Product Specification

QNM20PD02AJ

20V Dual P-Channel MOSFET

FEATURES

- -20V, -20A

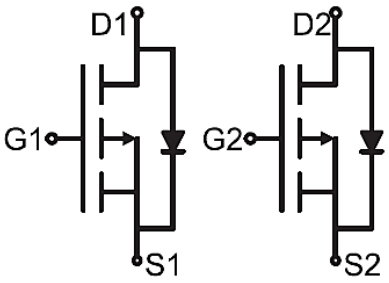
  $R_{DS(ON)}$=12.5 mΩ @ V_{GS} =-4.5V(Typ.)

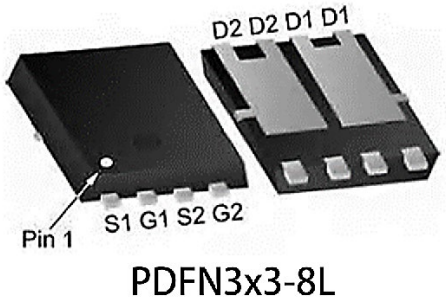
  $R_{DS(ON)}$=16.5 mΩ @ V_{GS} =-2.5V(Typ.)
- Advanced Trench Technology
- Provide Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired

Applications

- Load Switch
- PWM Application
- Power management

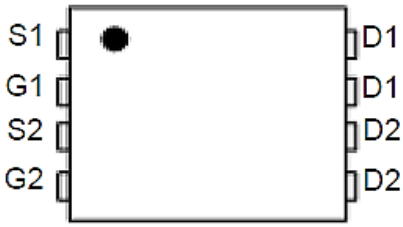
Pin Description





PDFN3x3-8L

Top View



NO.	Symbol	Description
1	S1	SOURCE
2	G1	GATE
3	S2	SOURCE
4	G2	GATE
5	D1	DRAIN
6	D1	DRAIN
7	D2	DRAIN
8	D2	DRAIN

Absolute Maximum Ratings

(@ T_A = 25℃ unless otherwise specified)

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	+12	V
I_D	Drain Current -Continuous	-20	A
I_{DM}	Drain Current -Pulsed (1)	-80	A
P_D	Maximum Power Dissipation	15	W
T_J,T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	℃
Thermal Characteristic			
$R_{\theta JA}$	Thermal Resistance,Junction-to-Ambient (2)	4.5	℃/W

Electrical Characteristics

(T_J = 25℃ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D= -250μA	-20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}= -20V, V_{GS}=0V,	-	-	-1	μA
I_{GSS}	Gate to Body Leakage Current	V_{DS}=0V, V_{GS}= ±12V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D= -250μA	-0.4	-0.7	-1.0	V
$R_{DS(on)}$	Static Drain-Source on-Resistance(3)	V_{GS}= -4.5V, I_D= -10A	-	12.5	15	mΩ
		V_{GS}= -2.5V, I_D= -5A	-	16.5	20	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}= -10V, V_{GS}=0V, f=1.0MHz	-	1764	-	pF
C_{oss}	Output Capacitance		-	171	-	pF
C_{rss}	Reverse Transfer Capacitance		-	143	-	pF
Q_g	Total Gate Charge	V_{DS}= -10V, I_D= -6A, V_{GS}= -4.5V	-	16	-	nC
Q_{gs}	Gate-Source Charge		-	3	-	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	4	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD} = -10V, I_D= -12A, V_{GS}= -4.5V, R_{GEN}=2.4Ω	-	14	-	ns
t_r	Turn-on Rise Time		-	79	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	76	-	ns
t_f	Turn-off Fall Time		-	76	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-20	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-80	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS}=0V, I_S= -20A	-	-0.8	-1.2	V
t_{rr}	Body Diode Reverse Recovery Time	I_F=-2A, di/dt=-100A/μs	-	180	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	300	-	nC

Notes: 1.Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2.EAS condition : T_J=25℃,V_{DD}=-10V,V_G=10V,L=0.5mH,Rg=25Ω,I_{AS}=-12A

3.Pulse Test: Pulse Width≤300us, Duty Cycle≤2%

Typical Performance Characteristics

Figure1: Output Characteristics

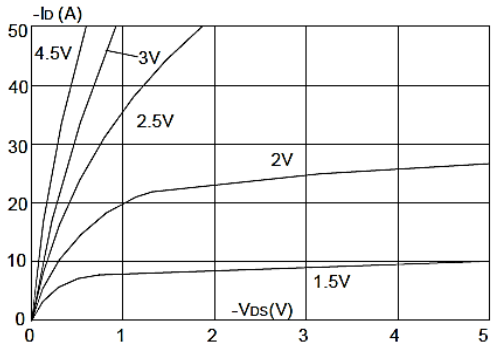


Figure 2: Typical Transfer Characteristics

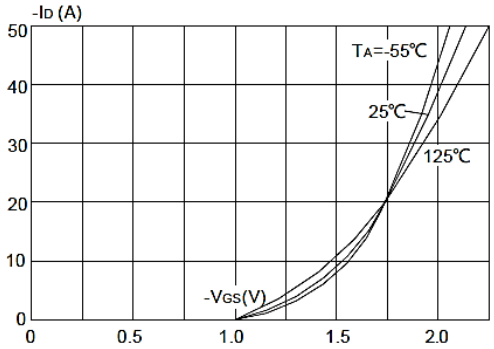


Figure 3: On-resistance vs. Drain Current

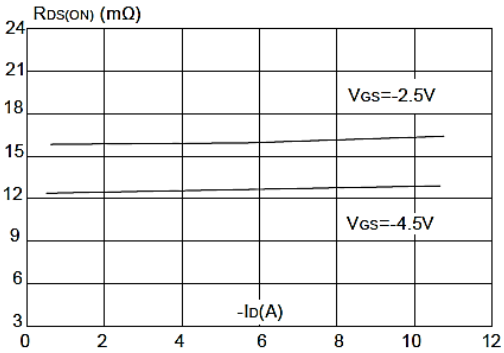


Figure 4: Body Diode Characteristics

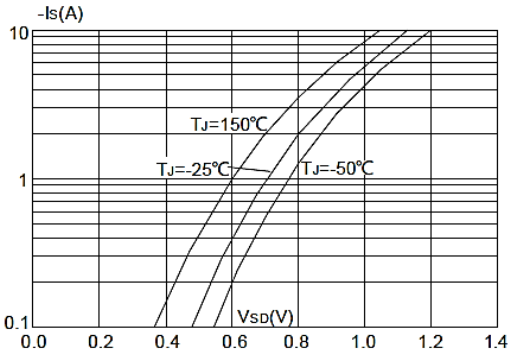


Figure 5: Gate Charge Characteristics

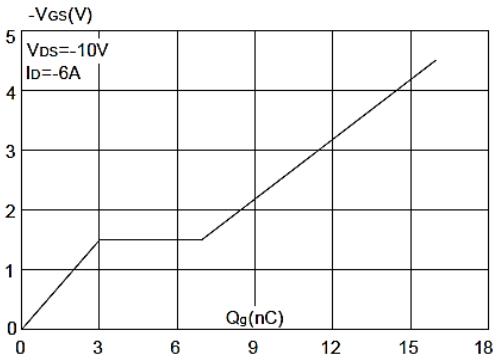


Figure 6: Capacitance Characteristics

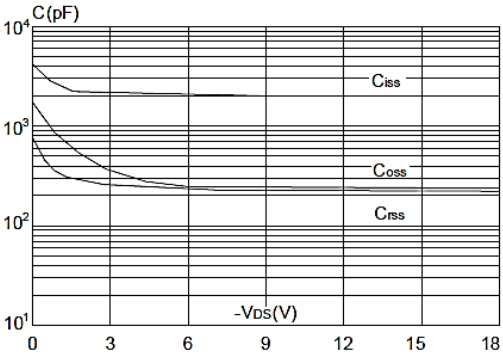


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

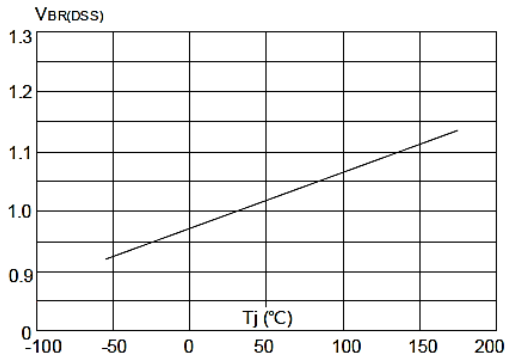


Figure 8: Normalized on Resistance vs. Junction Temperature

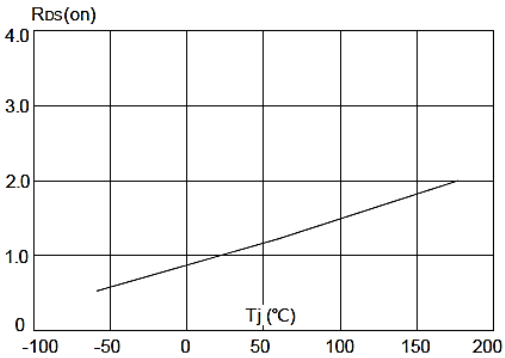


Figure 9: Maximum Safe Operating Area

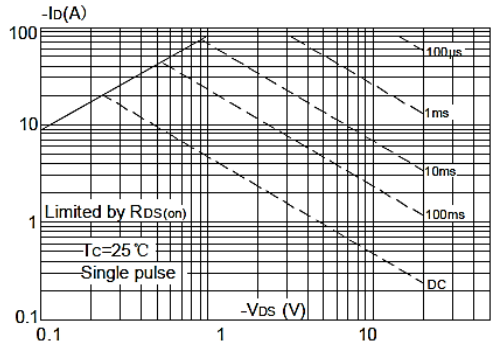


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

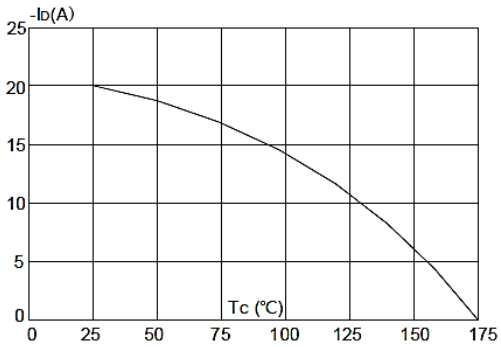
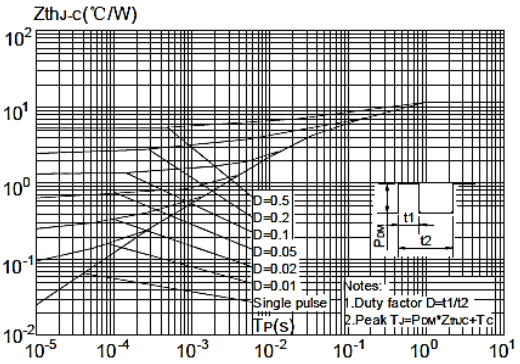
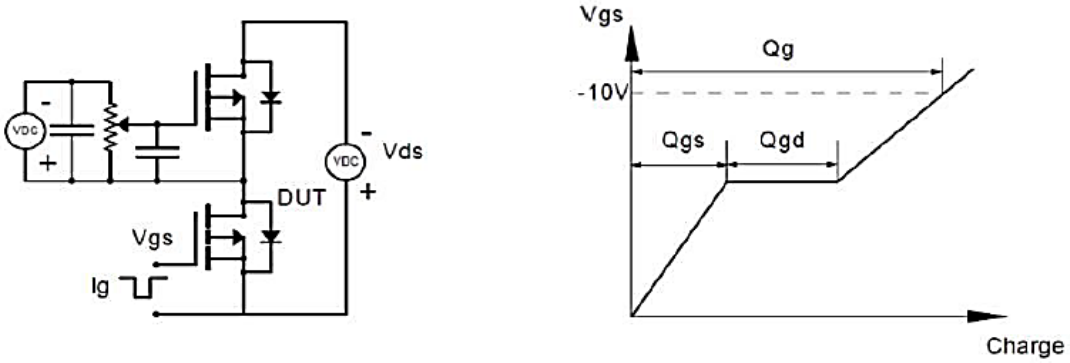


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

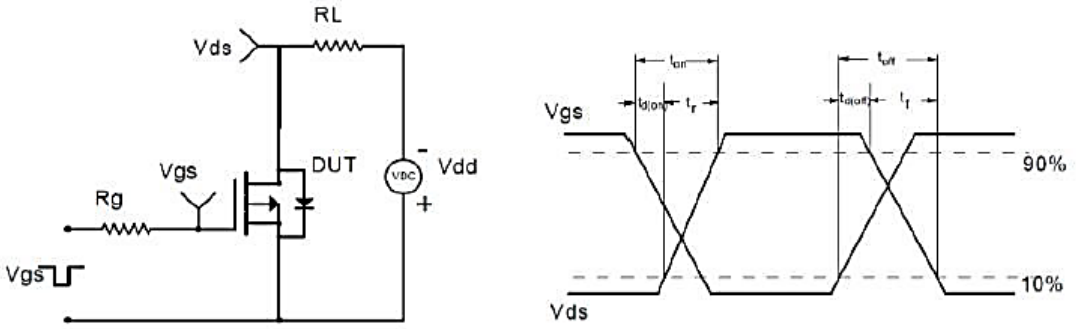


Test Circuit

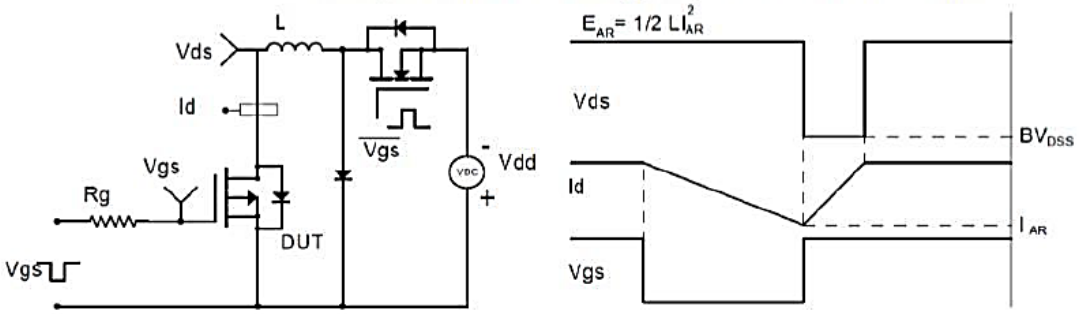
Gate Charge Test Circuit & Waveform



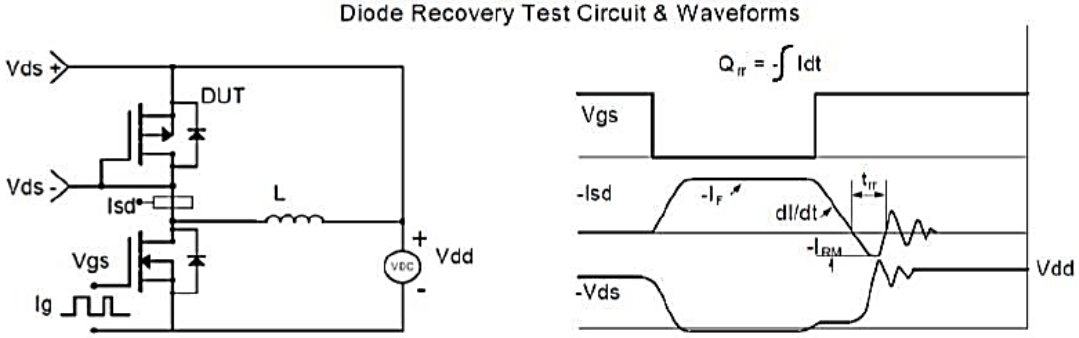
Resistive Switching Test Circuit & Waveforms



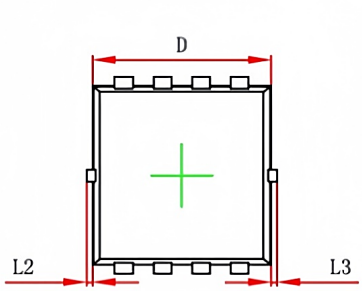
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



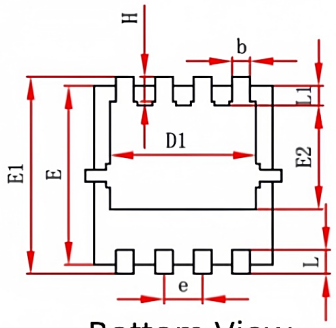
Diode Recovery Test Circuit & Waveforms



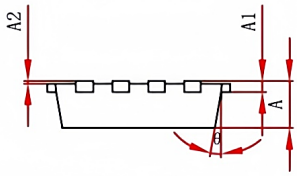
Package Mechanical Data(PDFN 3.3x3.3-8L)



Top View

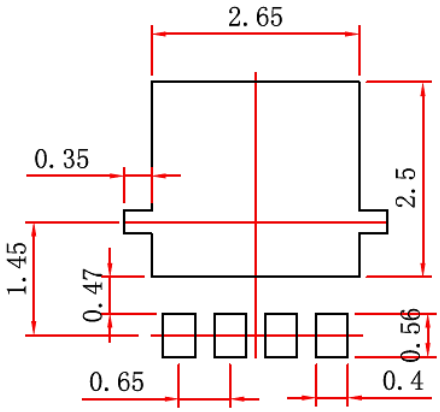


Bottom View



Side View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.650	0.850	0.026	0.033
A1	0.152 REF.		0.006 REF.	
A2	0~0.05		0~0.002	
D	2.900	3.100	0.114	0.122
D1	2.300	2.600	0.091	0.102
E	2.900	3.100	0.114	0.122
E1	3.150	3.450	0.124	0.136
E2	1.535	1.935	0.060	0.076
b	0.200	0.400	0.008	0.016
e	0.550	0.750	0.022	0.030
L	0.300	0.500	0.012	0.020
L1	0.180	0.480	0.007	0.019
L2	0~0.100		0~0.004	
L3	0~0.100		0~0.004	
H	0.315	0.515	0.012	0.020
θ	9°	13°	9°	13°



Note:

1.Controlling dimension: in millimeters.

2.General tolerance: ±0.05mm.

3.The pad layout is for reference purposes only.

Ordering information

Order Code	Package	V_{DS}(V)	I_D(A)	$R_{DS(ON)}$(mΩ)	
QNM20PD02AJ	PDFN 3x3-8	-20	-20	V_{GS}=-4.5V	12.5
				V_{GS}=-2.5V	16.5