

N1M065030PD2

Silicon Carbide Power MOSFET

N-Channel Enhancement Mode

V_{DS}	650V
$I_D @ 25^\circ\text{C}$	55A
$R_{DS(ON)}$	30m Ω

Features

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitance
- Fast Intrinsic Diode with Low Reverse Recovery

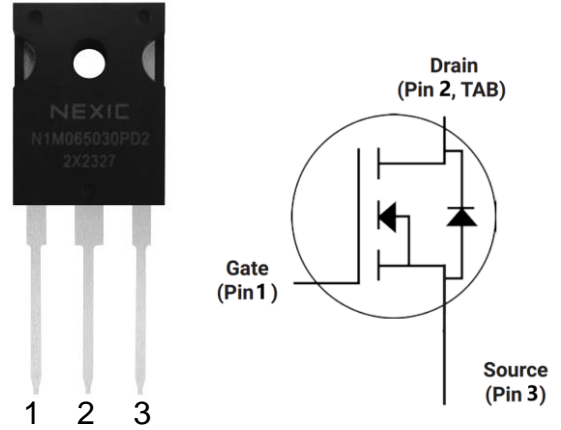
Benefits

- Higher System Efficiency
- Reduced Cooling Requirements
- Increased Power Density
- Increased System Switching Frequency
- Easy to Parallel and Simple to Drive

Applications

- EV Charging
- Server Power Supplies
- Solar PV Inverters
- UPS
- DC/DC Converters

Package



Part Number	Package
N1M065030PD2	TO-247-3

Maximum Ratings ($T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{DSmax}	Drain - Source Voltage	650	V	$V_{GS} = 0\text{ V}, I_D = 100\ \mu\text{A}$	
V_{GSmax}	Gate - Source Voltage	-8/+22	V	Absolute maximum values	
V_{GSop}	Gate - Source Voltage	-5/+18	V	Recommended operational values	
I_D	Continuous Drain Current	55	A	$V_{GS} = 18\text{ V}, T_C = 25^\circ\text{C}$	
		39		$V_{GS} = 18\text{ V}, T_C = 100^\circ\text{C}$	
$I_{D(pulse)}$	Pulsed Drain Current	197	A	Pulse width t_p limited by T_{jmax}	
P_D	Power Dissipation	187	W	$T_C=25^\circ\text{C}, T_J=175^\circ\text{C}$	
T_J, T_{stg}	Operating Junction and Storage Temperature	-55 to + 175	$^\circ\text{C}$		

Electrical Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions	Note
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	650			V	$V_{GS}=0V, I_D=1mA$	
$V_{GS(th)}$	Gate Threshold Voltage	1.8	2.6	4.3	V	$V_{DS}=V_{GS}, I_D=10mA$	
I_{DSS}	Zero Gate Voltage Drain Current		1	50	μA	$V_{DS}=650V, V_{GS}=0V$	
I_{GSS}	Gate-Source Leakage Current		10	250	nA	$V_{GS}=22V, V_{DS}=0V$	
$R_{DS(on)}$	Drain-Source On-State Resistance		30	50	m Ω	$V_{GS}=18V, I_D=25A$	
			42			$V_{GS}=18V, I_D=25A, T_J=175^{\circ}\text{C}$	
C_{iss}	Input Capacitance		1850		pF	$V_{GS}=0V, V_{DS}=400V,$ $f=1MHz, V_{AC}=25mV$	
C_{oss}	Output Capacitance		160				
C_{rss}	Reverse Transfer Capacitance		15				
E_{ON}	Turn-On Switching Energy		50		μJ	$V_{DS}=400V, V_{GS}=-5/18V, I_D=25A,$ $R_{G(ext)}=2.5\Omega, L=100\mu H$	
E_{OFF}	Turn-Off Switching Energy		65				
$t_{d(on)}$	Turn-On Delay Time		14		ns	$V_{DS}=400V, V_{GS}=-5/18V, I_D=25A,$ $R_{G(ext)}=2.5\Omega, R_L=16\Omega$	
t_r	Rise Time		15				
$t_{d(off)}$	Turn-Off Delay Time		28				
t_f	Fall Time		8				
$R_{G(int)}$	Internal Gate Resistance		3		Ω	$f=1MHz, V_{AC}=25mV$	
Q_{gs}	Gate to Source Charge		30		nC	$V_{DS}=400V, V_{GS}=-5/18V,$ $I_D=25A$	
Q_{gd}	Gate to Drain Charge		32				
Q_g	Total Gate Charge		110				

Reverse Diode Characteristics

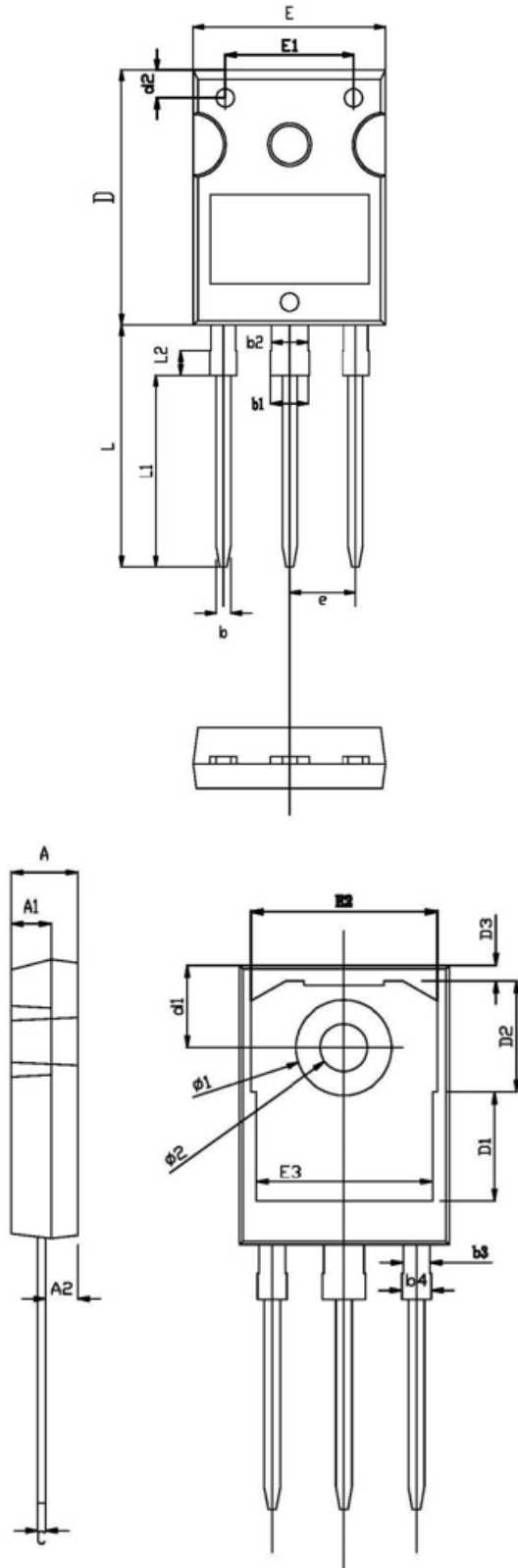
Symbol	Parameter	Typ.	Max.	Unit	Test conditions	Note
V_{SD}	Diode Forward Voltage	4.2		V	$V_{GS}=-5V, I_{SD}=12.5A$	
		3.8			$V_{GS}=-5V, I_{SD}=12.5A, T_J=175^{\circ}\text{C}$	
I_S	Continuous Diode Forward Current		45	A	$V_{GS}=-5V, T_C=25^{\circ}\text{C}$	
t_{rr}	Reverse Recovery Time	25		ns	$I_{SD}=25A, V_R=400V$	
Q_{rr}	Reverse Recovery Charge	100		nC		
I_{rrm}	Peak Reverse Recovery Current	5		A		

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test conditions	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case		0.8	$^{\circ}\text{C}/\text{W}$		
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient		40			

Package TO-247-3

RECOMMENDED LAND PATTERN



	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.80	3.00	3.20
A2	2.26	2.41	2.56
b	1.10	1.20	1.30
b1	2.90	/	3.20
b2	2.90	3.00	3.10
b3	1.90	2.00	2.10
b4	2.00	/	2.20
c	0.50	0.60	0.70
D	20.80	21.00	21.20
D1	/	8.23	/
D2	/	8.32	/
D3	/	1.17	/
d1	6.00	6.15	6.30
d2	2.20	2.30	2.40
E	15.60	15.80	16.00
E1	/	10.50	/
E2	/	14.02	/
E3	/	13.50	/
e	5.34	5.44	5.54
L	19.72	19.92	20.12
L1	/	15.79	/
L2	/	1.98	/
$\phi 1$	7.10	7.19	7.30
$\phi 2$	3.50	3.60	3.70