

TM80N06D

N-Channel Enhancement Mosfet

General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

Applications

- Load switch
- PWM

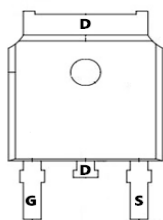
General Features

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

$R_{DS(ON)} = 6.8m\Omega(\text{typ.}) @ V_{GS} = 10V$

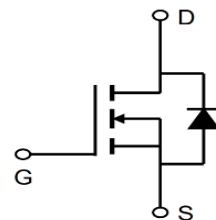
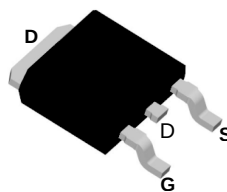
100% UIS Tested

100% R_g Tested



Marking: 80N06

D:TO-252-3 L



Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ 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⁾	$I_{D, \text{pulse}}$	180	A
Power dissipation ³⁾	P_D	125	W
Single pulsed avalanche energy ⁴⁾	EAS	30	mJ
Operation and storage temperature	T_{stg}, T_j	-55 to 150	$^\circ\text{C}$
Thermal resistance, junction-case	$R_{\theta JC}$	1	$^\circ\text{C/W}$
Thermal resistance, junction-ambient ⁵⁾	$R_{\theta JA}$	62	$^\circ\text{C/W}$

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Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
BV_{DS}	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	$V_{GS}=10\text{ V}$, $I_D=20\text{ A}$		6.8	9.1	m Ω
$R_{DS(ON)}$	Drain-source on-state resistance	$V_{GS}=4.5\text{ V}$, $I_D=10\text{ A}$		9.2	11	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	$V_{GS}=0\text{ V}$, $V_{DS}=50\text{ V}$, $f=100\text{ kHz}$		2182		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	$V_{GS}<V_{th}$			80	A
I_{SP}	Pulsed source current				180	
V_{SD}	Diode forward voltage	$I_S=20\text{ A}$, $V_{GS}=0\text{ V}$ $I_S=10\text{ A}$, $di/dt=100\text{ A}/\mu\text{s}$			1.3	V
t_{rr}	Reverse recovery time			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 $T_J=25^\circ\text{C}$.
- 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 $T_a=25^\circ\text{C}$.

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Electrical Characteristics Diagrams

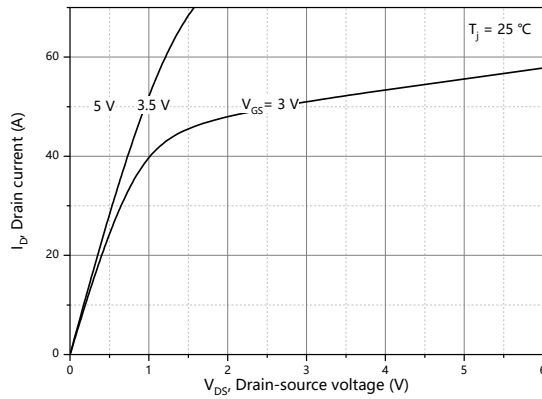


Figure 1, Typ. output characteristics

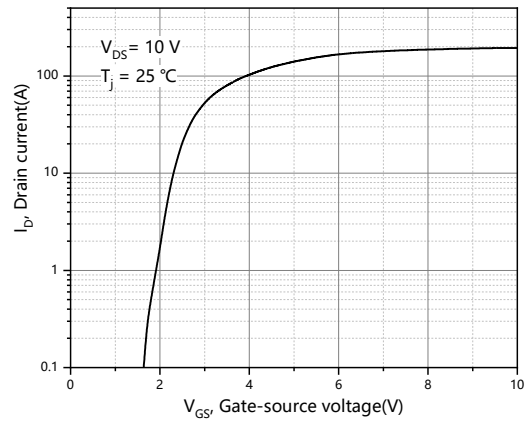


Figure 2, Typ. transfer characteristics

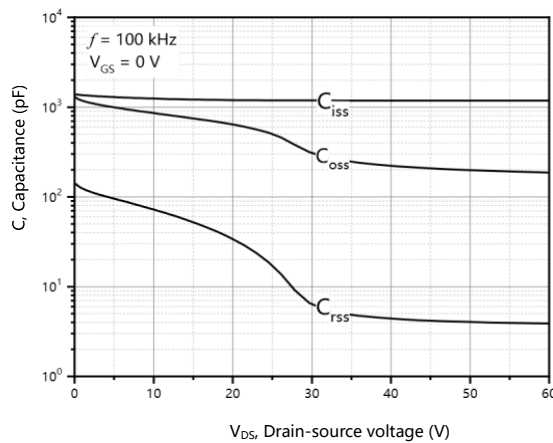


Figure 3, Typ. capacitances

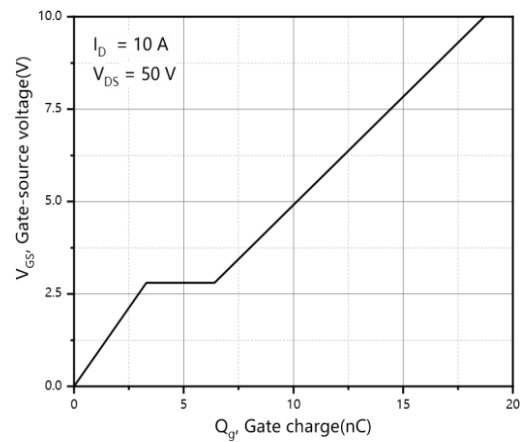


Figure 4, Typ. gate charge

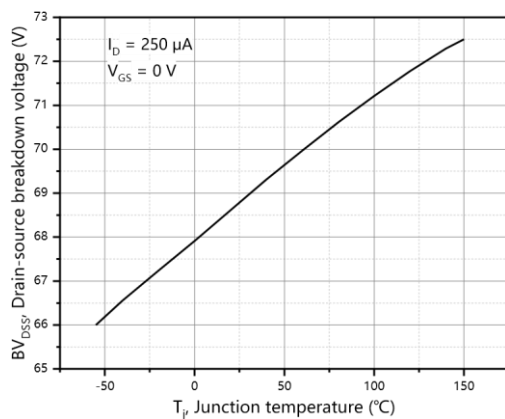


Figure 5, Drain-source breakdown voltage

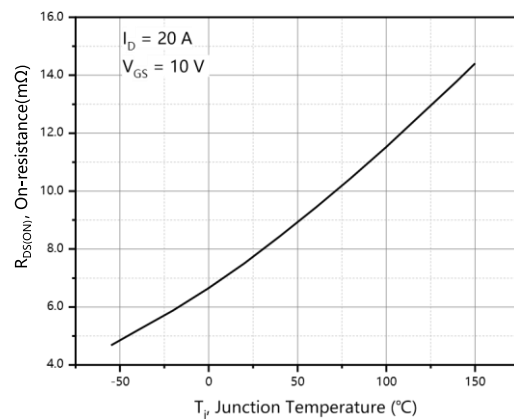


Figure 6, Drain-source on-state resistance



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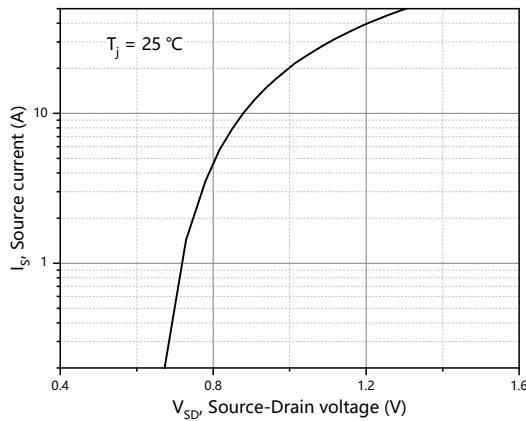


Figure 7, Forward characteristic of body diode

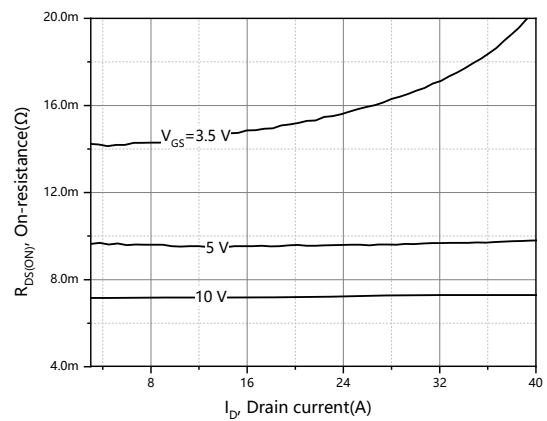


Figure 8, Drain-source on-state resistance

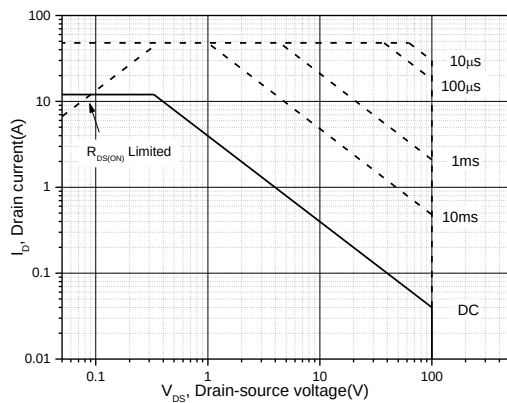


Figure 9, Safe operation area $T_C=25\text{ }^{\circ}\text{C}$

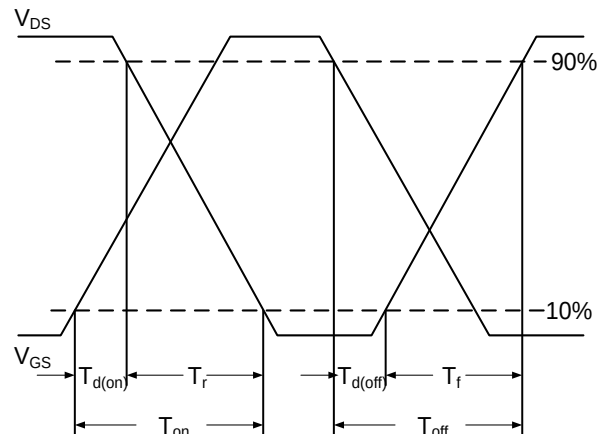


Fig.10 Switching Time Waveform

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

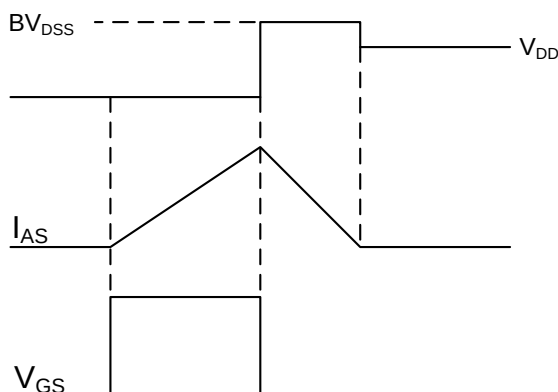
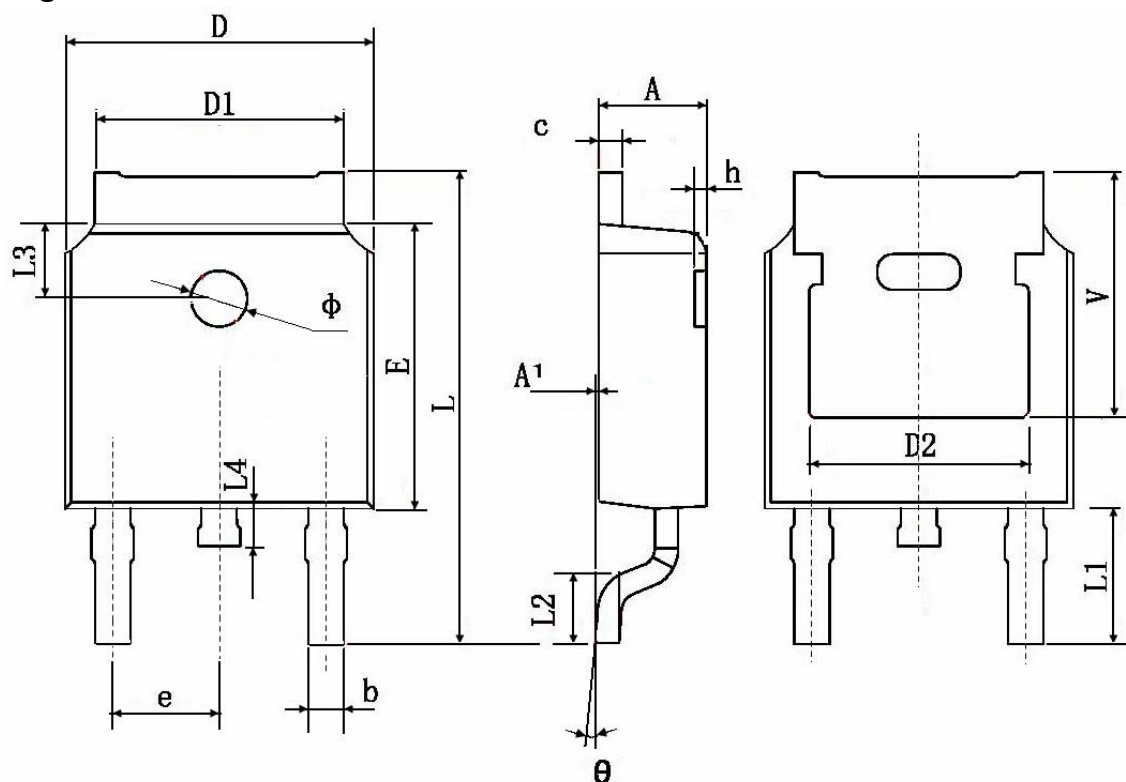


Fig.11 Unclamped Inductive Switching Waveform

Package Information : TO-252-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	