

## 30V N-Channel Enhancement Mode MOSFET

### Description

The NP35S03QR uses SGT technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of  $R_{DS(ON)}$  and  $Q_g$ . This device is ideal for high-frequency switching and synchronous rectification.

### General Features

- ◆  $V_{DS} = 30V$ ,  $I_D = 35A$   
 $R_{DS(ON)} = 7.3m\Omega$  (typical) @  $V_{GS} = 10V$   
 $R_{DS(ON)} = 10 m\Omega$  (typical) @  $V_{GS} = 4.5V$
- ◆ Excellent gate charge x  $R_{DS(ON)}$  product(FOM)
- ◆ Very low on-resistance  $R_{DS(ON)}$
- ◆ 150 °C operating temperature
- ◆ Pb-free lead plating
- ◆ 100% UIS tested

### Application

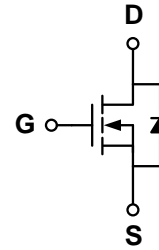
- ◆ DC/DC Converter
- ◆ Ideal for high-frequency switching and synchronous rectification

### Package

- ◆ PDFN3X3-8L

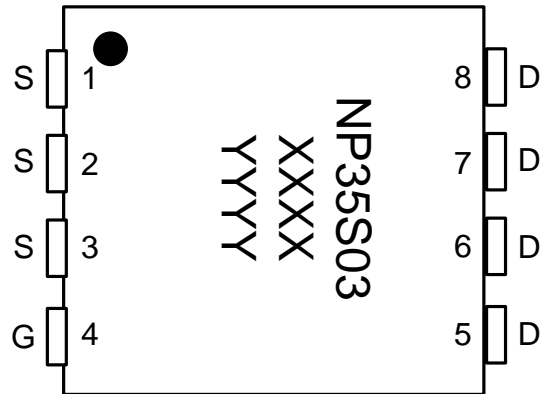


### Schematic diagram



### Marking and pin assignment

**PDFN3×3-8L**  
(Top View)



XXXX—Wafer Information  
 YYYY—Quality Code

### Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
NP35S03QR-G	-55°C to +150°C	PDFN3X3-8L	5000

### Absolute Maximum Ratings (TA=25°C unless otherwise noted)

parameter	symbol	limit	unit
Drain-source voltage	$V_{DS}$	30	V
Gate-source voltage	$V_{GS}$	±20	V
Drain Current-Continuous (Silicon Limited)	$I_D$	35	A
Drain Current-Continuous( $T_C=100^\circ C$ )	$I_D (100^\circ C)$	18	A
Pulsed Drain Current (Package Limited)	$I_{DM}$	140	A

Single pulse avalanche energy	$E_{AS}$	60	mJ
Maximum power dissipation	$P_D$	27	W
Operating junction Temperature range	$T_j$	-55—150	°C

### Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>OFF Characteristics</b>						
Drain-source breakdown voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS}=30V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-body leakage	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	$\pm 10$	$\mu A$
<b>ON Characteristics</b>						
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.6	2	V
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	-	7.3	10	m $\Omega$
		$V_{GS}=4.5V, I_D=20A$	-	10	14	
Forward transconductance	$g_{fs}$	$V_{DS}=5V, I_D=20A$	26	30	-	S
<b>Dynamic Characteristics</b>						
Input capacitance	$C_{ISS}$	$V_{DS}=-20V, V_{GS}=0V$ $f=1.0MHz$	-	701	-	pF
Output capacitance	$C_{OSS}$		-	116	-	
Reverse transfer capacitance	$C_{RSS}$		-	105	-	
<b>Switching Characteristics</b>						
Turn-on delay time	$t_{D(ON)}$	$V_{DS}=-20V$ $I_D=-2.8A$ $V_{GEN}=-4.5V$ $R_L=10ohm$ $R_{GEN}=-60ohm$	-	14	-	ns
Rise time	$t_r$		-	18	-	
Turn-off delay time	$t_{D(OFF)}$		-	50	-	
Fall time	$t_f$		-	21	-	
Total gate charge	$Q_g$	$V_{DS}=-20V, I_D=-3A$ $V_{GS}=-4.5V$	-	16.8	-	nC
Gate-source charge	$Q_{gs}$		-	3	-	
Gate-drain charge	$Q_{gd}$		-	4.4	-	

### Thermal Characteristics

Thermal Resistance junction-to ambient	$R_{th JA}$	100	°C/W
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## Typical Performance Characteristics

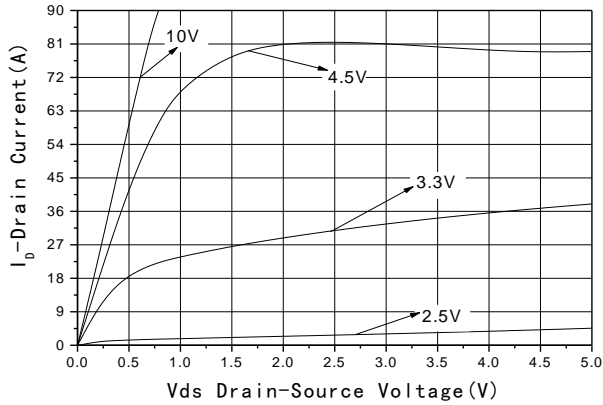


Fig1 Output Characteristics

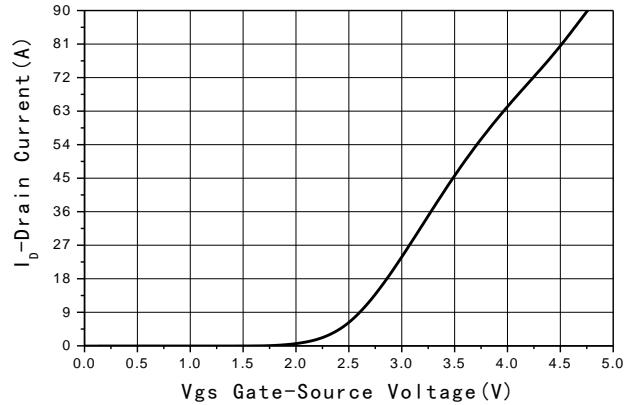


Fig2 Transfer Characteristics

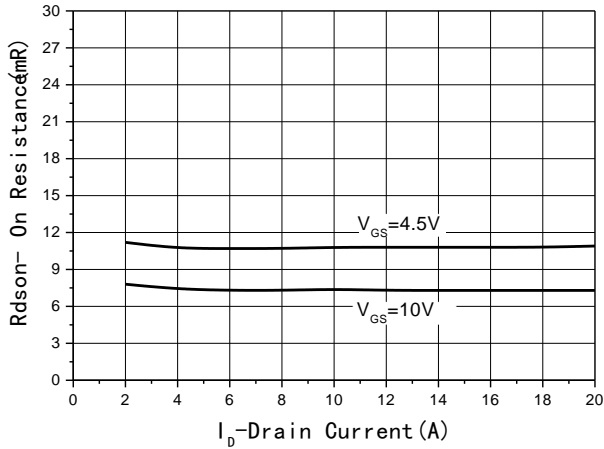


Fig3  $R_{DS(on)}$ -Drain current

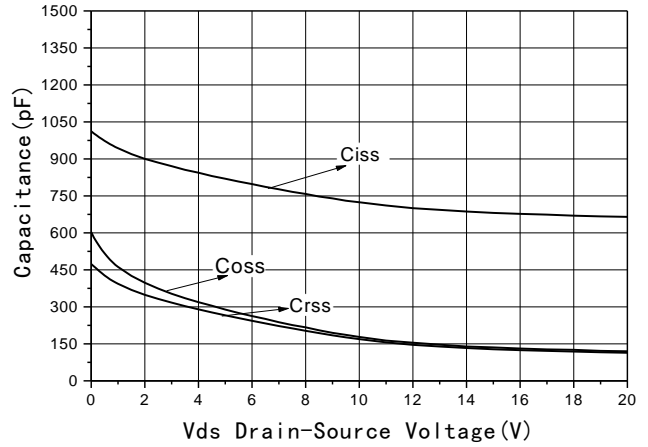


Fig4 Capacitance vs  $V_{DS}$

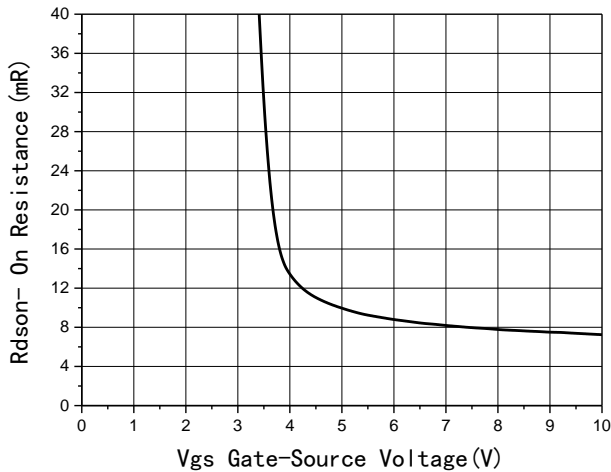


Fig5  $R_{DS(on)}$ -Gate Drain voltage

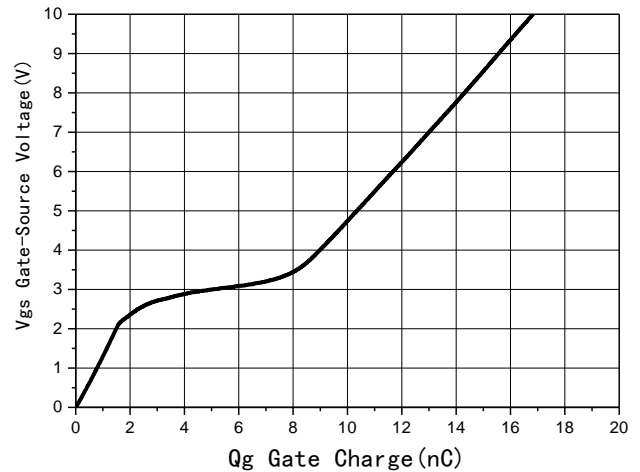
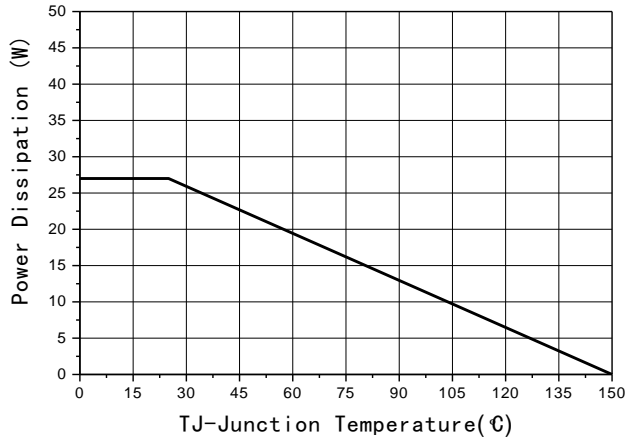
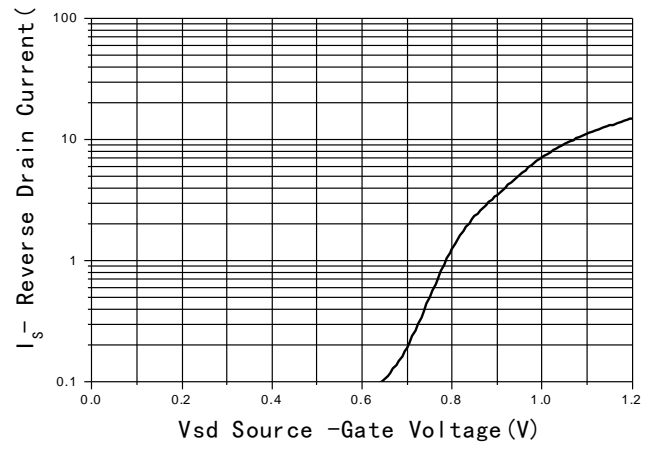


Fig6 Gate Charge



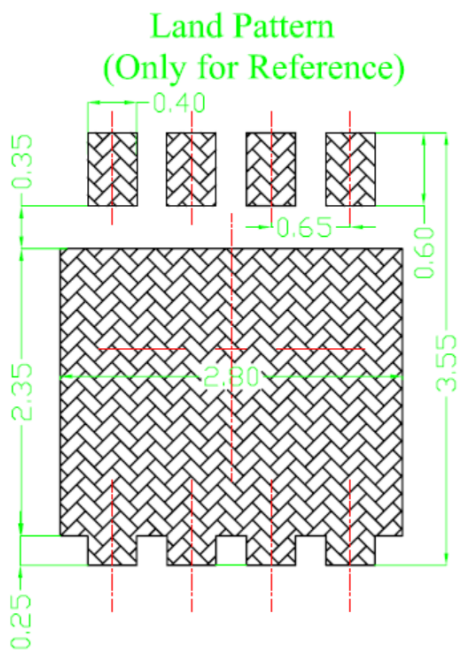
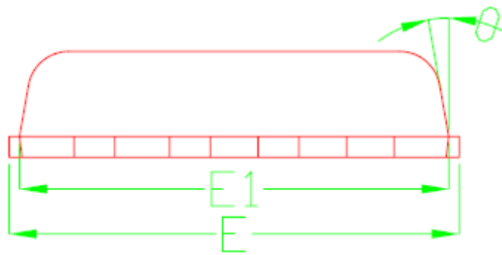
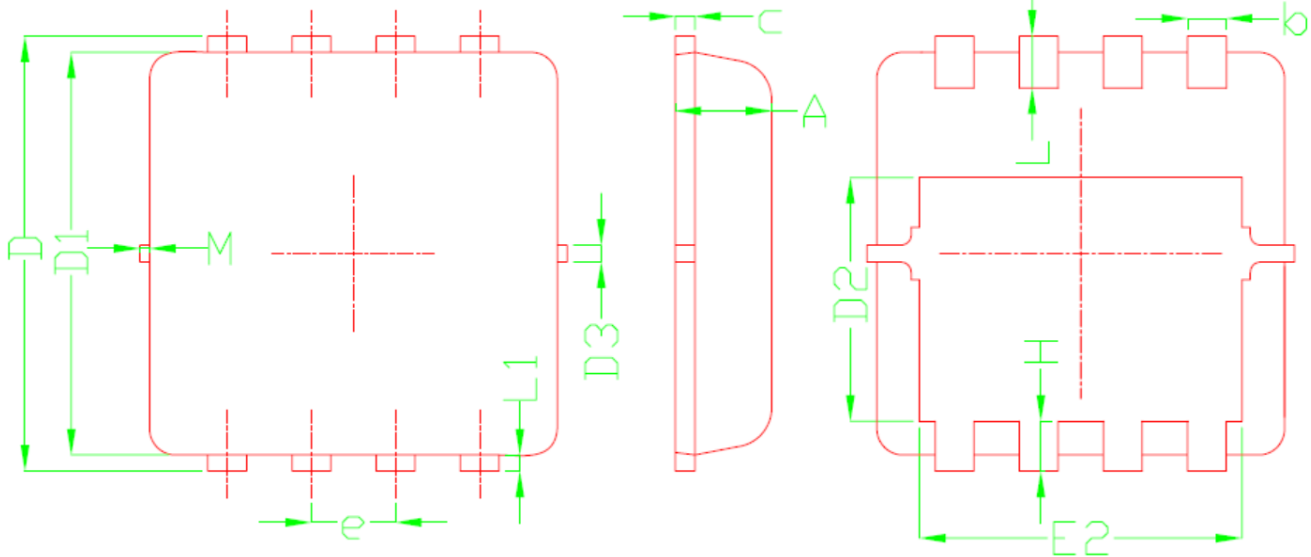
**Fig7 Power De-rating**



**Fig8 Source-Drain Diode Forward**

## Package Information

- PDFN3×3-8L



SYMBOL	DIMENSIONAL REQMTS		
	MIN	NOM	MAX
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.78	1.88	1.98
D3	---	0.13	---
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	---	0.13	---
$\theta$	---	10°	12°
M	*	*	0.15
* Not specified			