Product Specification

QND30N06AX

60V N-Channel MOSFET

FEATURES

- 60V, 20A

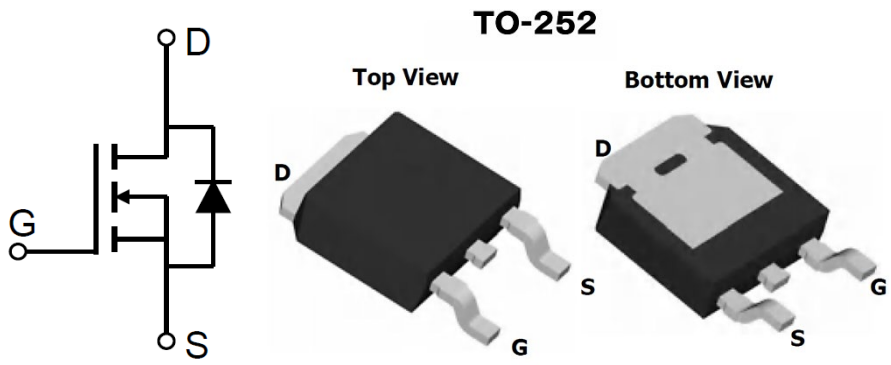
  $R_{DS(ON)}$ Typ= 26mΩ @ V_{GS} = 10V

  $R_{DS(ON)}$ Typ= 33mΩ @ V_{GS} = 4.5V
- Advanced Trench Technology
- Excellent RDS(ON) and Low Gate Charge
- Lead Free

Applications

- Load Switch
- PWM Application
- Power Management

Pin Description



NO.	Symbol	Description
1	G	GATE
2	D	DRAIN
3	S	SOURCE

Absolute Maximum Ratings

(@ T_C = 25℃ unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{DS}	Drain-to-Source Voltage		60	V
V_{GS}	Gate-to-Source Voltage		±20	V
I_D	Continuous Drain Current	T_C = 25℃	20	A
		T_C = 100℃	13	
I_{DM}	Pulsed Drain Current (1)		80	A
E_{AS}	Single Pulsed Avalanche Energy (2)		27	mJ
P_D	Power Dissipation	T_C = 25℃	23	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		5.4	℃/W
T_J, T_{STG}	Junction & Storage Temperature Range		-55 to 150	℃

Electrical Characteristics

(T_J = 25℃ unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	I_D=250mA, V_{GS}=0V	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=60V, V_{GS}=0V	-	-	1.0	mA
I_{GSS}	Gate-Body Leakage Current	V_{DS}=0V, V_{GS}=±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250mA	1.0	1.6	2.5	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance(4)	V_{GS}=10V,I_D=10A	-	26	33	mW
		V_{GS}=4.5V,I_D=5A	-	33	45	mW
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz	-	860	-	pF
C_{oss}	Output Capacitance		-	62	-	pF
C_{rss}	Reverse Transfer Capacitance		-	51	-	pF
Q_g	Total Gate Charge	V_{GS}=0~10V, V_{DS}=30V, I_D=10A	-	20.3	-	nC
Q_{gs}	Gate Source Charge		-	3.7	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	5.3	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DD}=30V I_D= 20A, R_{GEN} =1.8W	-	7.6	-	ns
t_r	Turn-On Rise Time		-	20	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	15	-	ns
t_f	Turn-Off Fall Time		-	24	-	ns
Body Diode Characteristics						
I_S	Maximum Continuous Body Diode Forward Current		-	-	20	A
I_{SM}	Maximum Pulsed Body Diode Forward Current		-	-	80	A
V_{SD}	Body Diode Forward Voltage	V_{GS}=0V,I_S=15A	-	-	1.2	V

Notes:

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

2. E_{AS} condition: Starting T_J=25C, V_{DD}=30V, V_G=10V, R_G=25Ω, L=0.5mH, I_{AS}=10.5A

3. Pulse Test: Pulse Width≤300us, Duty Cycle≤0.5%.

Typical Performance Characteristics

Figure 1: Output Characteristics

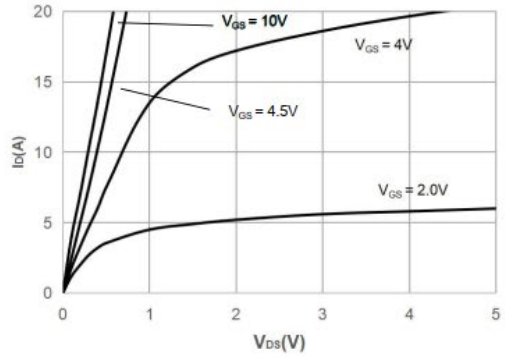


Figure 2: Typical Transfer Characteristics

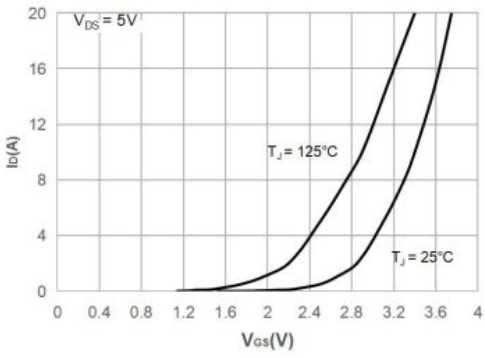


Figure 3: On-resistance vs. Drain Current

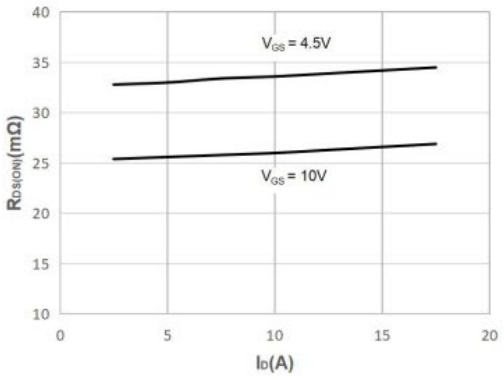


Figure 4: Body Diode Characteristics

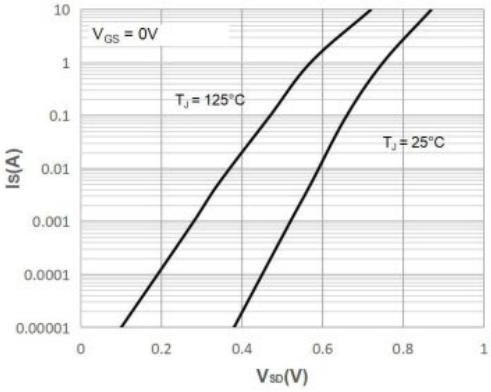


Figure 5: Gate Charge Characteristics

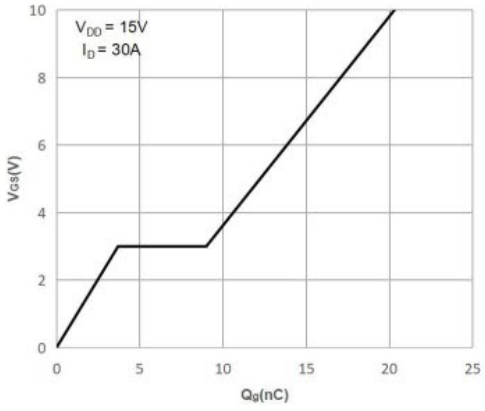


Figure 6: Capacitance Characteristics

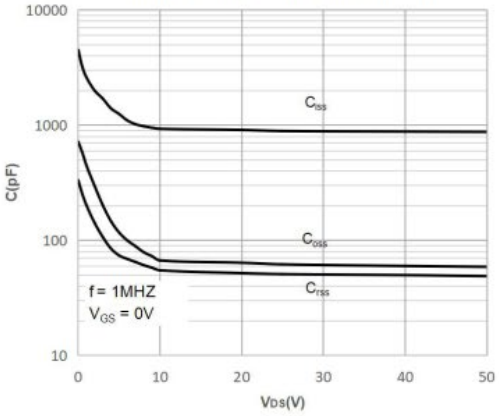


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

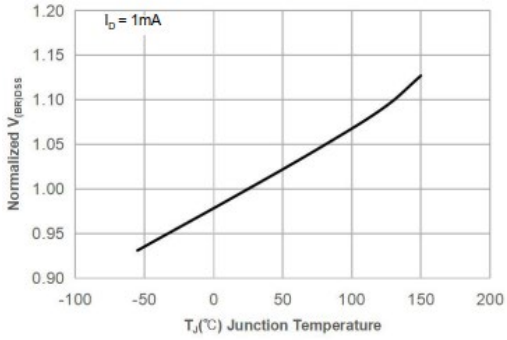


Figure 8: Normalized on Resistance vs. Junction Temperature

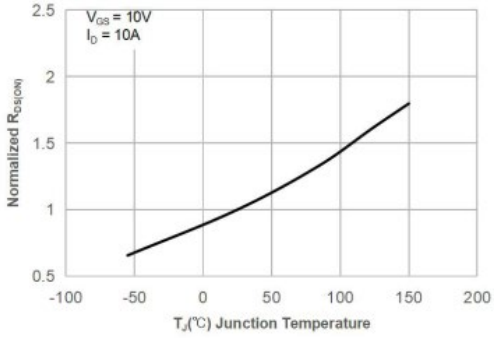


Figure 9: Maximum Safe Operating Area

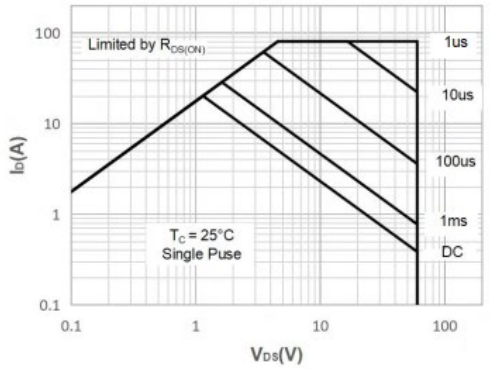


Figure 10: Maximum Continuous Drian Current vs. Case Temperature

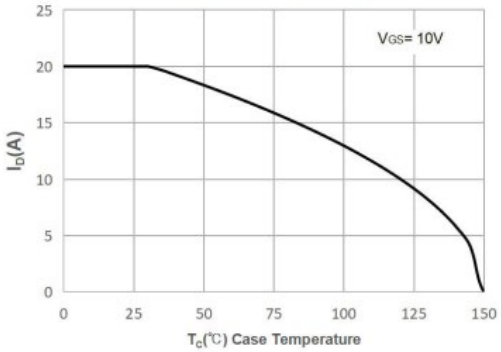


Figure 11: Normalized Maximum Transient Thermal Impedance

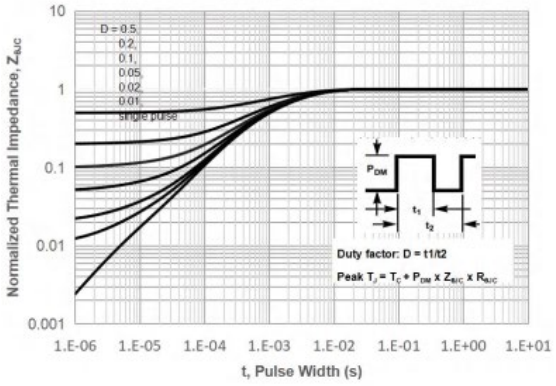
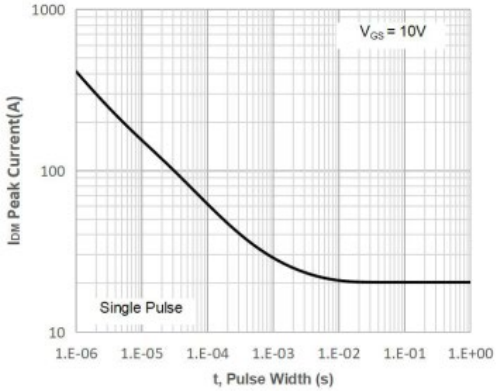


Figure 12: Peak Current Capacity



Test Circuit

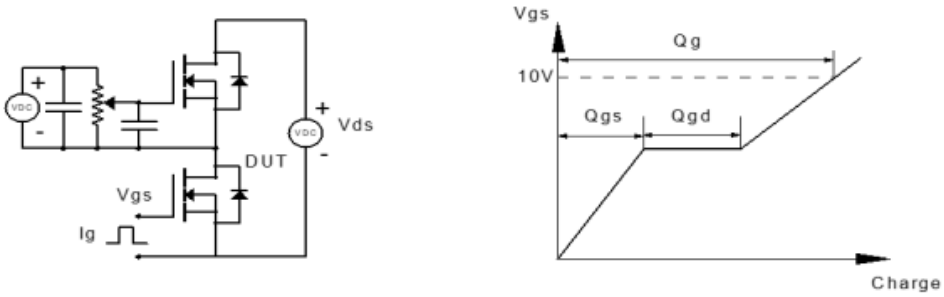


Figure 1: Gate Charge Test Circuit & Waveform

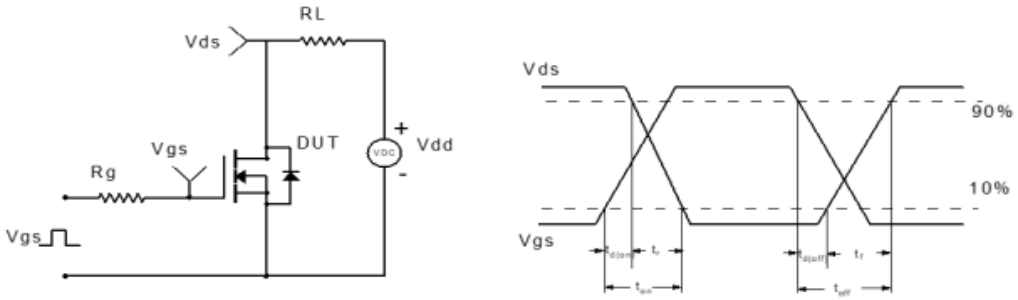


Figure 2: Resistive Switching Test Circuit & Waveform

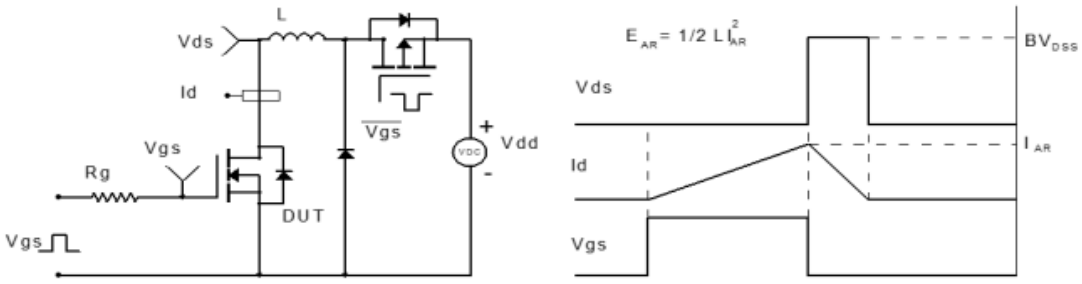


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

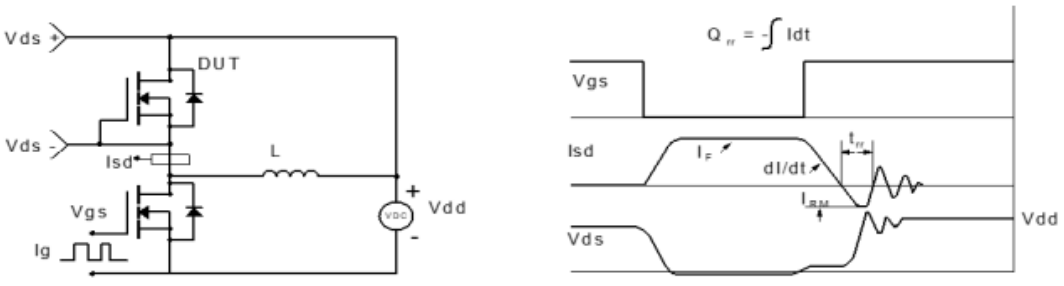
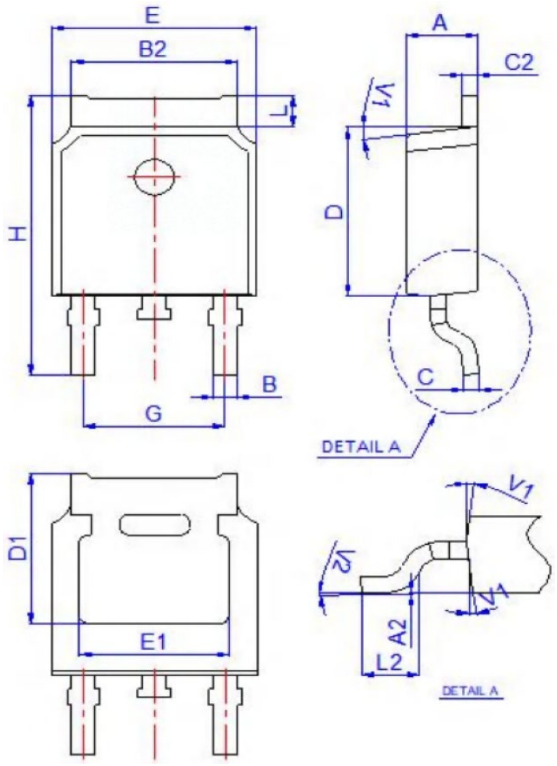


Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(TO-252-3L)



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.10	2.50	0.083	0.098
A2	0	0.10	0	0.004
B	0.66	0.86	0.026	0.034
B2	5.18	5.48	0.202	0.216
C	0.40	0.60	0.016	0.024
C2	0.44	0.58	0.017	0.023
D	5.90	6.30	0.232	0.248
D1	5.30 REF		0.209 REF	
E	6.40	6.80	0.252	0.268
E1	4.63		0.182	
G	4.47	4.67	0.176	0.184
H	9.50	10.70	0.374	0.421
L	1.09	1.21	0.043	0.048
L2	1.35	1.65	0.053	0.065
V1	7°		7°	
V2	0°	6°	0°	6°

Ordering information

Order Code	Package	V_{DS}(V)	I_D(A)	$R_{DS(ON)}$(m Ω)	
QND30N06AX	TO-252	60	20	V_{GS}=10V	26
				V_{GS}=4.5V	33