QNHCHIP QND160N03C

Product Specification

QND160N03C

30V N-Channel MOSFET

FEATURES

- 30V, 160A

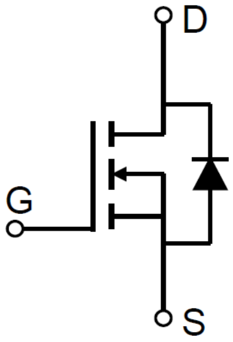
  $R_{DS(ON)} < 3.5m\Omega$ @ $V_{GS} = 10V$

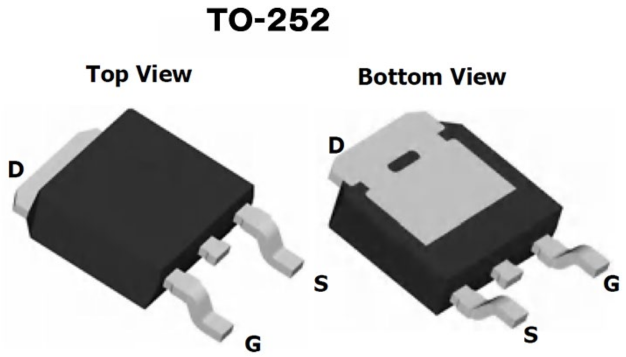
  $R_{DS(ON)} < 4.5m\Omega$ @ $V_{GS} = 4.5V$
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead Free

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_A = 25℃ unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{DS}	Drain-to-Source Voltage		30	V
V_{GS}	Gate-to-Source Voltage		±20	V
I_D	Continuous Drain Current (1)	T_C = 25℃	160	A
		T_C = 100℃	75	
I_{DM}	Pulsed Drain Current (2)		385	A
I_{AS}	Avalanche Current (3)		25	A
E_{AS}	Avalanche Energy (3)		94	mJ
P_D	Power Dissipation (4)	T_C = 25℃	74	W
		T_C = 100℃	29	
T_J,T_{STG}	Junction & Storage Temperature Range		-55 to 150	℃

Electrical Characteristics

(T_J = 25℃ unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D = 1mA, V_{GS} = 0V	30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 24V, V_{GS} = 0V			1.0	A
		T_J = 55℃			5.0	
Gate-Body Leakage Current	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250uA	1.0	1.5	2.5	V
Static Drain-Source ON-Resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 20A		2.7	3.5	m Ω
		V_{GS} = 4.5V, I_D = 15A		4.2	5.5	m Ω
Forward Transconductance	g_{FS}	V_{DS} = 5V, I_D = 20A		128		S
Diode Forward Voltage	V_{SD}	I_S = 1A, V_{GS} = 0V		0.69	1.0	V
Diode Continuous Current	I_S	T_C=25℃			160	A
DYNAMIC PARAMETERS (5)						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=15V, f=1MHz		4221		pF
Output Capacitance	C_{oss}			420		pF
Reverse Transfer apacitance	C_{rss}			375		pF
Gate Resistance	R_g	V_{GS} = 0V, V_{DS}= 0V, f = 1MHz		21		
SWITCHING PARAMETERS (5)						
Total Gate Charge (@V_{GS}=10V)	Q_g	V_{GS} = 0 to 10V V_{DS} = 15V, I_D = 20A		40		nC
Total Gate Charge (@V_{GS}=4.5V)	Q_g			18.8		nC
Gate Source Charge	Q_{gs}			5.3		nC
Gate Drain Charge	Q_{gd}			5.2		nC
Turn-On DelayTime	$t_{D(on)}$	V_{GS} = 10V, V_{DS} = 15V R_L=0.75 Ω , R_{GEN}=6 Ω		7.1		ns
Turn-On Rise Time	t_r			8.4		ns
Turn-Off DelayTime	$t_{D(off)}$			38		ns
Turn-Off Fall Time	t_f			22		ns
Body Diode Reverse Recovery Time	t_{rr}	I_F=20A, dI_F/dt=100A/us		48		ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F=20A, dI_F/dt=100A/us		45		nC
Thermal Performance						
Thermal Resistance, Junction-to-Ambient	$R_{θJA}$	38	45			℃/W
Thermal Resistance, Junction-to-Case	$R_{θJC}$	1.3	1.7			℃/W

Notes:

1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous urrent depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under T_{J_Max} = 150℃.
3. This single-pulse measurement was taken under the following condition [L = 300uH, V_{GS} = 10V, V_{DS} = 30V] while its value is limited by T_{J_Max} = 150℃.
4. The power dissipation P_D is based on T_{J_Max} = 150℃.
5. This value is guaranteed by design hence it is not included in the production test.

Test Circuit

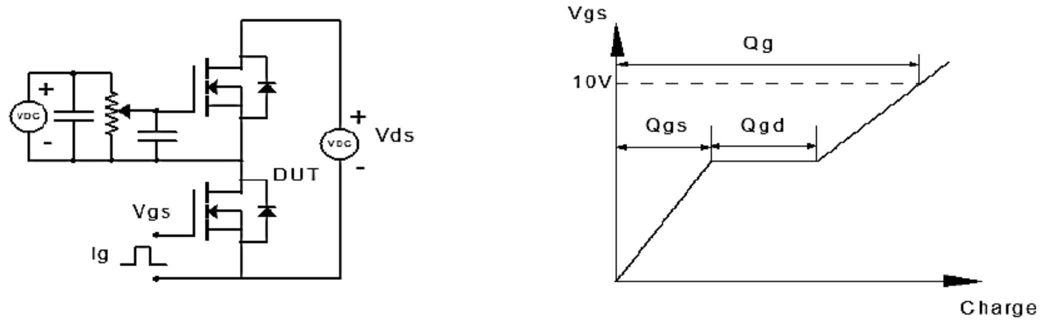


Figure 1: Gate Charge Test Circuit & Waveform

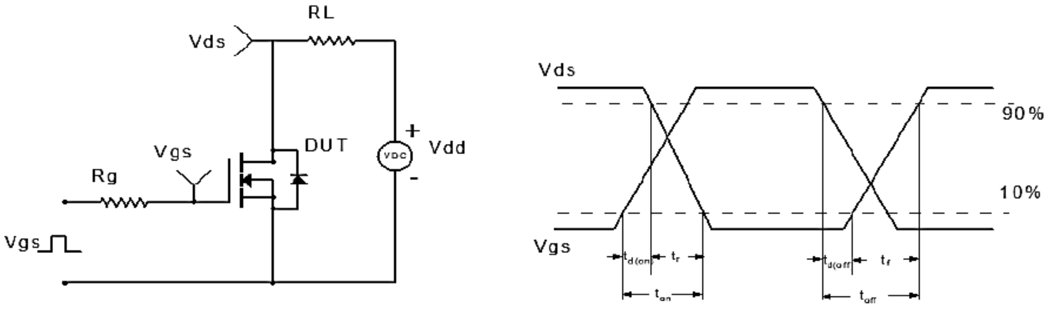


Figure 2: Resistive Switching Test Circuit & Waveform

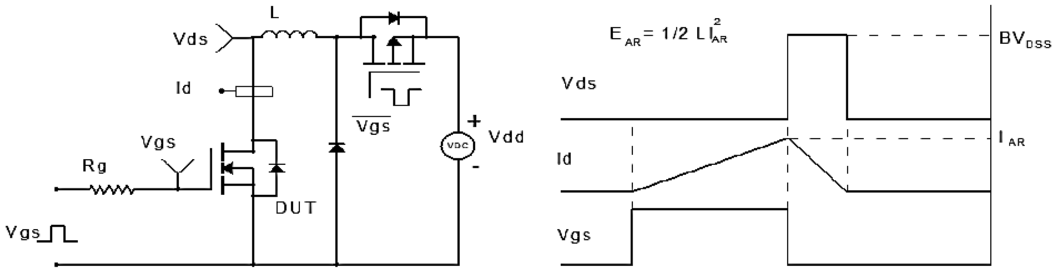


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

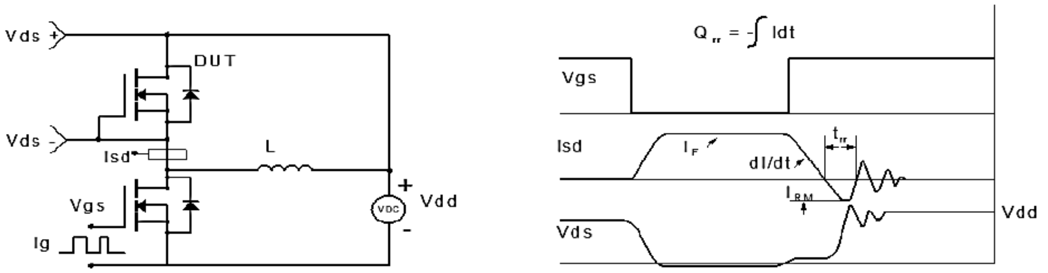
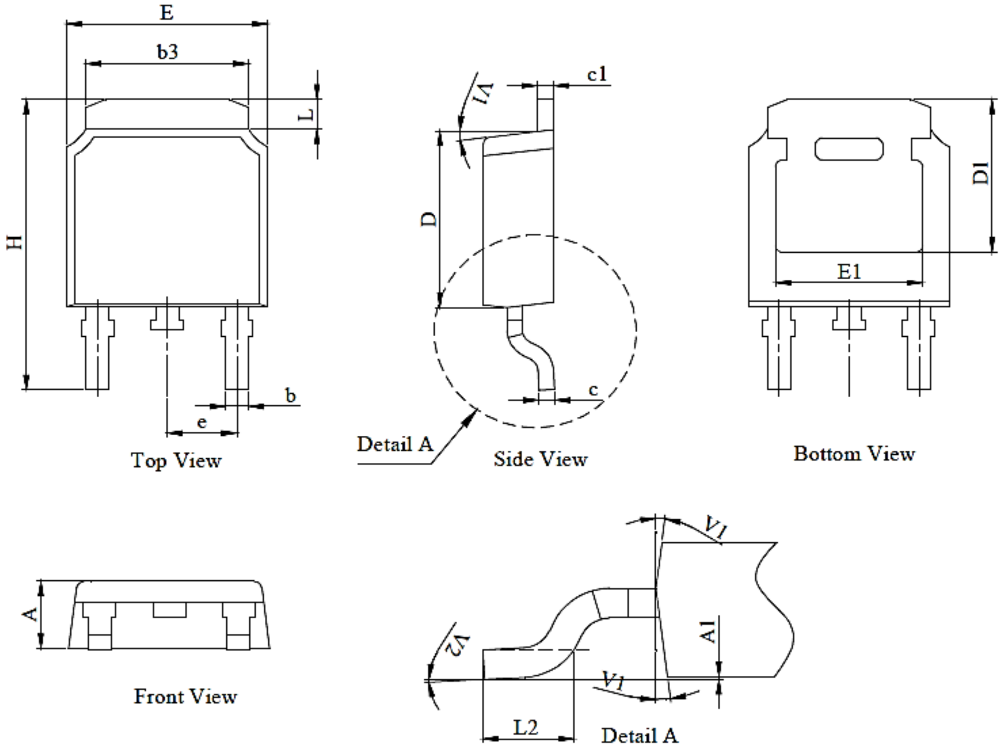


Figure 4: Diode Recovery Test Circuit & Waveform

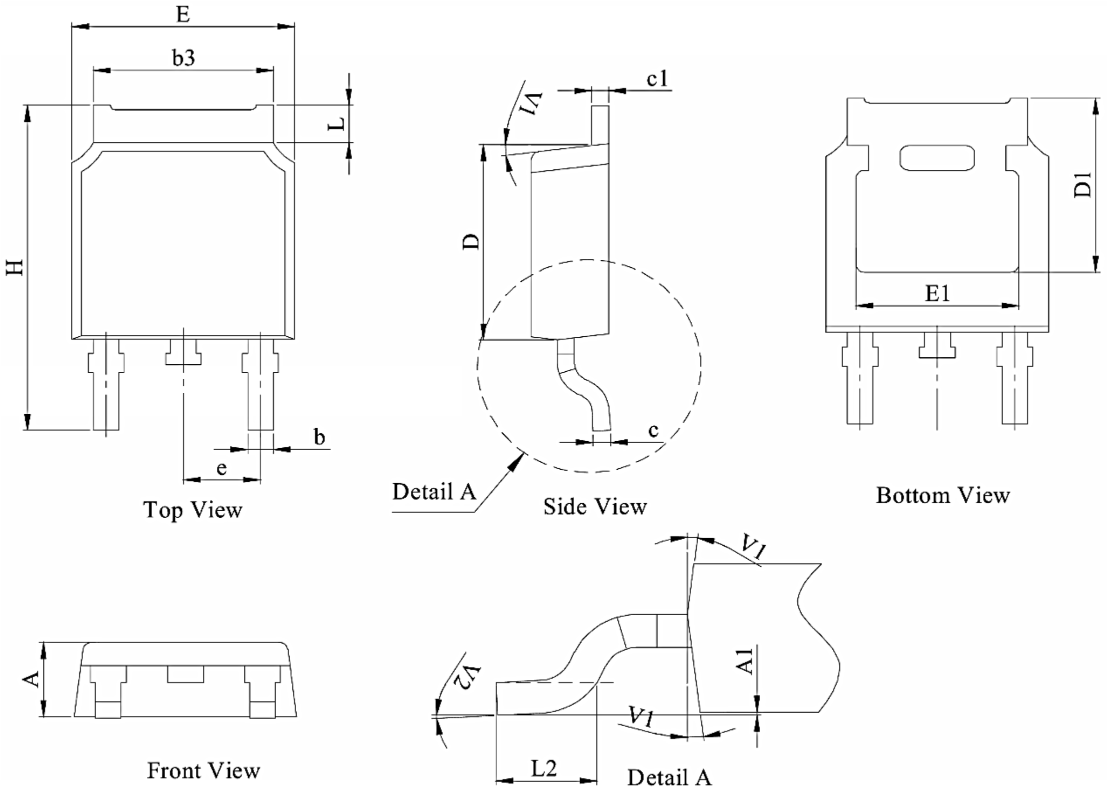
TO-252-3L Package Information

Package Outline Type-A



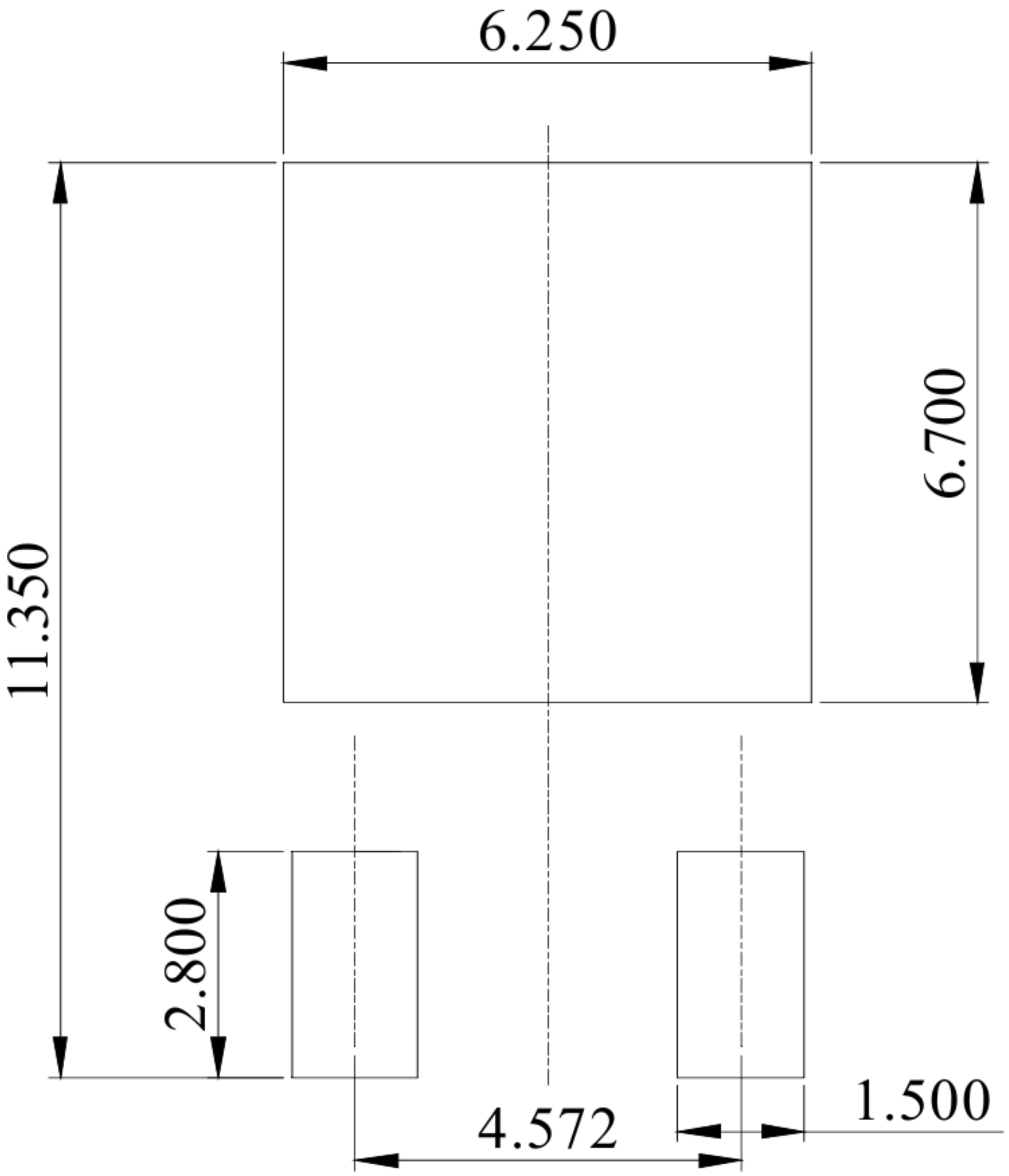
DIM	MILLIMETER		
	MIN.	NOM.	MAX.
A	2.18	2.30	2.39
A1	0	--	0.13
b	0.64	0.76	0.89
c	0.40	0.50	0.61
c1	0.46	0.50	0.58
D	5.97	6.10	6.23
D1	5.05	--	--
E	6.35	6.60	6.73
E1	4.32	--	--
b3	5.21	5.38	5.55
e	2.29 BSC		
H	9.40	10.00	10.40
L	0.89	--	1.27
L2	1.40	--	1.78
V1	7° REF		
V2	0°	--	6°

Package Outline Type-B



DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	2.10	2.30	2.40
A1	0	--	0.13
b	0.66	0.76	0.86
b3	5.21	5.38	5.55
c	0.40	0.50	0.60
c1	0.44	0.50	0.58
D	5.90	6.10	6.30
D1	5.30REF		
E	6.40	6.60	6.80
E1	4.63	-	-
e	2.29 BSC		
H	9.50	10.00	10.70
L	1.09	--	1.21
L2	1.35	--	1.65
V1	7° REF		
V2	0°	--	6°

Recommended Soldering Footprint



DIMENSIONS:MILLIMETERS

Ordering information

Order Code	Package	V_{DS}(V)	I_D(A)	$R_{DS(ON)}$(mΩ)	
QND160N03C	TO-252	30	160	V_{GS}=10	＜3.5
				V_{GS}=4.5	＜4.5