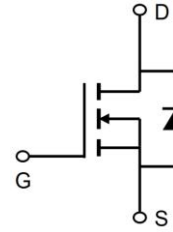


60V N-Channel Enhancement Mode MOSFET

Description

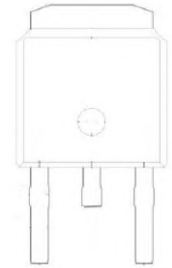
The 80N06D uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 7.5V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

$V_{DS} = 60V$ $I_D = 80A$

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



Application

Battery protection

Load switch

Uninterruptible power supply



Absolute Maximum Ratings at $T_j=25^\circ C$ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain source voltage	V _{DS}	60	V
Gate source voltage	V _{GS}	±20	V
Continuous drain current ¹⁾	I _D	80	A
Pulsed drain current ²⁾	I _{D, pulse}	180	A
Power dissipation ³⁾	P _D	125	W
Single pulsed avalanche energy ⁴⁾	E _{AS}	30	mJ
Operation and storage temperature	T _{stg} , T _j	-55 to 150	°C
Thermal resistance, junction-case	R _{θJC}	1	°C/W
Thermal resistance, junction-ambient ⁵⁾	R _{θJA}	62	°C/W

60V N Channel Enhancement Mode MOSFET
Electrical Characteristics ($T_J=25\text{ }^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-source breakdown voltage	$V_{GS}=0\text{ V}$, $I_D=250\text{ }\mu\text{A}$	60	71		V
$V_{GS(th)}$	Gate threshold voltage	$V_{DS}=V_{GS}$, $I_D=250\text{ }\mu\text{A}$	1.0	2.0	2.5	V
$R_{DS(ON)}$	Drain-source on-state resistance	$V_{GS}=10\text{ V}$, $I_D=20\text{ A}$		8	10	m Ω
$R_{DS(ON)}$	Drain-source on-state resistance	$V_{GS}=4.5\text{ V}$, $I_D=10\text{ A}$		10	13	m Ω
I_{GSS}	Gate-source leakage current	$V_{GS}=20\text{ V}$			100	nA
		$V_{GS}=-20\text{ V}$			-100	
I_{DSS}	Drain-source leakage current	$V_{DS}=40\text{ V}$, $V_{GS}=0\text{ V}$			1	μA
C_{iss}	Input capacitance	$V_{GS}=0\text{ V}$, $V_{DS}=50\text{ V}$, $f=100\text{ kHz}$		1182.1		pF
C_{oss}	Output capacitance			199.5		pF
C_{rss}	Reverse transfer capacitance			4.1		pF
$t_{d(on)}$	Turn-on delay time	$V_{GS}=10\text{ V}$, $V_{DS}=50\text{ V}$, $R_G=2\text{ }\Omega$, $I_D=10\text{ A}$		17.9		ns
t_r	Rise time			4.0		ns
$t_{d(off)}$	Turn-off delay time			34.9		ns
t_f	Fall time			5.5		ns
Q_g	Total gate charge	$I_D=10\text{ A}$, $V_{DS}=50\text{ V}$, $V_{GS}=10\text{ V}$		18.4		nC
Q_{gs}	Gate-source charge			3.3		nC
Q_{gd}	Gate-drain charge			3.1		nC
$V_{plateau}$	Gate plateau voltage			2.8		V
I_S	Diode forward current	$V_{GS}<V_{th}$			60	A
I_{SP}	Pulsed source current				180	
V_{SD}	Diode forward voltage	$I_S=20\text{ A}$, $V_{GS}=0\text{ V}$			1.3	V
t_{rr}	Reverse recovery time	$I_S=10\text{ A}$, $di/dt=100\text{ A}/\mu\text{s}$		41.8		ns
Q_{rr}	Reverse recovery charge				36.1	nC
I_{rrm}	Peak reverse recovery current				1.4	A

Note

- 1) Calculated continuous current based on maximum allowable junction temperature.
- 2) Repetitive rating; pulse width limited by max. junction temperature.
- 3) P_d is based on max. junction temperature, using junction-case thermal resistance.
- 4) $V_{DD}=50\text{ V}$, $R_G=50\text{ }\Omega$, $L=0.3\text{ mH}$, starting $T_J=25\text{ }^\circ\text{C}$.
- 5) The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_a=25\text{ }^\circ\text{C}$.

Electrical Characteristics Diagrams

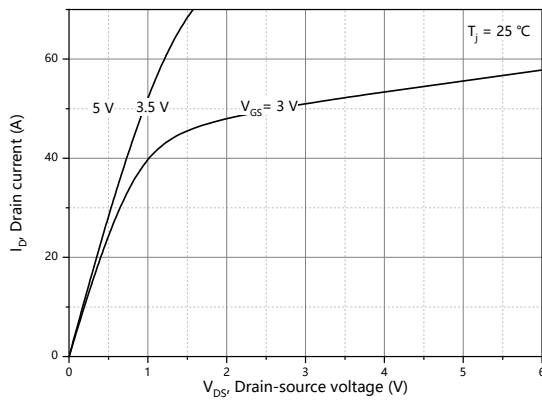


Figure 1, Typ. output characteristics

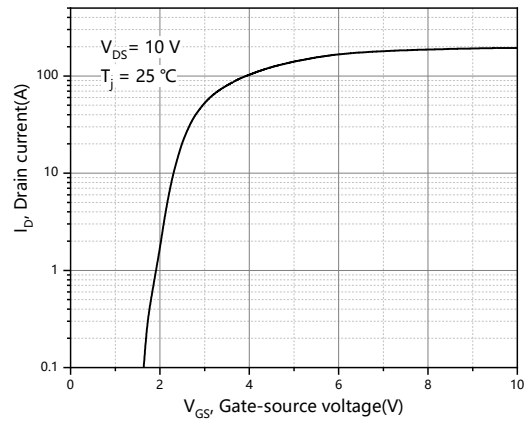


Figure 2, Typ. transfer characteristics

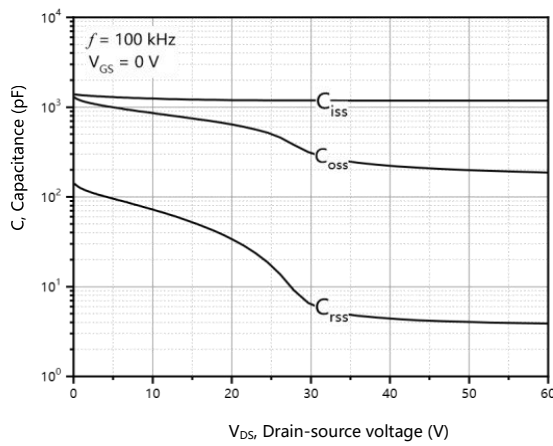


Figure 3, Typ. capacitances

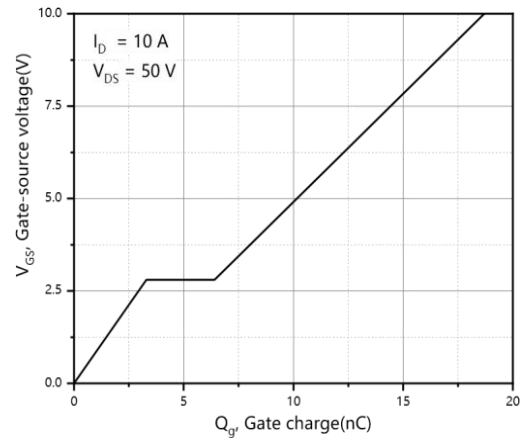


Figure 4, Typ. gate charge

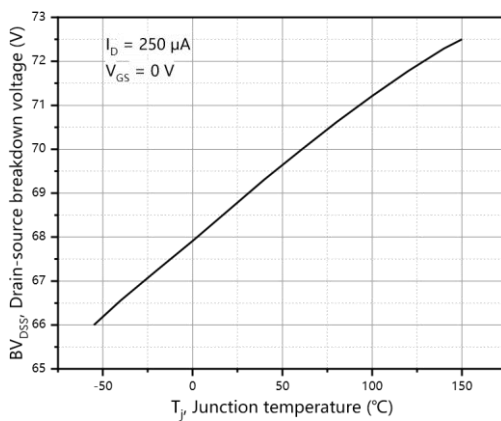


Figure 5, Drain-source breakdown voltage

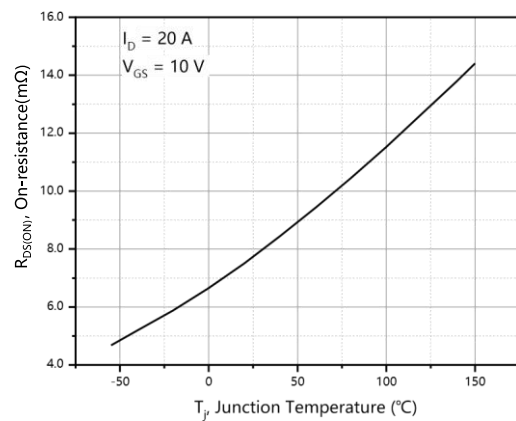


Figure 6, Drain-source on-state resistance

60V N-Channel Enhancement Mode MOSFET

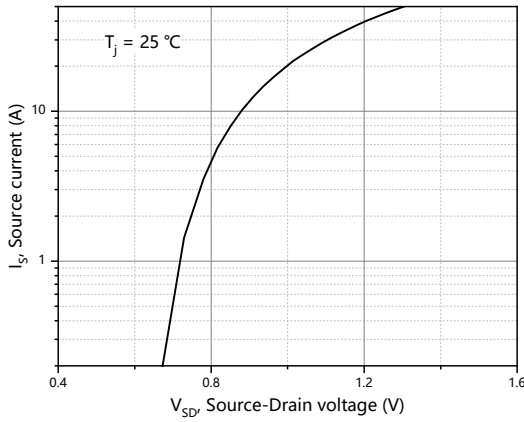


Figure 7, Forward characteristic of body diode

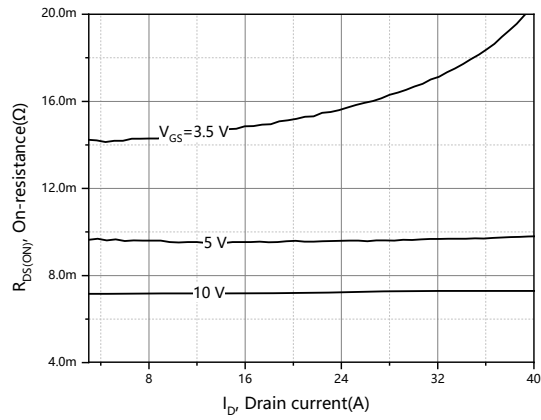


Figure 8, Drain-source on-state resistance

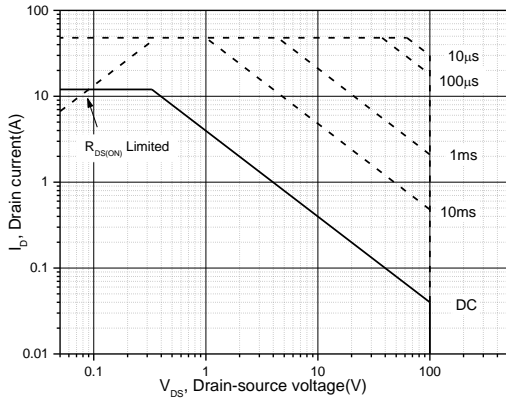


Figure 9, Safe operation area $T_C=25\text{ }^\circ\text{C}$

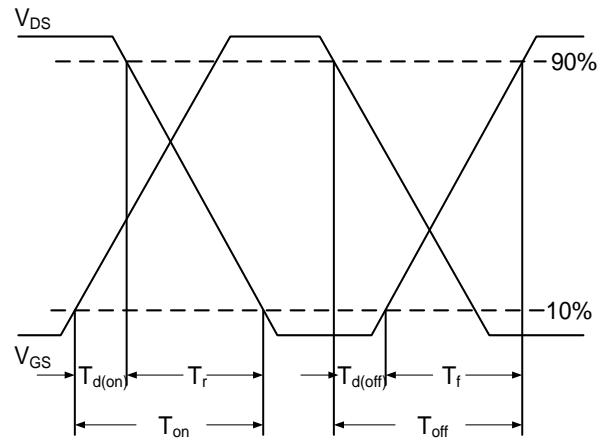


Fig.10 Switching Time Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

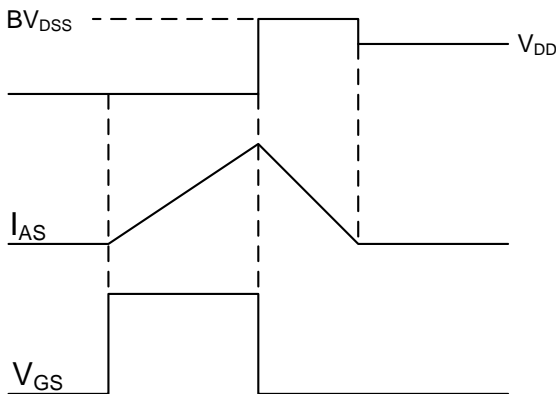
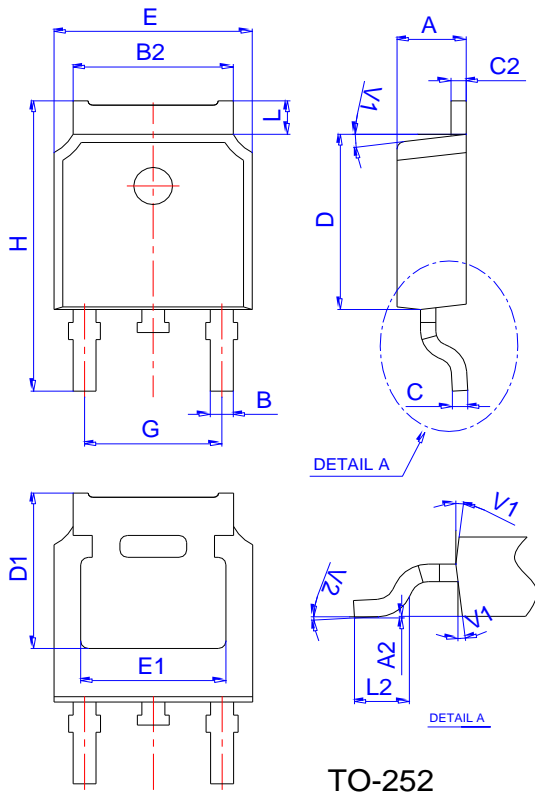


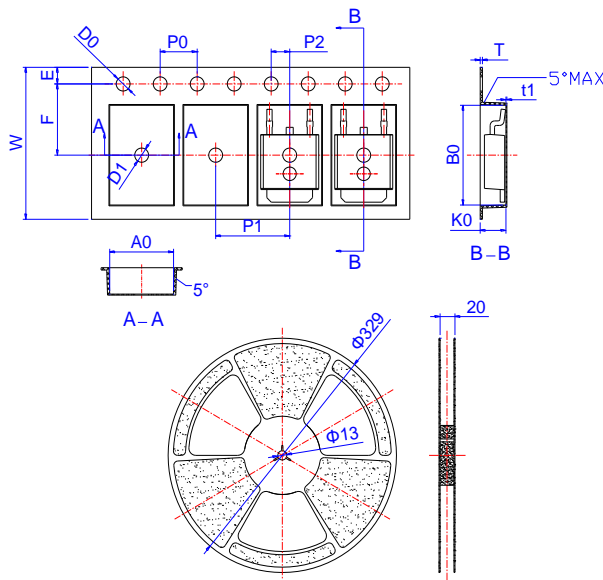
Fig.11 Unclamped Inductive Switching Waveform

Package Mechanical Data TO-252-3L



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	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	5.30REF			0.209REF		
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°

Reel Specification-TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583