

### Features

- 100% EAS Guaranteed
- Green Device Available
- Super Low Gate Charge
- Excellent  $CdV/dt$  effect decline
- Advanced high cell density Trench technology

### Description

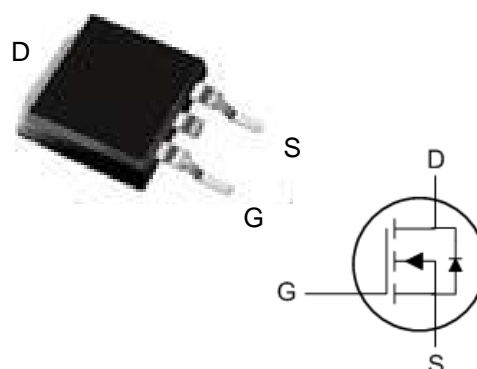
The D80N03M is the high cell density trenched N-ch MOSFETs, which provide excellent  $R_{DS(on)}$  and gate charge for most of the synchronous buck converter applications.

The D80N03M meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

### Product Summary

BVDSS	$R_{DS(on)}$	$I_D$
30V	5.5mΩ	80A

### TO-252Pin Configuration



### Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		10s	Steady State	
$V_{DS}$	Drain-Source Voltage	30		V
$V_{GS}$	Gate-Source Voltage	$\pm 20$		V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	80		A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	57		A
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	27	17	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	23	14.5	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	160		A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	115.2		mJ
$I_{AS}$	Avalanche Current	48		A
$P_D @ T_C = 25^\circ C$	Total Power Dissipation <sup>4</sup>	53		W
$P_D @ T_A = 25^\circ C$	Total Power Dissipation <sup>4</sup>	6	2.4	W
$T_{STG}$	Storage Temperature Range	-55 to 175		$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 175		$^\circ C$

### Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient (Steady State) <sup>1</sup>	---	62	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup> ( $t \leq 10s$ )	---	25	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	2.8	$^\circ C/W$

# D80N03M

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V , I <sub>D</sub> =250uA	30	---	---	V
△BV <sub>DSS</sub> /△T <sub>J</sub>	BVDSS Temperature Coefficient	Reference to 25°C , I <sub>D</sub> =1mA	---	0.028	---	V/°C
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V , I <sub>D</sub> =30A	---	4.7	5.5	mΩ
		V <sub>GS</sub> =4.5V , I <sub>D</sub> =15A	---	7.5	9	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.0	1.5	2.5	V
△V <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	-6.16	---	mV/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =24V , V <sub>GS</sub> =0V , T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =24V , V <sub>GS</sub> =0V , T <sub>J</sub> =55°C	---	---	5	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =± 20V , V <sub>DS</sub> =0V	---	---	± 100	nA
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =5V , I <sub>D</sub> =30A	---	22	---	S
R <sub>g</sub>	Gate Resistance	V <sub>DS</sub> =0V , V <sub>GS</sub> =0V , f=1MHz	---	1.7	3.4	Ω
Q <sub>g</sub>	Total Gate Charge (4.5V)	V <sub>DS</sub> =15V , V <sub>GS</sub> =4.5V , I <sub>D</sub> =15A	---	20	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	7.6	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	7.2	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =15V , V <sub>GS</sub> =10V , R <sub>G</sub> =3.3Ω I <sub>D</sub> =15A	---	7.8	---	ns
T <sub>r</sub>	Rise Time		---	15	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	37.3	---	
T <sub>f</sub>	Fall Time		---	10.6	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V , V <sub>GS</sub> =0V , f=1MHz	---	2295	---	pF
C <sub>oss</sub>	Output Capacitance		---	267	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	210	---	
Diode Characteristics						
I <sub>S</sub>	Continuous Source Current <sup>1,5</sup>	V <sub>G</sub> =V <sub>D</sub> =0V , Force Current	---	---	80	A
I <sub>SM</sub>	Pulsed Source Current <sup>2,5</sup>		---	---	160	A
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V , I <sub>S</sub> =1A , T <sub>J</sub> =25°C	---	---	1	V
t <sub>rr</sub>	Reverse Recovery Time	IF=30A , dI/dt=100A/μs ,	---	14	---	nS
Q <sub>rr</sub>	Reverse Recovery Charge	T <sub>J</sub> =25°C	---	5	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is  $V_{DD}=25V$ ,  $V_{GS}=10V$ ,  $L=0.1mH$ ,  $I_{AS}=53.8A$
- 4.The power dissipation is limited by  $175^\circ\text{C}$  junction temperature
- 5.The data is theoretically the same as  $I_D$  and  $I_{DM}$  , in real applications , should be limited by total power dissipation.

Typical Characteristics

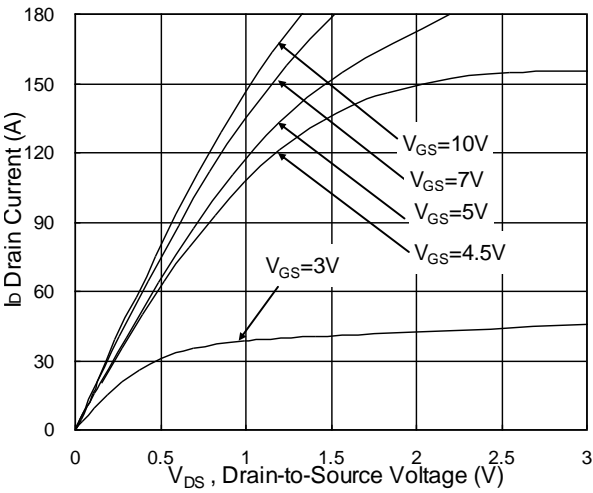


Fig.1 Typical Output Characteristics

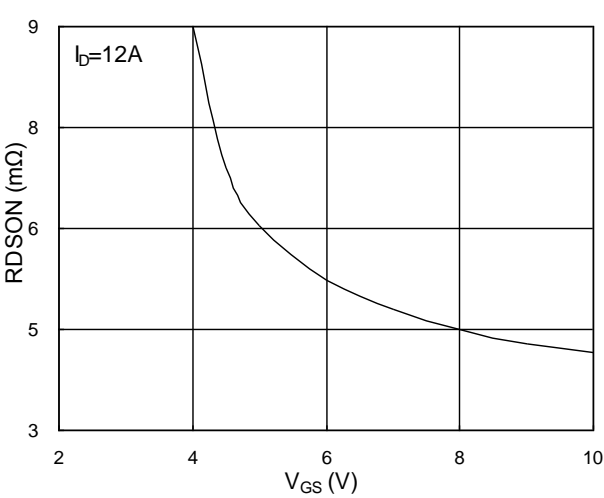


Fig.2 On-Resistance vs. G-S Voltage

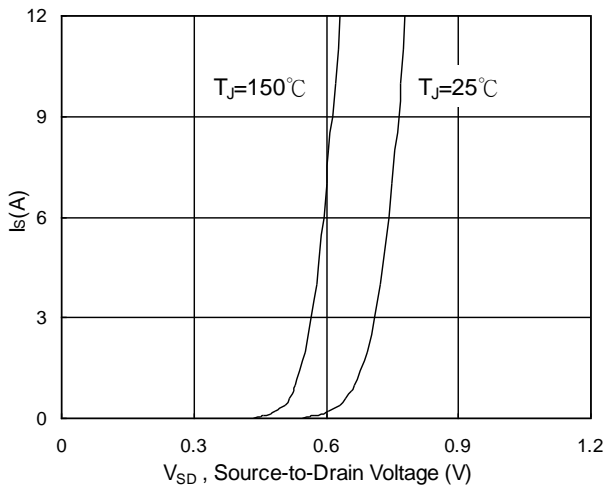


Fig.3 Forward Characteristics of Reverse

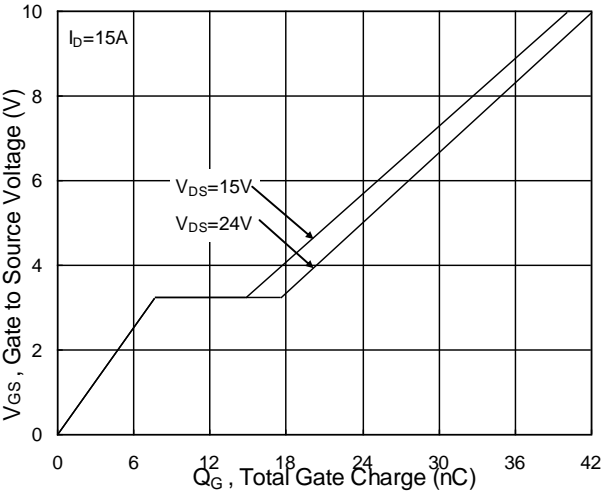


Fig.4 Gate-Charge Characteristics

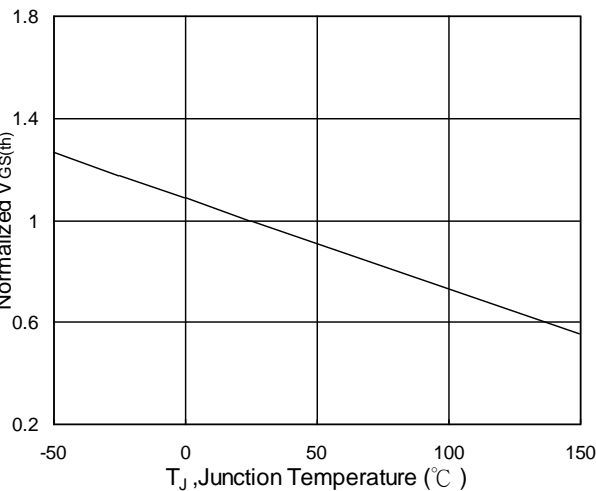


Fig.5 Normalized V<sub>GS(th)</sub> vs. T<sub>J</sub>

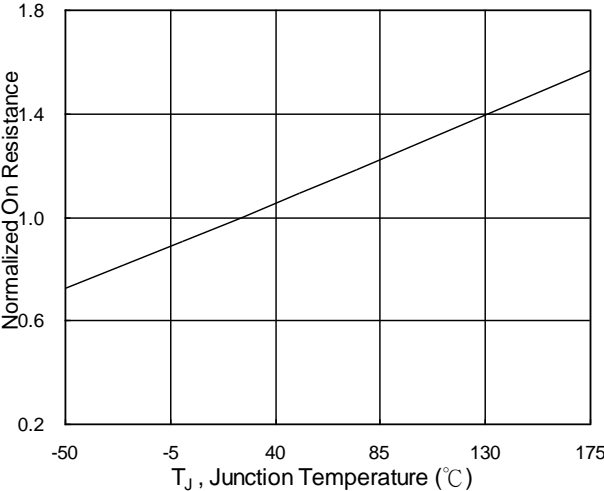


Fig.6 Normalized R<sub>DSON</sub> vs. T<sub>J</sub>

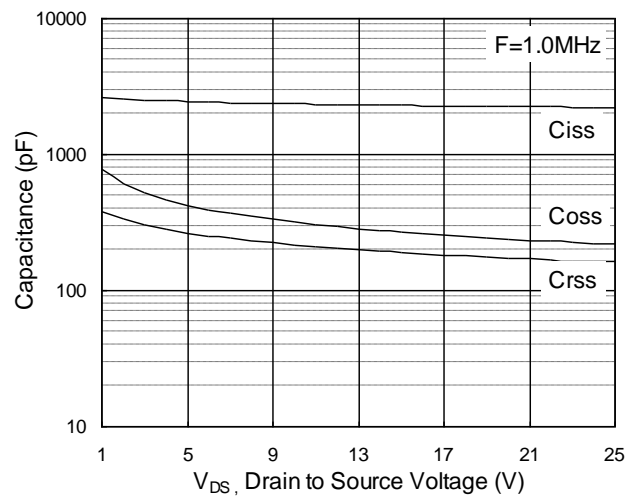


Fig.7 Capacitance

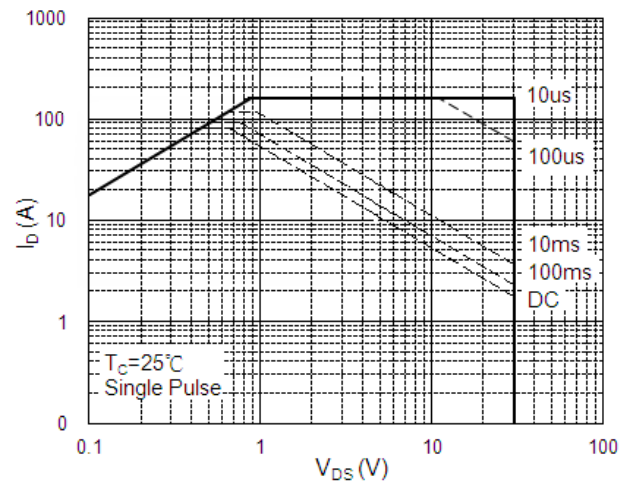


Fig.8 Safe Operating Area

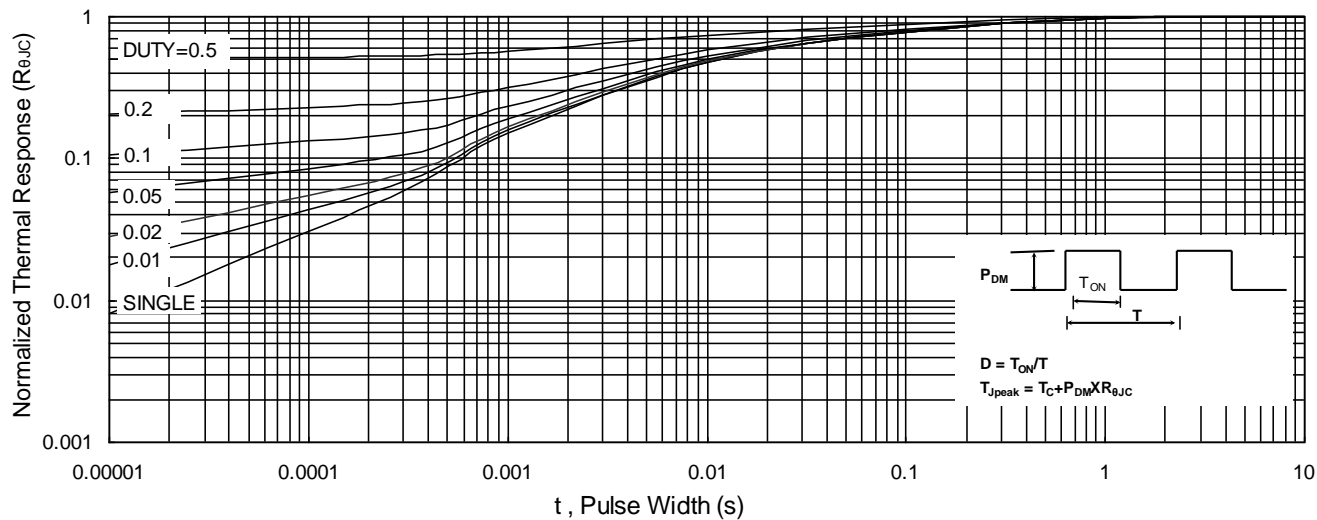


Fig.9 Normalized Maximum Transient Thermal Impedance

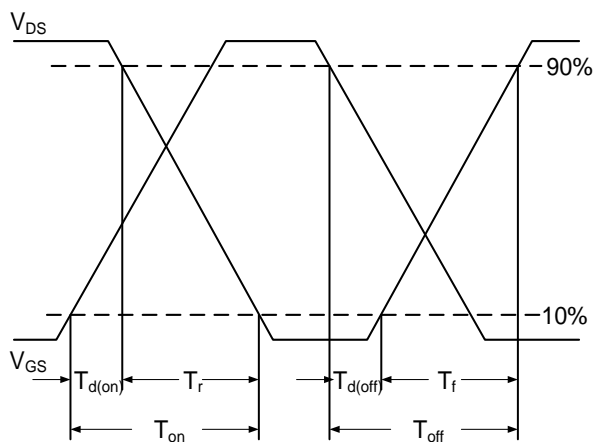


Fig.10 Switching Time Waveform

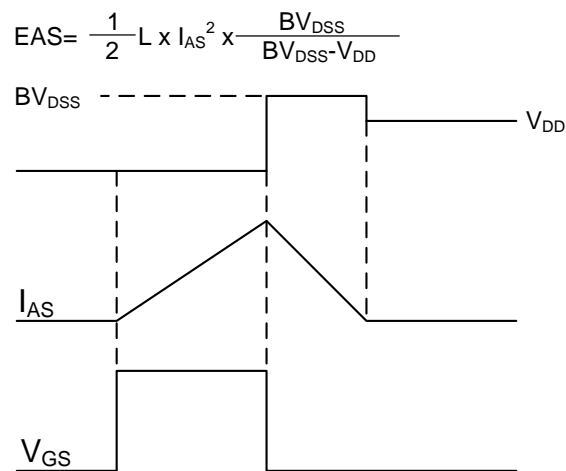
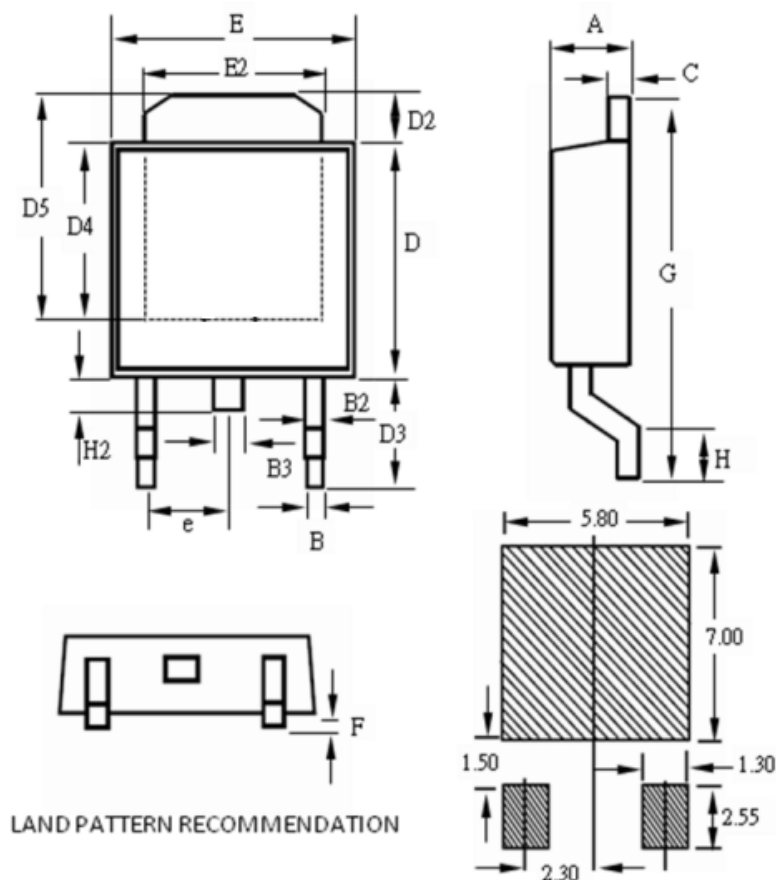


Fig.11 Unclamped Inductive Switching Waveform

## TO-252 Package Outline



SYMBOLS	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	2.10	--	2.50	0.083	--	0.098
B	0.30	--	0.89	0.012	--	0.035
B2	0.40	--	1.14	0.016	--	0.045
B3	0.60	--	1.00	0.024	--	0.039
C	0.40	--	0.89	0.016	--	0.035
D	5.30	--	6.25	0.209	--	0.246
D2	0.50	--	1.70	0.020	--	0.067
D3	2.20	--	3.40	0.087	--	0.134
D4	4.32	--	--	0.170	--	--
D5	5.21	--	--	0.205	--	--
E	6.30	--	6.73	0.248	--	0.265
E2	4.80	--	5.46	0.189	--	0.215
F	0.00	--	0.30	0.000	--	0.012
G	9.20	--	10.41	0.362	--	0.410
H	0.90	--	1.95	0.035	--	0.077
H2	0.50	--	1.10	0.020	--	0.043
e	--	2.30	--	--	0.091	--

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