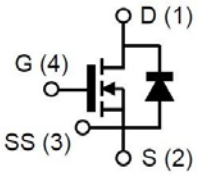
DAC020N120ZY4

Silicon Carbide Enhancement Mode MOSFET

V_{DSS}	1200V
$I_{D(@25℃)}$	110A
$R_{DS(ON)\ typ.}$	20mΩ

Features

- Low Capacitance With High Speed Switching Speed
- High frequency operation with low Capacitance
- Simple to drive with -4V/+18V gate
- Low Reverse Recovery (Qrr)
- Halogen Free and ROHS Compliant



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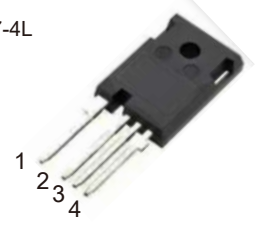


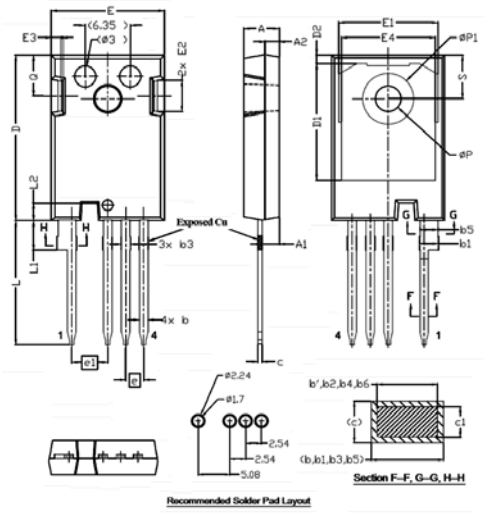
Benefits

- Superior robustness and system reliability
- Simple to drive and easy to parallel
- Lower system cost of ownership
- Improved thermal capabilities and lower switching losses
- Faster and more efficient switching

Applications

- Solar inverters
- DC/DC converters
- Switch mode power supplies
- Induction heating
- Motor drives

Package Dimensions



Unit : mm

Symbol	Min	Max	Symbol	Min	Max
A	4.83	5.21	E	15.75	16.13
A1	2.29	2.54	E1	13.10	14.15
A2	1.91	2.16	E2	3.68	5.10
b'	1.07	1.28	E3	1.00	1.90
b	1.07	1.33	E4	12.38	13.43
b1	2.39	2.94	e	2.54 BSC	
b2	2.39	2.84	e1	5.08 BSC	
b3	1.07	1.60	L	17.31	17.82
b4	1.07	1.50	L1	3.97	4.37
b5	2.39	2.69	L2	2.35	2.65
b6	2.39	2.64	ΦP	3.51	3.51
c	0.55	0.68	ΦP1	7.19 REF	
c1	0.55	0.65	Q	5.49	6.00
D	23.30	23.60	S	6.04	6.30
D1	16.25	17.65	-	-	-
D2	0.95	1.25	-	-	-

Absolute Maximum Ratings

(Tc = 25℃ unless otherwise specified)

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DS}	1200	V
Gate - Source Voltage (DC)		V_{GS}	-10/+25	V
Recommended Operation Value		$V_{GS(op)}$	-4/+18	V
Drain Current-Continuous	T_C=25°C T_C=100°C	I_D	110 80	A
Pulse Drain Current	pulse width tp limited by T_{Jmax}	I_{DM}	180	A
Total Power Dissipation		P_D	500	W
Storage Temperature Range		T_{STG}	-55 to +175	°C
Operating Junction Temperature Range		T_J	-55 to +175	°C

Electrical Characteristics @ T_J =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		-	1	50	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS} =18V V_{DS} =0V		-	-	250	nA
ON Characteristics							
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} =V_{GS}，I_{DS} =15mA		-	3.0	-	V
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS} =18V I_{DS} =50A	T_{VJ} =25°C	-	20	33	mΩ
			T_{VJ} =175°C	-	38	-	
Gate Resistance	$R_{G(int)}$	f=1MHz，V_{AC}=25mV		-	1.3	-	Ω
Dynamic Characteristics							
Input Capacitance	C_{iss}	V_{DS} =1000V V_{GS} =0V V_{AC} =25mV f =100kHz		-	4140	-	pF
Output Capacitance	C_{oss}			-	132	-	
Reverse Transfer Capacitance	C_{rss}			-	8.6	-	
Total Gate Charge	Q_g	V_{DS} =800V V_{GS} =-4V/+15V I_D =50A		-	165	-	nC
Gate to Source Charge	Q_{gs}			-	55	-	
Gate to Drain Charge	Q_{gd}			-	60	-	
Switching Characteristics							
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 800V V_{GS} = -4/+15V I_D = 50A $R_{G(ext)}$ = 5Ω		-	10	-	ns
Rise Time	t_r			-	26	-	
Turn-Off Delay Time	$t_{d(off)}$			-	35	-	
Fall Time	t_f			-	9	-	
Turn-On Switching Energy	E_{on}	V_{DD} = 800V V_{GS} = -4V/+15V I_D = 50A $R_{G(ext)}$ = 5Ω		-	476	-	mJ
Turn-Off Switching Energy	E_{off}			-	155	-	
Total Switching Energy	E_{tot}			-	631	-	
Body Diode Characteristics , at T_J = 25° C , unless otherwise specified							
Continuous Diode Fwd Current	I_{SDC}	V_{GS} = -4V		-	100	-	A
Maximum Source Current	I_{SM}	V_{GS} = -4V pulse width tp limited by T_J max		-	180	-	A
Drain-Source Reverse Voltage	V_{SD}	I_{SD} = 25A , V_{GS} = -4V		-	4.2		V
Reverse Recovery Charge	Q_{rr}	V_R = 800V I_S = 50A V_{GS} = -4V dif/dt = 4100 A/μs		-	296	-	nC
Peak Forward Recovery Current	I_{rr}			-	33	-	A
Reverse Recovery Time	T_{rr}			-	21	-	ns

Notes:

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

Typical Performance

Fig. 1 On-Region Characteristics, T_J=25℃

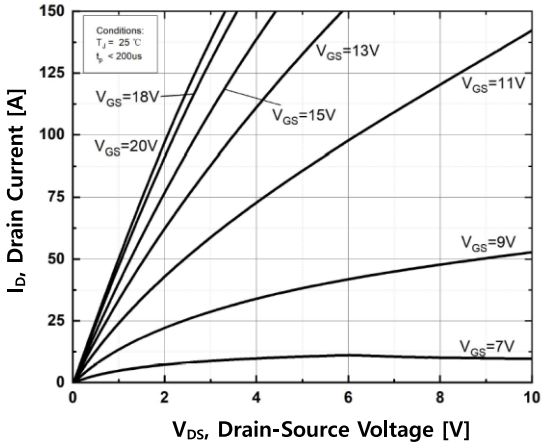


Fig. 2 On-Region Characteristics, T_J=175℃

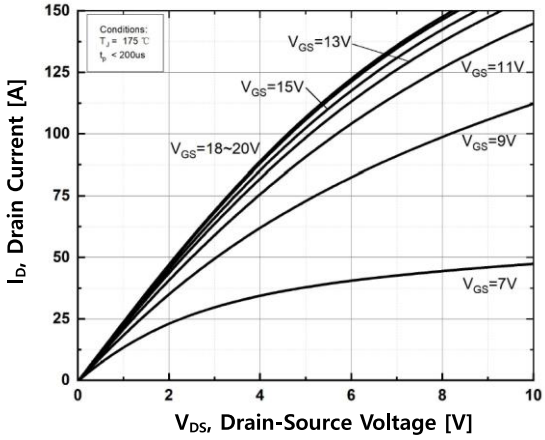


Fig. 3 On-Resistance Variation vs. Temperature

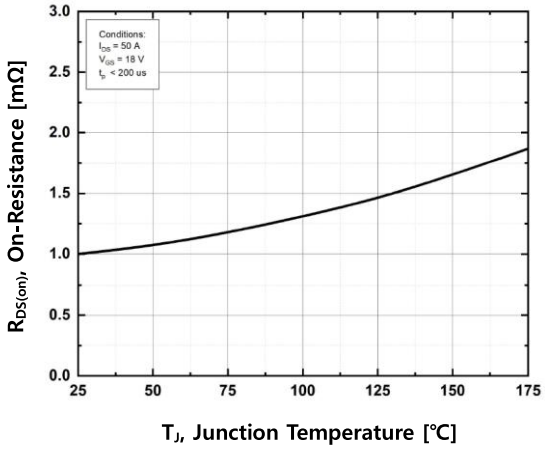


Fig. 4 Transfer Characteristics

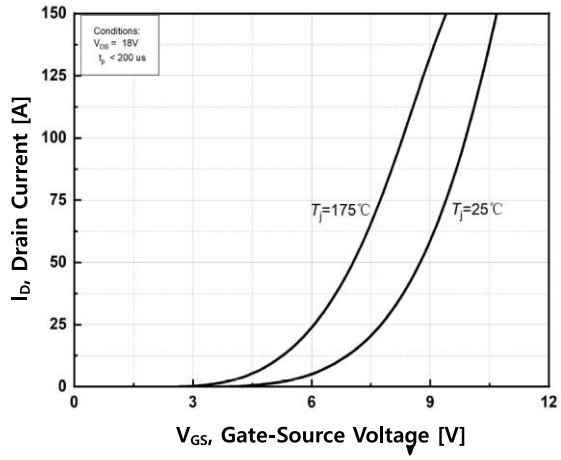


Fig. 5 V_{DS}-I_{DS} Characteristics, T_J=25℃

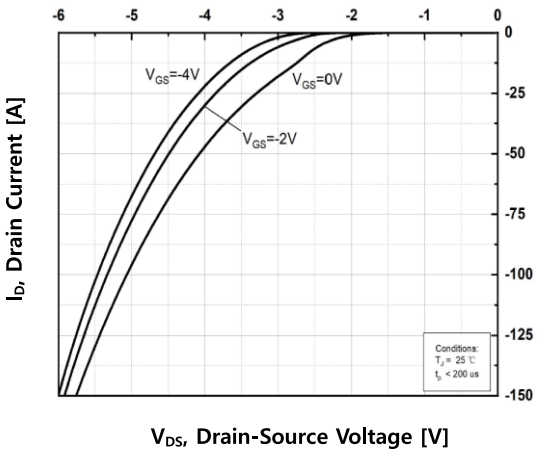
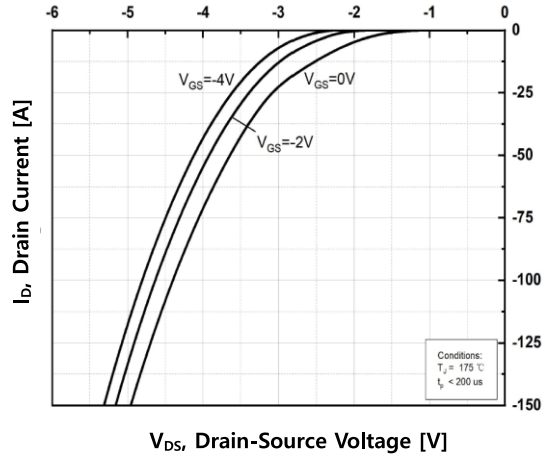


Fig. 6 V_{DS}-I_{DS} Characteristics, T_J=175℃



Typical Performance

Fig. 13 Transient Thermal impedance

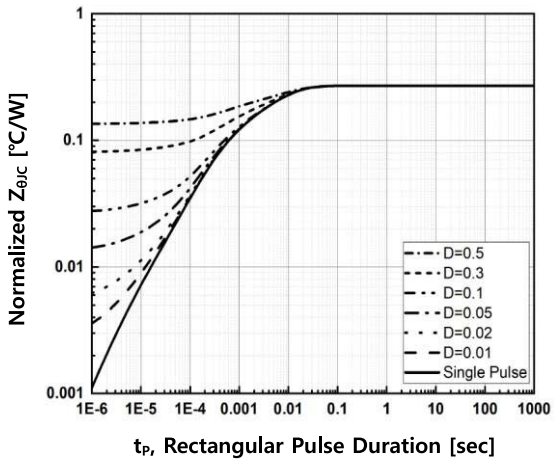


Fig. 14 Safe Operating Area

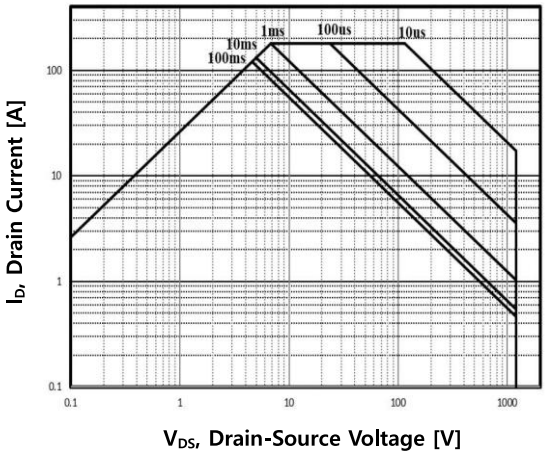


Fig. 15 CIS Energy vs. Drain Current

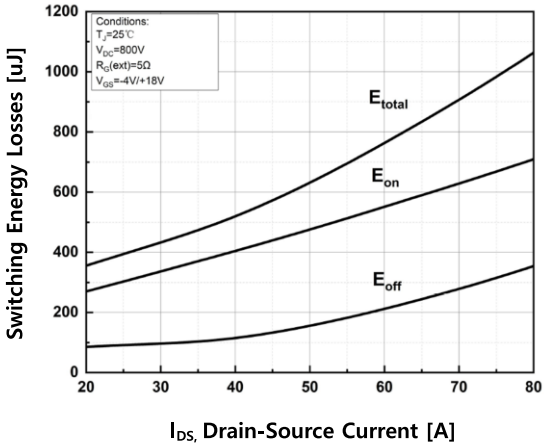


Fig. 16 CIS Energy vs. $R_{g(ext)}$

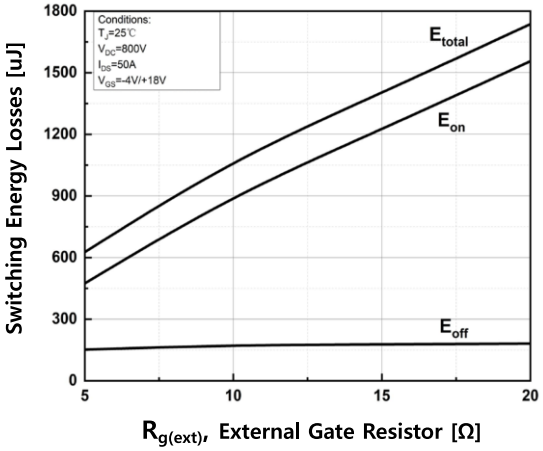
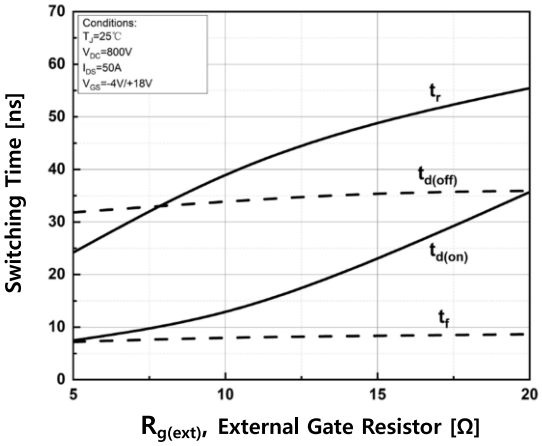


Fig. 17 Switching Times vs. $R_{g(ext)}$



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