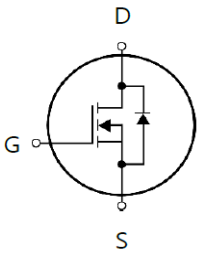
DAC036N065PY4

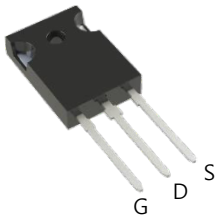
Silicon Carbide Enhancement Mode MOSFET

Features

- Low Capacitance With High Speed Switching Speed
- Low Reverse Recovery (Qrr)
- Reduction of Heat Sink Requirements
- Halogen Free, and RoHS Compliant

V_{DSS}	650V
$I_{D(@25℃)}$	70A
$R_{DS(ON)\ typ.}$	35.5mΩ





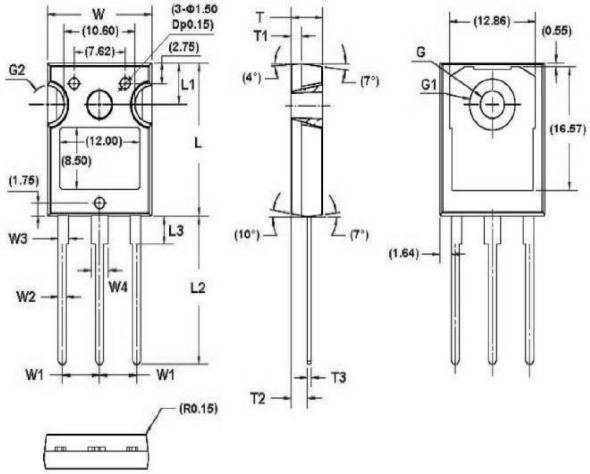
Benefits

- Increase Parallel Device Convenience
- Higher System Efficiency
- Allow High Frequency Operation
- Realize Compact and Lightweight Systems

Package Dimensions

Applications

- EV Motor Drive
- High voltage DC/DC Converters
- Switched Mode Power Supplies
- Load Switch
- Solar/Wind Renewable Energy
- Power Inverters



Absolute Maximum Ratings

(Tc = 25℃ unless otherwise specified)

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage	V_{GS}=0V I_D=100μA	V_{DS}	650	V
Gate-Source Voltage		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	70 50	A
Pulse Drain Current	Pulse width t_p limited by T_{jmax}	I_{DM}	120	A
Power Dissipation		P_D	217	W
Storage Temperature Range		T_{STG}	-55 to +175	°C
Operating Junction Temperature Range		T_J	-55 to +175	°C
Soldering Temperature		T_L	260	°C

Unit : mm

Symbol	Min	Max
W	15.40	15.80
W1	5.56 (TYP)	
W2	1.17	1.35
W3	1.55	1.75
W4	2.44	2.64
L	20.40	20.80
L1	5.36	5.56
L2	19.80	20.20
L3	3.69	3.93
T	4.60	4.80
T1	1.40	1.60
T2	2.30	2.50
T3	0.51	0.69
G(Φ)	3.51	3.65
G1(Φ)	6.61	6.85
G2(Φ)	4.96	5.20

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=100μA	650	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS}=0V，V_{DS}=650V	-	1	50	μA
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_D=10mA	-	2.8	-	V
Drain-Source On-State Resistance	$R_{DS(on)}$	V_{GS}=18V，I_D=20A	-	35.5	53	mΩ
		V_{GS}=18V，I_D=20A，T_J=175°C	-	46	-	
Internal Gate Resistance	$R_{G(int.)}$	f = 1MHz，V_{AC}=25mV	-	1.4	-	Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=600V V_{GS}=0V f=1MHz V_{AC}=25mV	-	1600	-	pF
Output Capacitance	C_{oss}		-	115	-	
Reverse Transfer Capacitance	C_{rss}		-	10	-	
Turn-On Switching Energy	E_{on}	V_{DS}=400V，V_{GS}=-4/+18V I_D=40A，$R_{G(ext)}$=5Ω L=200uH	-	110	-	μJ
Turn-Off Switching Energy	E_{off}		-	25	-	
Total Switching Energy	E_{tot}		-	135	-	
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	V_{DS}=400V V_{GS}=-4/+18V I_D=40A $R_{G(ext)}$=5Ω L=200uH	-	4	-	ns
Rise Time	t_r		-	21	-	
Turn-Off Delay Time	$t_{d(off)}$		-	20	-	
Fall Time	t_f		-	6	-	
Total Gate Charge	Q_g	V_{DS}=400V V_{GS}=-4/+18V I_D=20A	-	81	-	nC
Gate to Source Charge	Q_{gs}		-	20	-	
Gate to Drain Charge	Q_{gd}		-	22	-	
Body Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=-4V，I_{SD}=10A	-	4.3	-	V
Continuous Diode Forward Current	I_S	V_{GS}=-4V，T_C=25°C	-	43	-	A
Reverse Recovery Time	T_{rr}	V_{GS}=-4V I_S=20A，V_R=400V dif/dt=2400A/μs	-	20	-	ns
Reverse Recovery Charge	Q_{rr}		-	100	-	nC
Reverse Recovery Charge	I_{rrm}		-	11	-	A
Thermal Resistance						
Thermal Resistance, Junction-to-Case	$R\theta_{JC}$		-	0.69	-	°C/W
Thermal Resistance, Junction-to-Ambient	$R\theta_{JA}$		-	40	-	

Typical Performance

Fig 1. Output Characteristics, T_J = 25°C

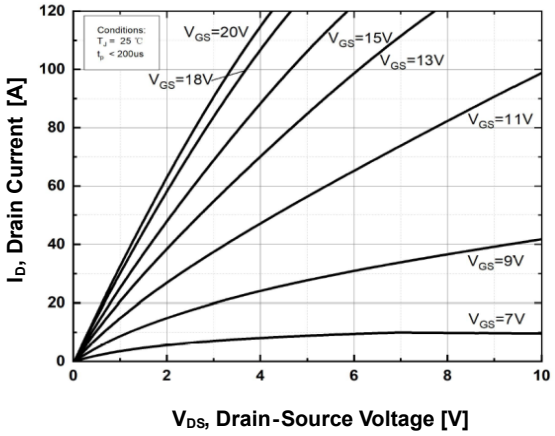


Fig 2. Output Characteristics, T_J = 175°C

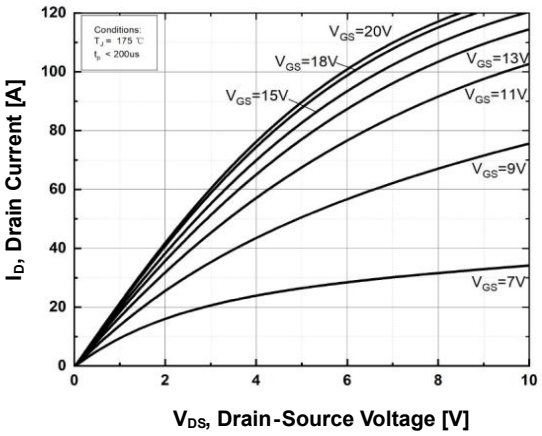


Fig 3. On-Resistance Variation vs.Temperature

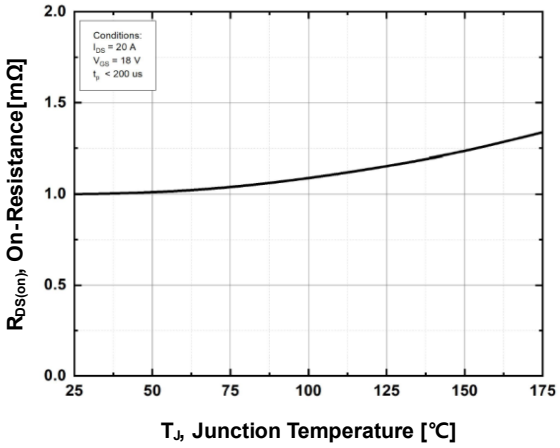


Fig 4. Transfer Characteristics

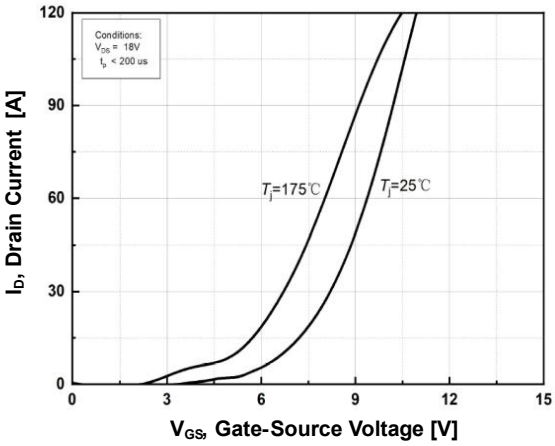


Fig 5. V_{SD}-I_{DS} Characteristics, T_J =25°C

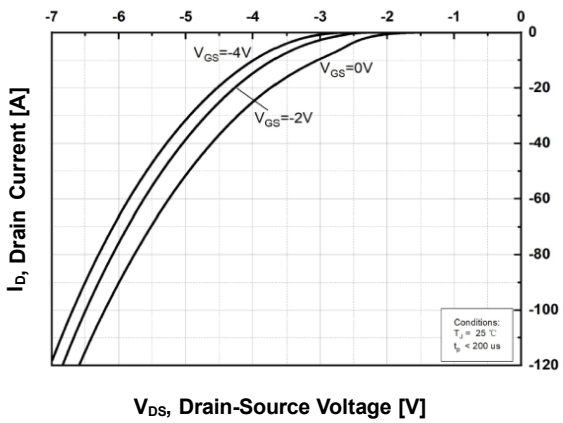
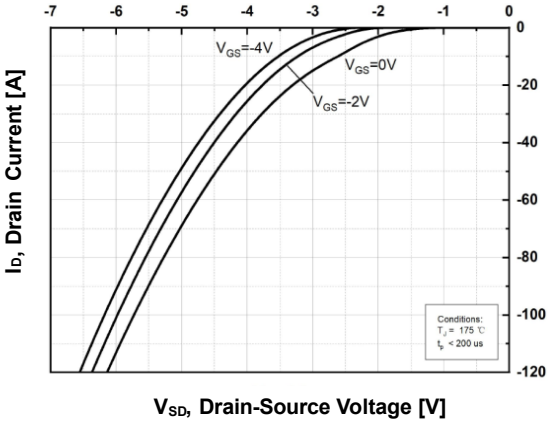


Fig 6. V_{SD}-I_{DS} Characteristics, T_J =175°C



Typical Performance

Fig 7. Threshold Voltage vs. Temperature

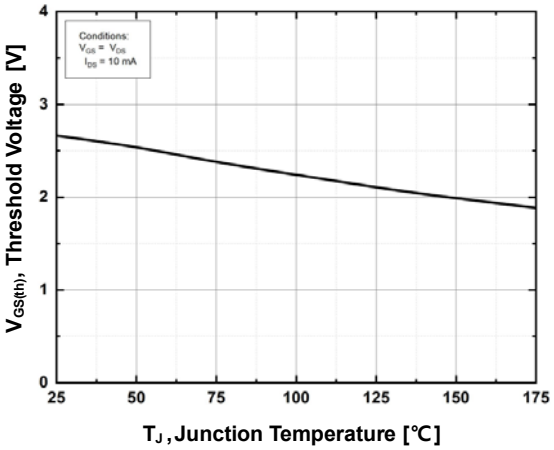


Fig 8. Gate Charge Characteristics

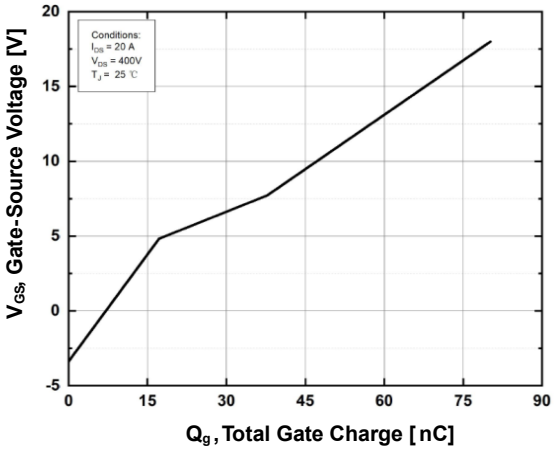


Fig 9. Stored Energy in Output Capacitance

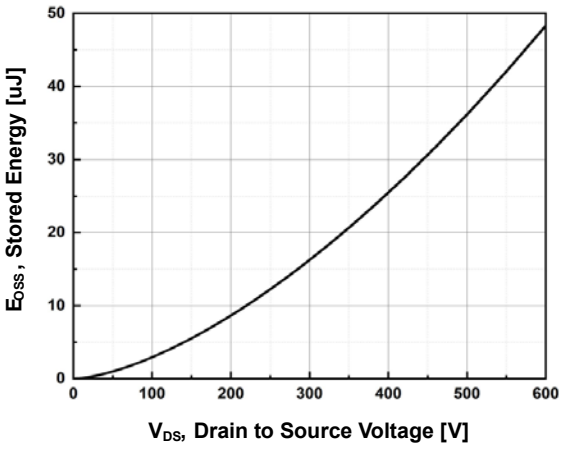


Fig 10. Capacitance Characteristics

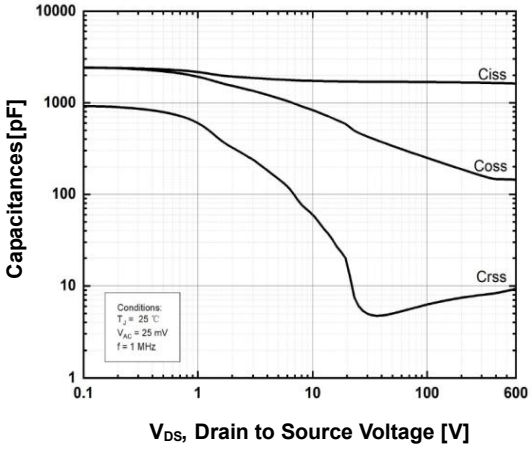


Fig 11. Max.P_D Derating vs. Case Temperature

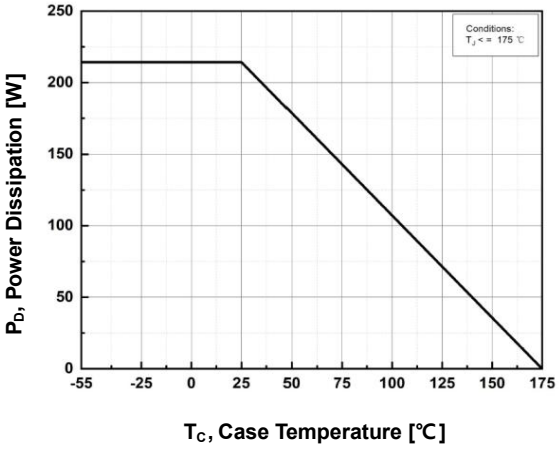
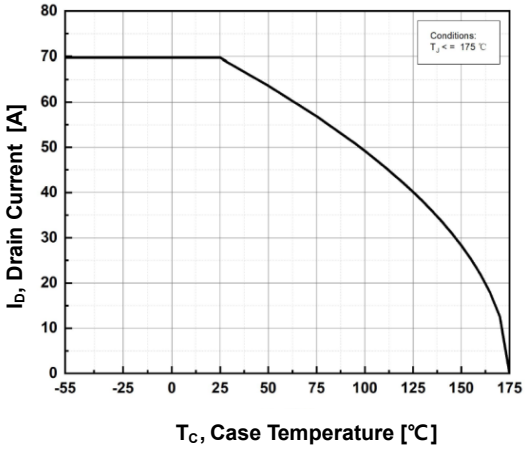
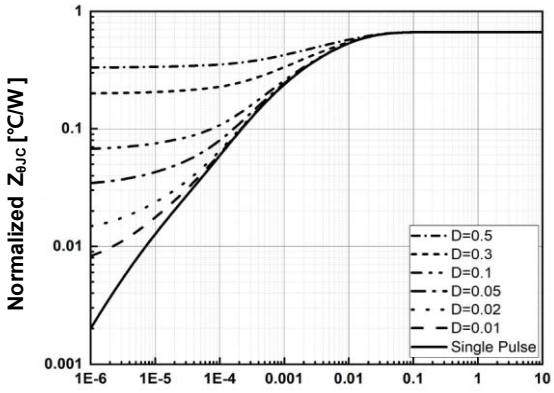


Fig 12. Continuous I_D Derating vs. Case Temperature



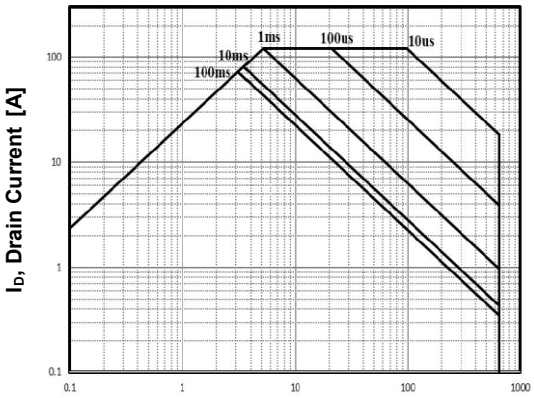
Typical Performance

Fig 13. Transient Thermal impedance



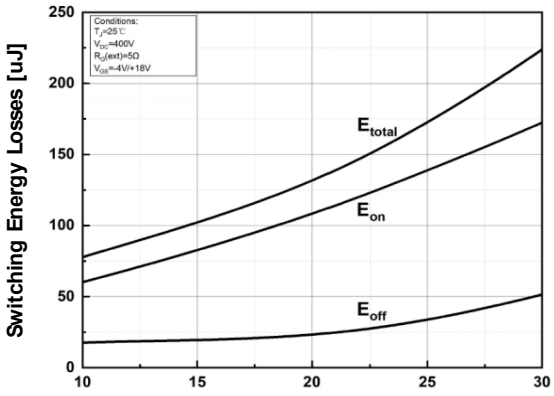
t_P, Rectangular Pulse Duration [sec]

Fig 14. Safe Operating Area



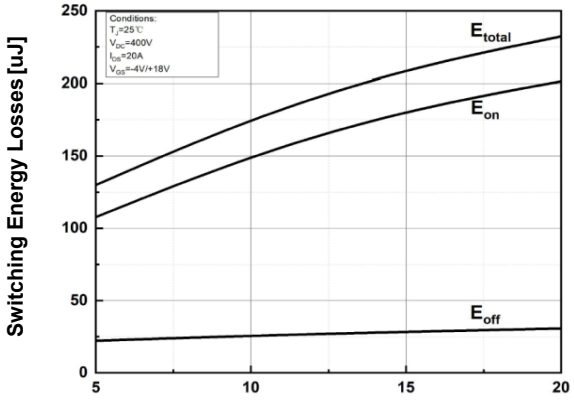
V_{DS}, Drain-Source Voltage [V]

Fig 15. CIS Energy vs. Drain Curren



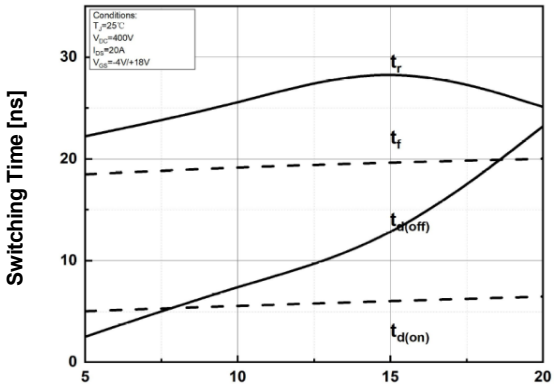
I_{DS}, Drain-Source Current [℃]

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



$R_{g(ext)}$, External Gate Resistor [Ω]

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



$R_{g(ext)}$, External Gate Resistor [Ω]

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