

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

## Product Summary

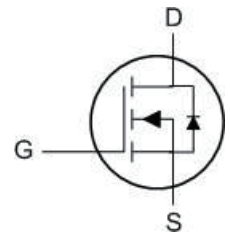
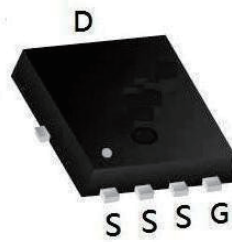
BVDSS	RDS(ON)	ID
30V	5.2mΩ	80A

## Description

The 80N03D is the high cell density trenched N-ch MOSFETs, which provide excellent RDS(ON) and gate charge for most of the synchronous buck converter applications.

The 80N03D meet the RoHS and Green Product, requirement 100% EAS guaranteed with full function reliability approved.

## PDFN3\*3 Pin Configuration



## Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		10s	Steady State	
V <sub>DS</sub>	Drain-Source Voltage	30		V
V <sub>GS</sub>	Gate-Source Voltage	±20		V
I <sub>D</sub> @T <sub>C</sub> =25°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup>	80		A
I <sub>D</sub> @T <sub>C</sub> =100°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup>	50		A
I <sub>DM</sub>	Pulsed Drain Current <sup>2</sup>	192		A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	306		mJ
I <sub>AS</sub>	Avalanche Current	53.8		A
P <sub>D</sub> @T <sub>C</sub> =25°C	Total Power Dissipation <sup>4</sup>	82.5		W
T <sub>STG</sub>	Storage Temperature Range	-55 to 175		°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 175		°C

## Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJC</sub>	Thermal Resistance Junction-Case <sup>2</sup>	---	1.8	°C/W

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

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Units
<b>Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=30V, V_{GS}=0V$	-	-	1	$\mu A$
$I_{GSS}$	Gate-Body Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics</b> (Note 3)						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.6	3	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	$V_{GS}=10V, I_D=30A$	-	5.2	6.5	m $\Omega$
		$V_{GS}=5V, I_D=24A$	-	7.5	10	
$g_{FS}$	Forward Transconductance	$V_{DS}=5V, I_D=24A$	20	-	-	S
<b>Dynamic Characteristics</b> (Note 4)						
$C_{iss}$	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, F=1.0\text{MHz}$	-	2016	-	PF
$C_{oss}$	Output Capacitance		-	251	-	PF
$C_{rss}$	Reverse Transfer Capacitance		-	230	-	PF
<b>Switching Characteristics</b> (Note 4)						
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=10V, I_D=30A$ $V_{GS}=10V, R_{GEN}=2.7\Omega$	-	20	-	nS
$t_r$	Turn-on Rise Time		-	15	-	nS
$t_{d(off)}$	Turn-Off Delay Time		-	60	-	nS
$t_f$	Turn-Off Fall Time		-	10	-	nS
$Q_g$	Total Gate Charge	$V_{DS}=10V, I_D=30A, V_{GS}=10V$	-	60.5	-	nC
$Q_{gs}$	Gate-Source Charge		-	8.1	-	nC
$Q_{gd}$	Gate-Drain Charge		-	7.8	-	nC
<b>Drain-Source Diode Characteristics</b>						
$V_{SD}$	Diode Forward Voltage (Note 3)	$V_{GS}=0V, I_S=24A$	-	-	1.2	V
$I_S$	Diode Forward Current (Note 2)		-	-	80	A
$t_{rr}$	Reverse Recovery Time	$T_J = 25^\circ\text{C}, I_F = 80A$ $di/dt = 100A/\mu s$ (Note 3)	-	32	50	nS
$Q_{rr}$	Reverse Recovery Charge		-	12	20	nC
$t_{on}$	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

**Note :**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production
5. EAS condition:  $T_J=25^\circ\text{C}, V_{DD}=15V, V_G=10V, L=0.5\text{mH}, R_g=25\Omega, I_{AS}=35A$

Typical Performance Characteristics

Figure 1: Output Characteristics

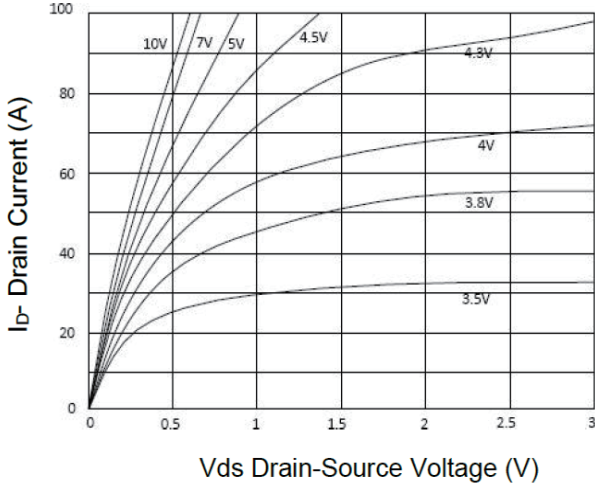


Figure 4:  $R_{DS(on)}$ -Junction Temperature

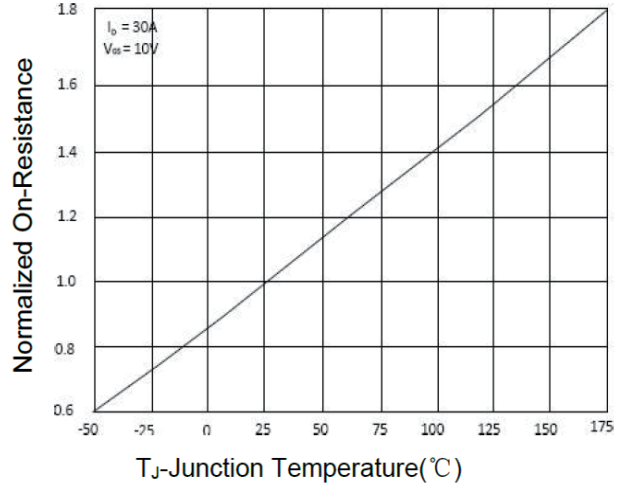


Figure 2: Transfer Characteristics

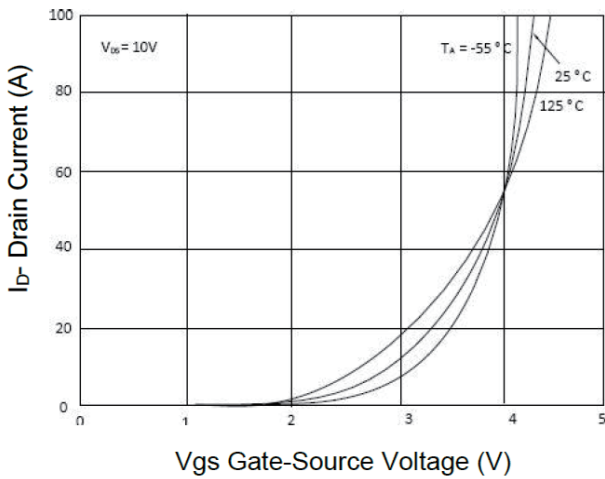


Figure 5: Gate Charge

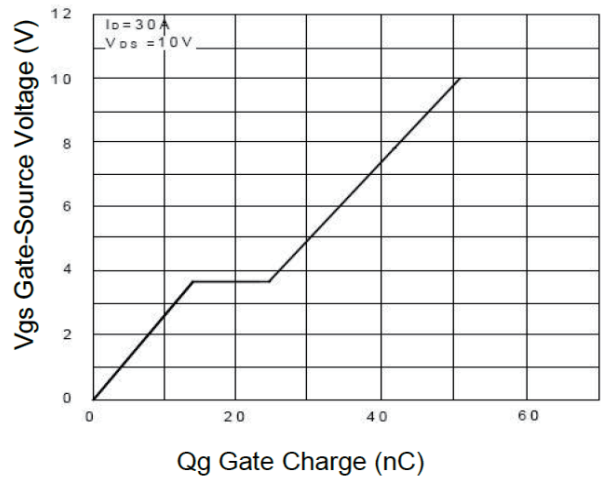


Figure 3:  $R_{DS(on)}$ - Drain Current

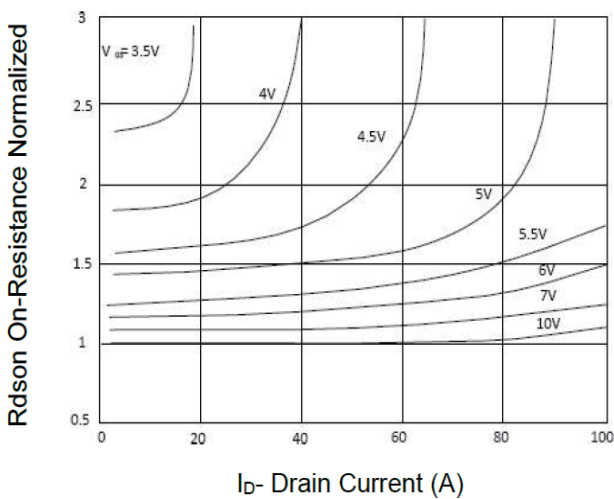
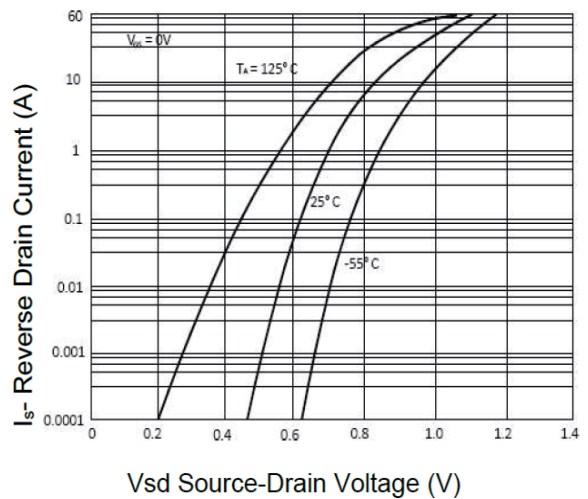


Figure 6: Source- Drain Diode Forward



Typical Performance Characteristics

Figure 7: Capacitance vs Vds

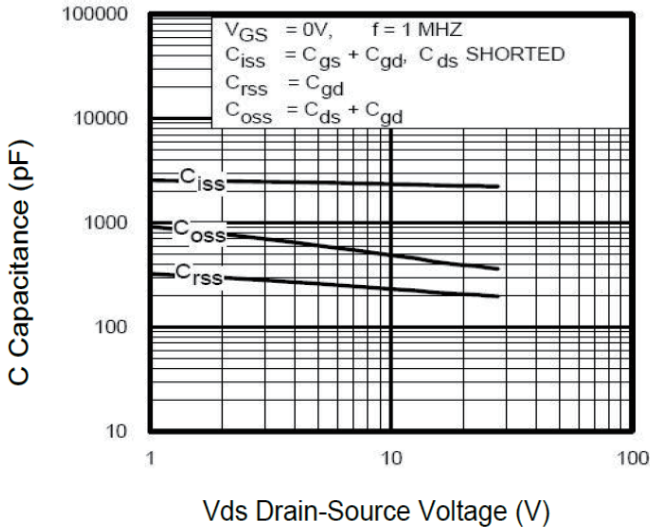


Figure 9: BVdss vs Junction Temperature

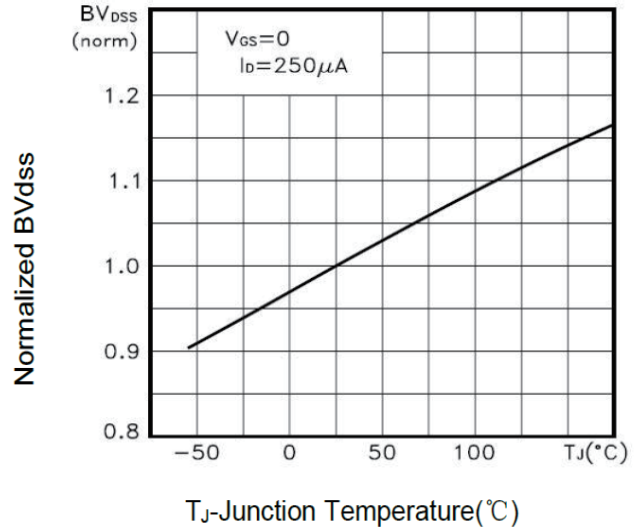


Figure 8: Safe Operation Area

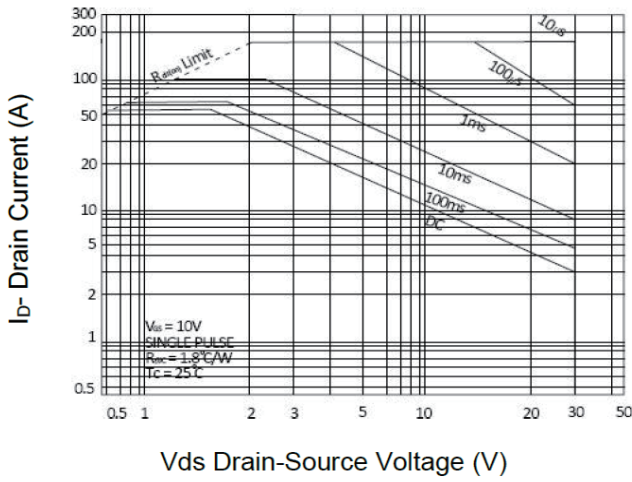


Figure 10: VGS(th) vs Junction Temperature

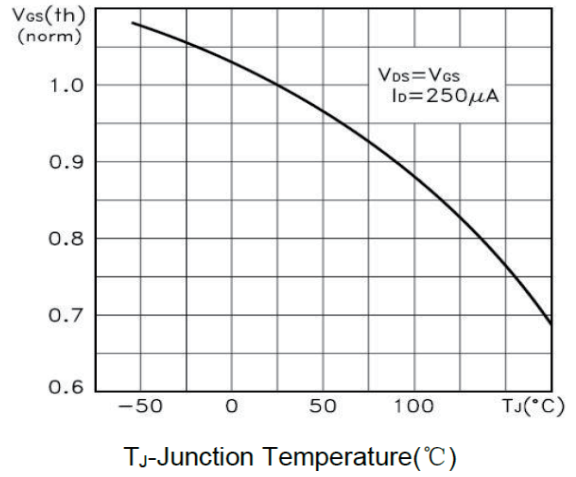
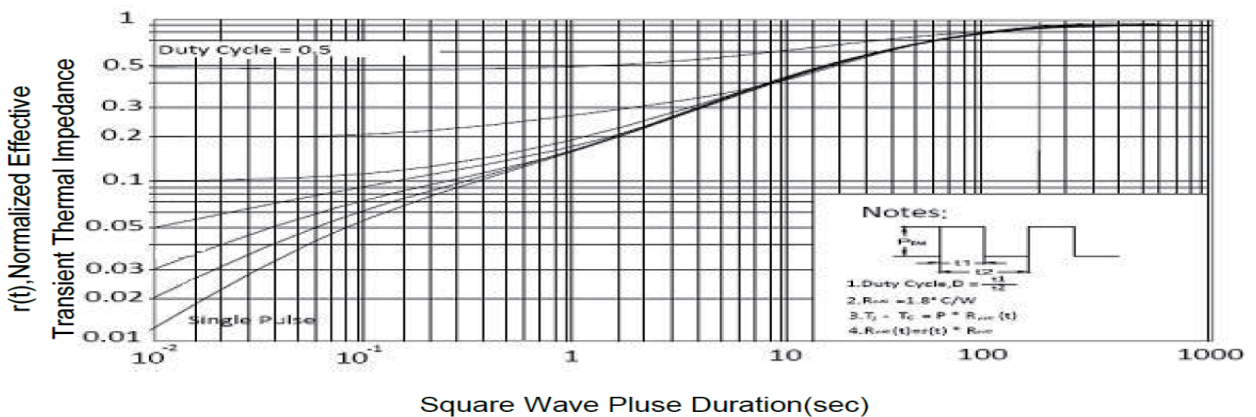
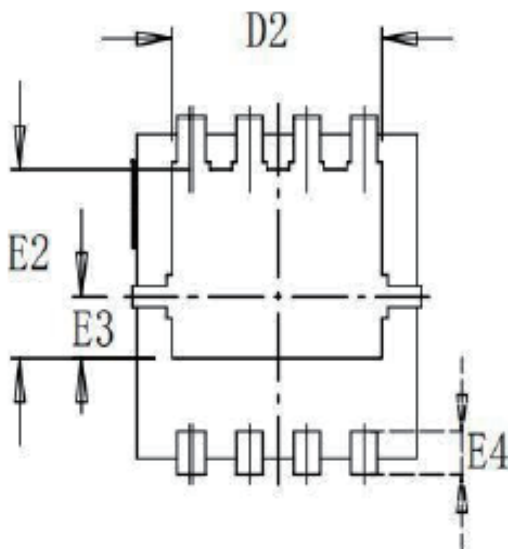
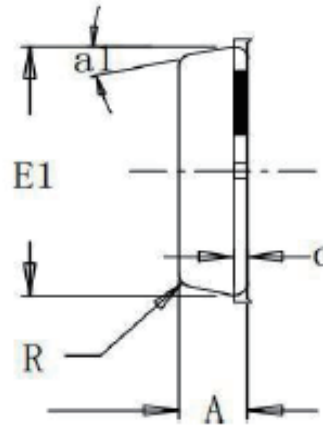
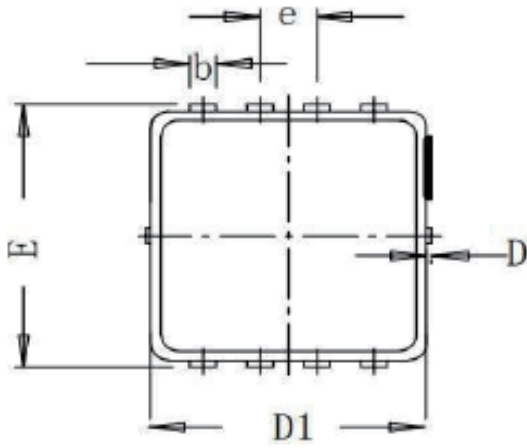


Figure 11: Normalized Maximum Transient Thermal Impedance





SYMBOL	MILLIMETER		
	MIN	NOM	MAX
<b>A</b>	0.75	0.78	0.81
<b>b</b>	0.297	0.3	0.35
<b>c</b>	—	0.152	—
<b>D</b>	0.00	0.05	0.1
<b>D1</b>	3.12	3.15	3.18
<b>D2</b>	—	2.35	—
<b>E</b>	3.2	3.3	3.4
<b>E1</b>	3.09	3.12	3.15
<b>E2</b>	—	1.75	—
<b>E3</b>	—	0.575	—
<b>E4</b>	—	0.4	—
<b>R</b>	—	0.15	—
<b>e</b>	0.65BSC		
<b>a1°</b>	—	12°	—

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