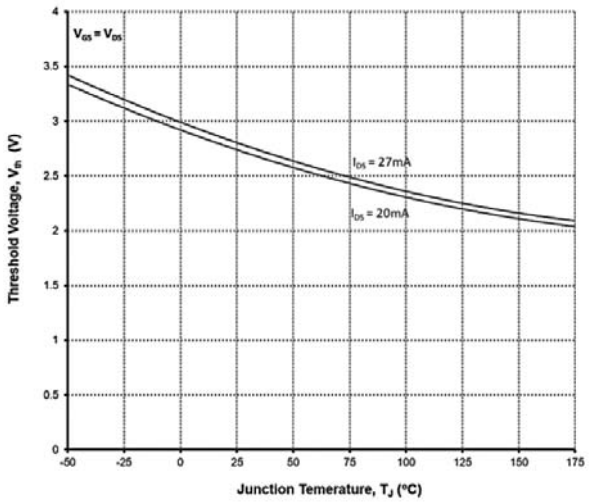


Fig 8.Body Diode Characteristics @ -55°C

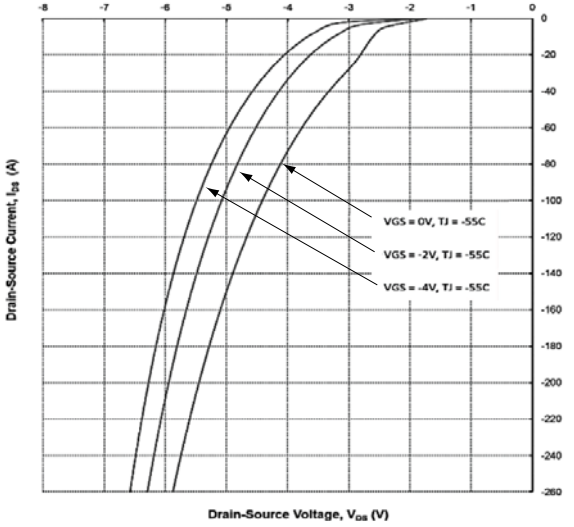


Fig 9. Body Diode Characteristics @ 25°C

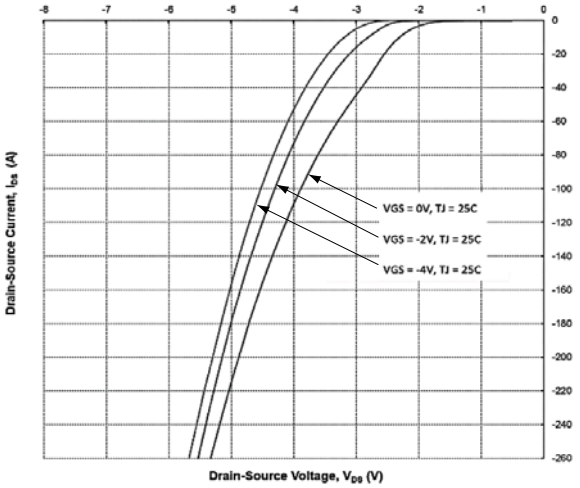


Fig 10. Body Diode Characteristics @ 175°C

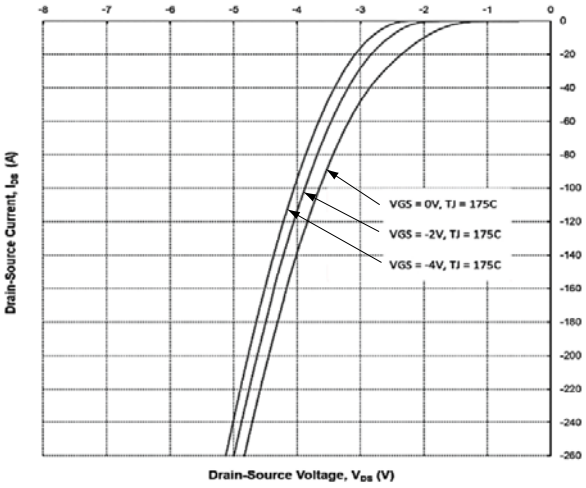


Fig 11. Gate Charge Characteristics

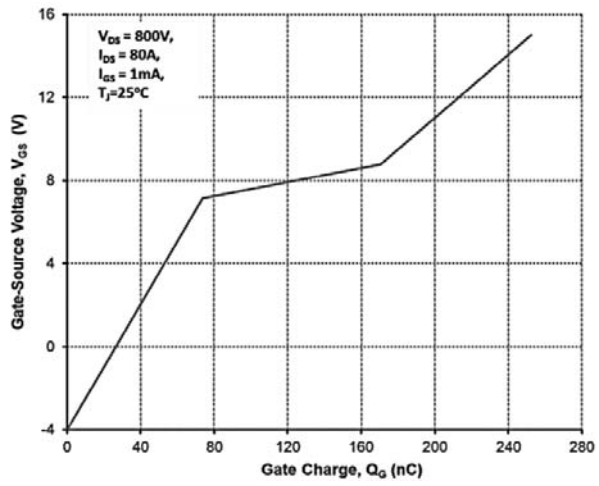
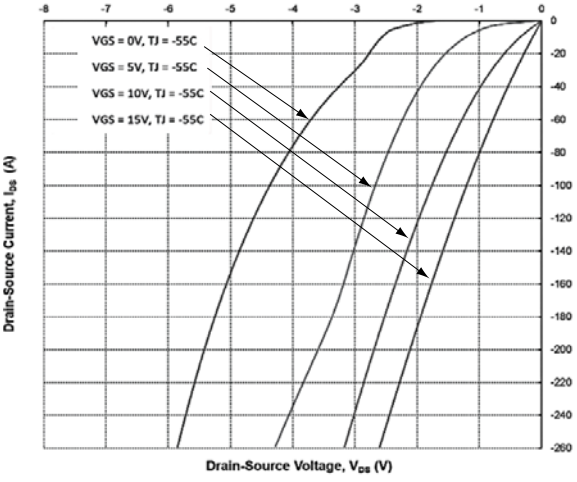


Fig 12. Quadrant Characteristics @ -55°C



Typical Performance

Fig 13. Quadrant Characteristics @ 25°C

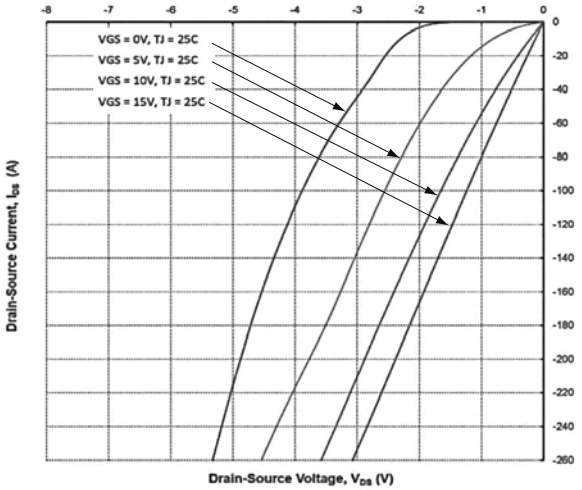


Fig 14. Quadrant Characteristics @ 175°C

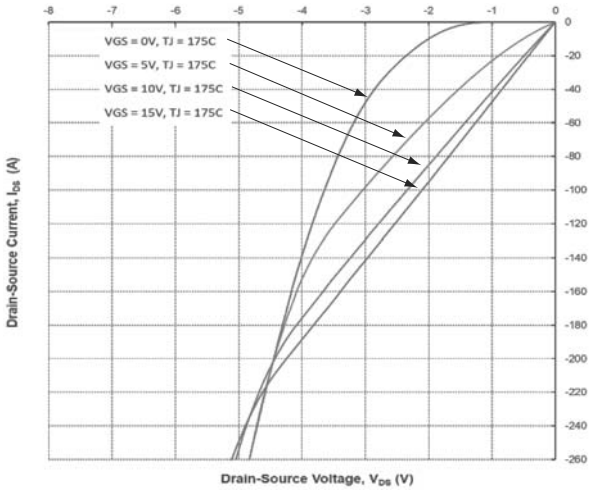


Fig 15. Output Capacitor Stored Energy

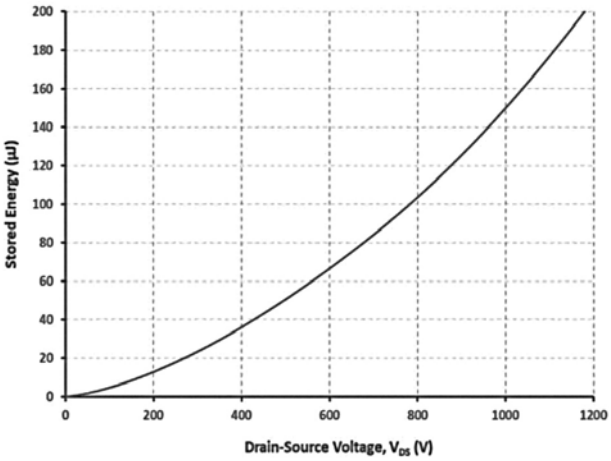


Fig 16. Capacitances vs. Drain-Source Voltage (0-200V)

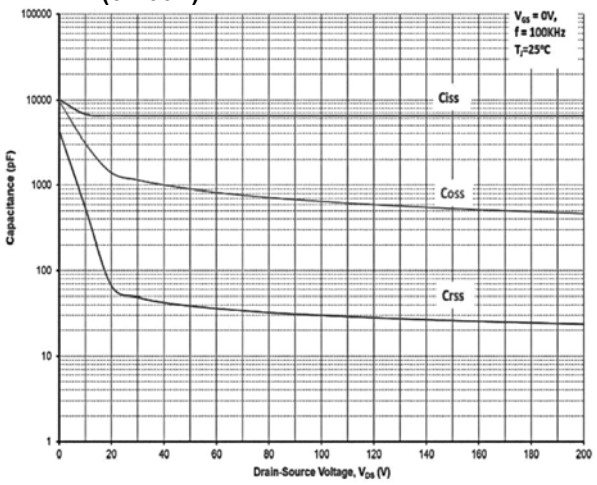


Fig 17. Capacitances vs. Drain-Source Voltage (0-1200V)

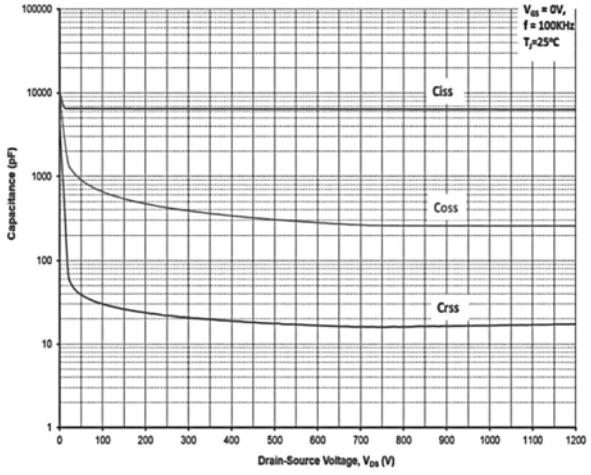
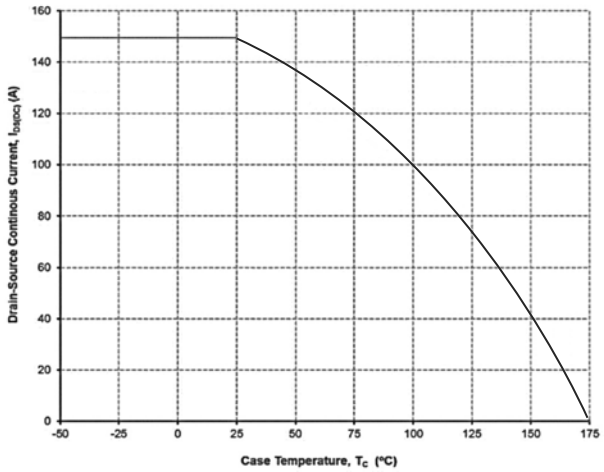


Fig 18. Continuous Drain Current (MOSFET) vs. Case Temperature



Typical Performance

Fig 19. Maximum Power Dissipation Derating vs. Case Temperature

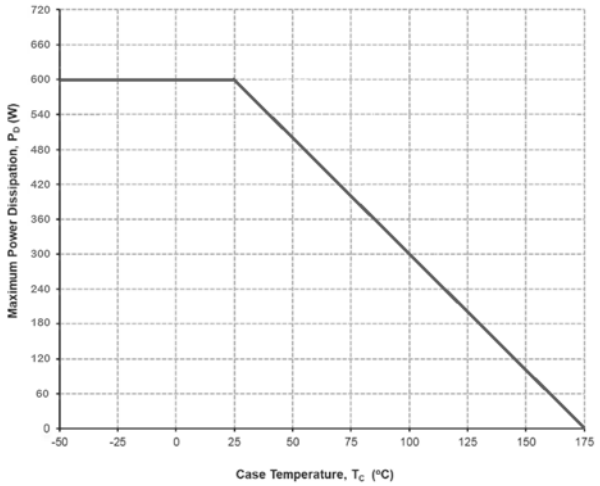


Fig 20. Transient Thermal Impedance (Junction to Case)

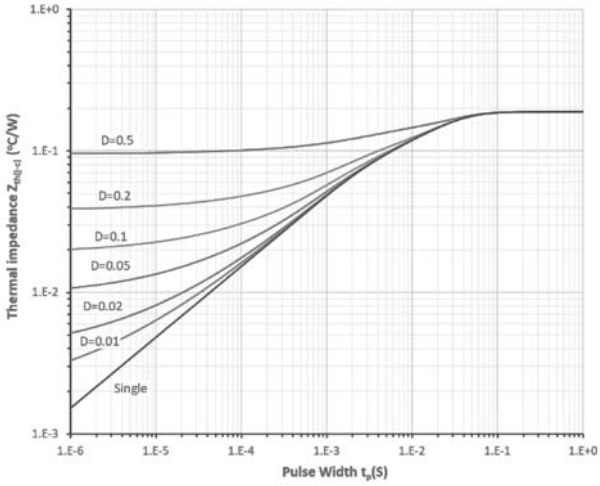


Fig 21. Safe Operating Area

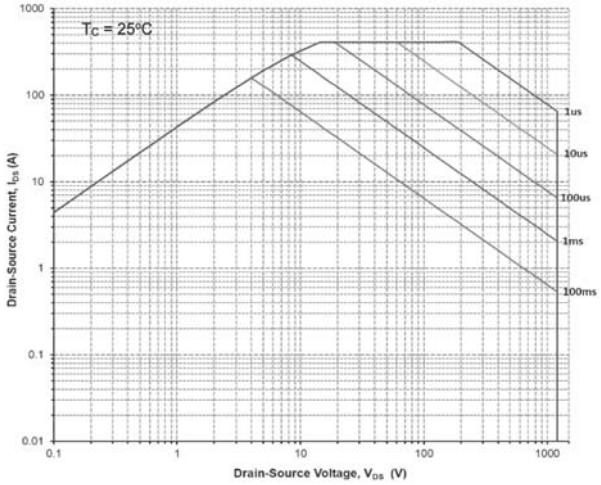


Fig 22. Switching Energy vs Drain Current

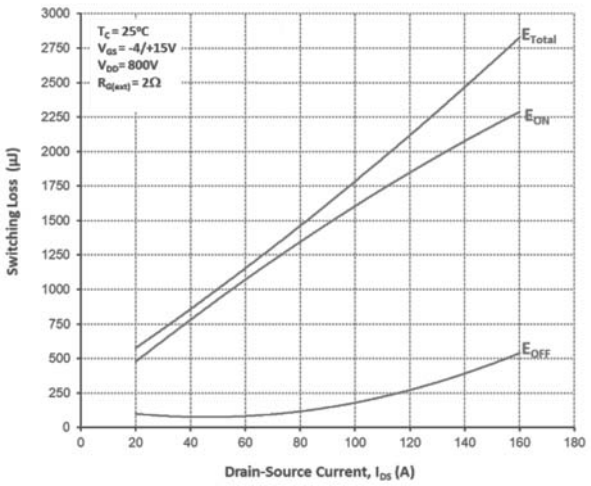


Fig 23. Switching Energy vs External Gate Resistor

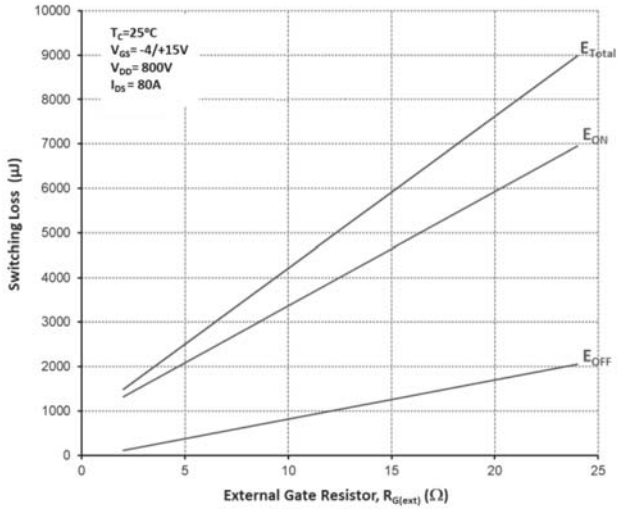
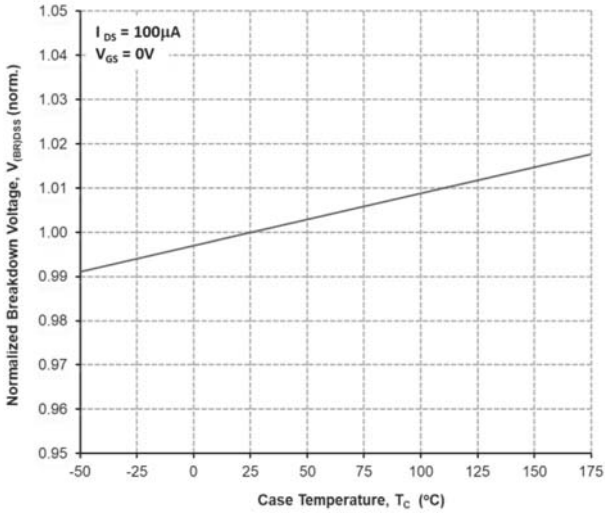


Fig 24. Normalized Breakdown Voltage vs Temperature



Disclaimer

DACO Semiconductor reserves the right to make modifications, enhancements, improvements, corrections, or other changes to this document and any product described herein without prior notice.

DACO Semiconductor makes no warranty, representation, or guarantee regarding the suitability of its products for any particular purpose, nor does DACO Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any liability, including without limitation special, consequential or incidental damages.

Purchasers are responsible for its products and applications using DACO Semiconductor products, including compliance with all laws, regulations, and safety requirements or standards, regardless of any support or application information provided by DACO Semiconductor. “Typical” parameters that may be provided in DACO Semiconductor datasheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including “Typical” must be validated for each customer application by the customer’s technical experts.

DACO Semiconductor products are not designed, authorized, or warranted to be suitable for use in life support, life-critical or safety-critical systems, or equipment, nor in applications where failure or malfunction of DACO Semiconductor’s product can reasonably be expected to result in personal injury, death or severe property or environmental damage. DACO Semiconductor accepts no liability for the inclusion and/or use of DACO Semiconductor’s products in such equipment or applications and therefore such inclusion and/or use is at the customer’s own risk.

Purchasers who buy or use DACO Semiconductor products for any unintended or unauthorized applications are required to indemnify and absolve DACO Semiconductor, its suppliers, and distributors from any claims, costs, damages, expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that DACO Semiconductor was negligent regarding the design or manufacture of the part.