

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

## Product Summary

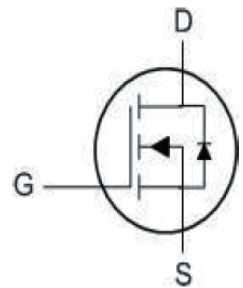
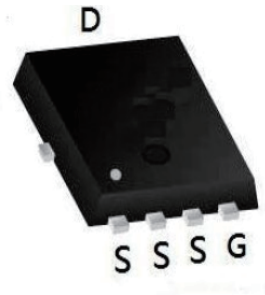
RoHS

BVDSS	RDS(on)	ID
60V	24mΩ	30A

## Description

The 30N06F is the high cell density trenched N-ch MOSFETs, which provides excellent RDS(on) and gate charge for most of the synchronous buck converter applications. The 30N06F meets the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

## PDFN5X6 Pin Configuration



## Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
30N06	30N06	PDFN5*6			5000

## Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
$V_{DS}$	Drain-Source Voltage	60	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_{D@T_C=25^\circ C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	30	A
$I_{D@T_C=100^\circ C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	15	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	60	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	50	mJ
$I_{AS}$	Avalanche Current	30	A
$P_{D@T_A=25^\circ C}$	Total Power Dissipation <sup>4</sup>	20	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

## Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup>	---	62	$^\circ C/W$

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

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Units
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	---	---	V
$\Delta BV_{DSS} / \Delta T_J$	$BV_{DSS}$ Temperature Coefficient	Reference to $25^\circ\text{C}$ , $I_D=1mA$	---	0.063	---	$V/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=10V, I_D=15A$	---	24	30	$m\Omega$
		$V_{GS}=4.5V, I_D=10A$	---	25	38	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	---	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-5.24	---	$mV/^\circ\text{C}$
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=48V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	$\mu A$
		$V_{DS}=48V, V_{GS}=0V, T_J=55^\circ\text{C}$	---	---	5	
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
$g_{fs}$	Forward Transconductance	$V_{DS}=5V, I_D=15A$	---	17	---	S
$R_g$	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	---	3.2	---	$\Omega$
$Q_g$	Total Gate Charge (4.5V)	$V_{DS}=48V, V_{GS}=4.5V, I_D=12A$	---	12.6	---	nC
$Q_{gs}$	Gate-Source Charge		---	3.2	---	
$Q_{gd}$	Gate-Drain Charge		---	6.3	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=30V, V_{GS}=10V, R_G=3.3\Omega, I_D=10A$	---	8	---	ns
$T_r$	Rise Time		---	14.2	---	
$T_{d(off)}$	Turn-Off Delay Time		---	24.4	---	
$T_f$	Fall Time		---	4.6	---	
$C_{iss}$	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1MHz$	---	1378	---	pF
$C_{oss}$	Output Capacitance		---	86	---	
$C_{rss}$	Reverse Transfer Capacitance		---	64	---	

## Diode Characteristics

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Units
$I_S$	Continuous Source Current <sup>1,5</sup>	$V_G=V_D=0V$ , Force Current	---	---	30	A
$I_{SM}$	Pulsed Source Current <sup>2,5</sup>		---	---	60	A
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1.2	V

### Notes:

1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 20Z 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  $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=22.6A$

4.The power dissipation is limited by  $150^\circ\text{C}$  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 Electrical and Thermal Characteristics (Curves)

Figure1: Output Characteristics

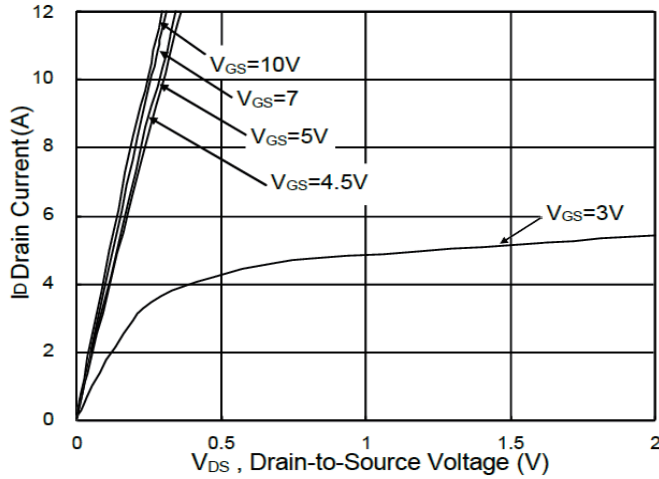


Figure 2: On-Resistance v.s Gate-Source

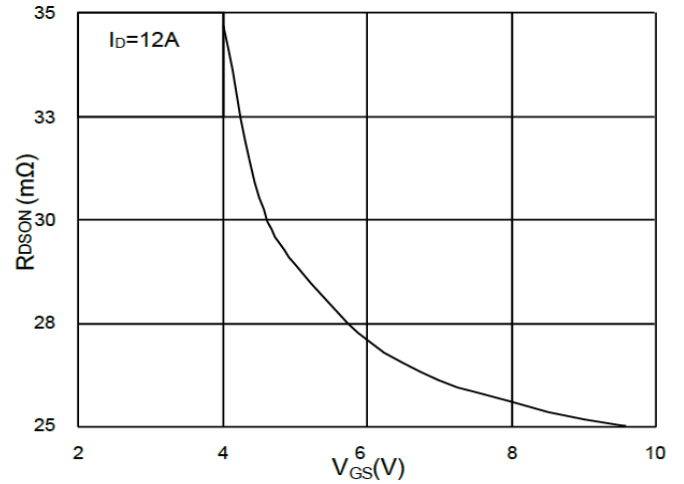


Figure 3: Forward Characteristics of Reverse

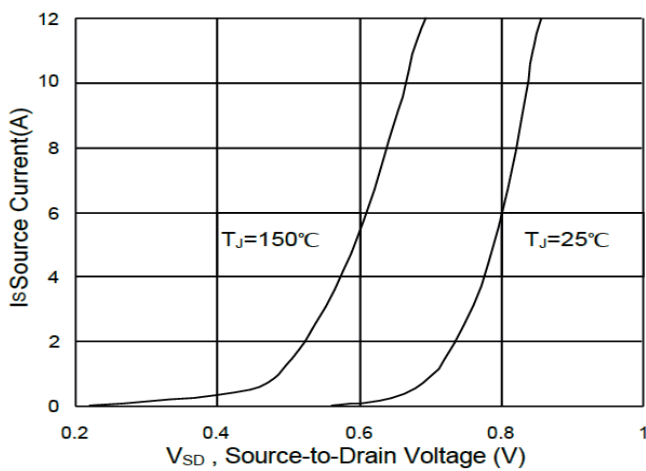


Figure 4: Gate-Charge Characteristics

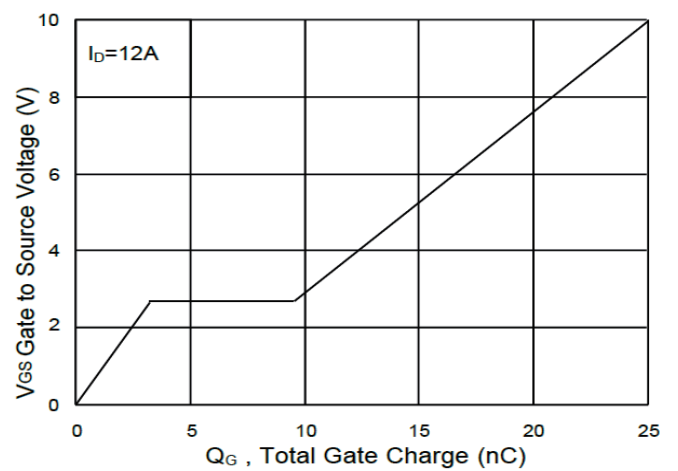


Figure 5: Normalized VGS(th) v.s TJ

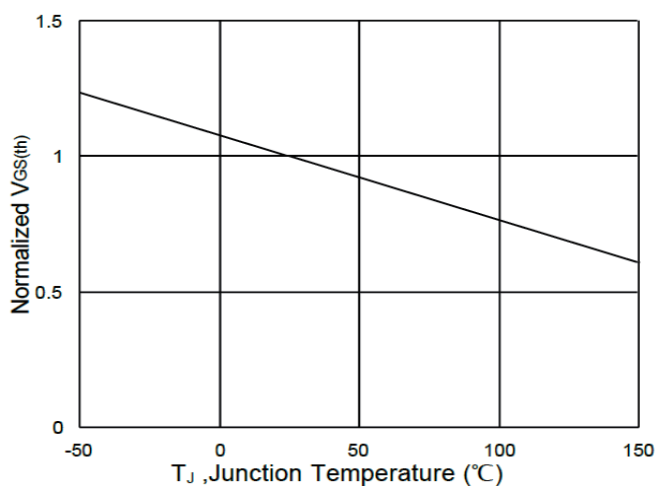
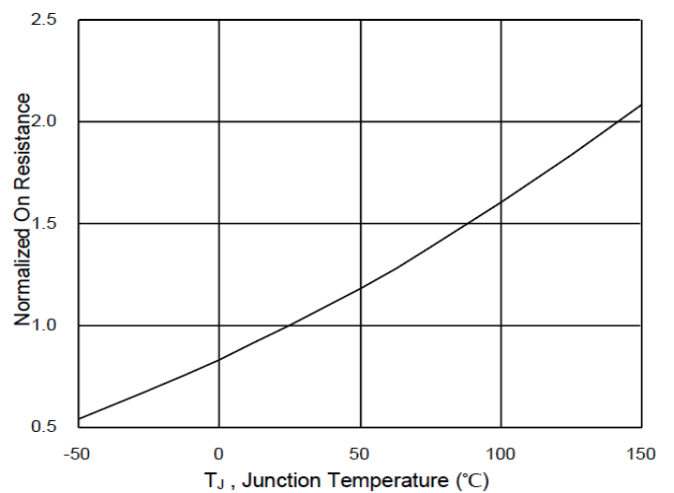


Figure 6: Normalized RDSON v.s TJ



## Typical Performance Characteristics

Figure 7: Capacitance

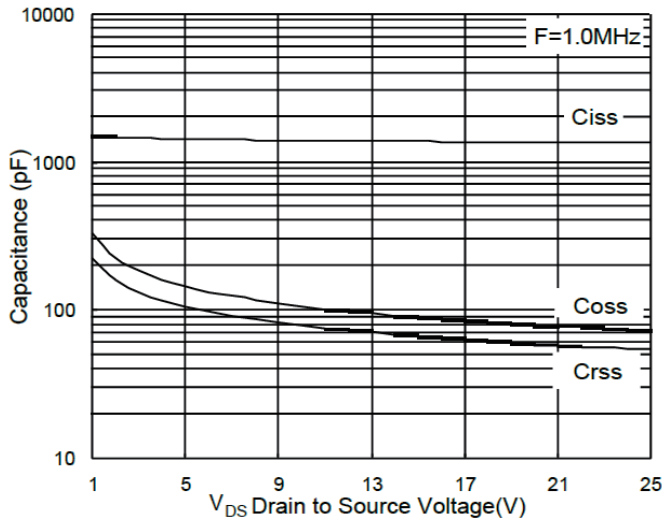


Figure 8: Safe Operating Area

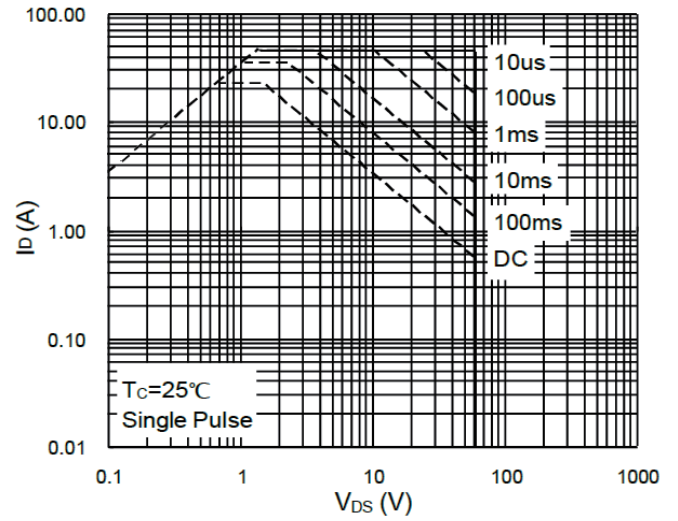


Figure 9: Normalized Maximum Transient

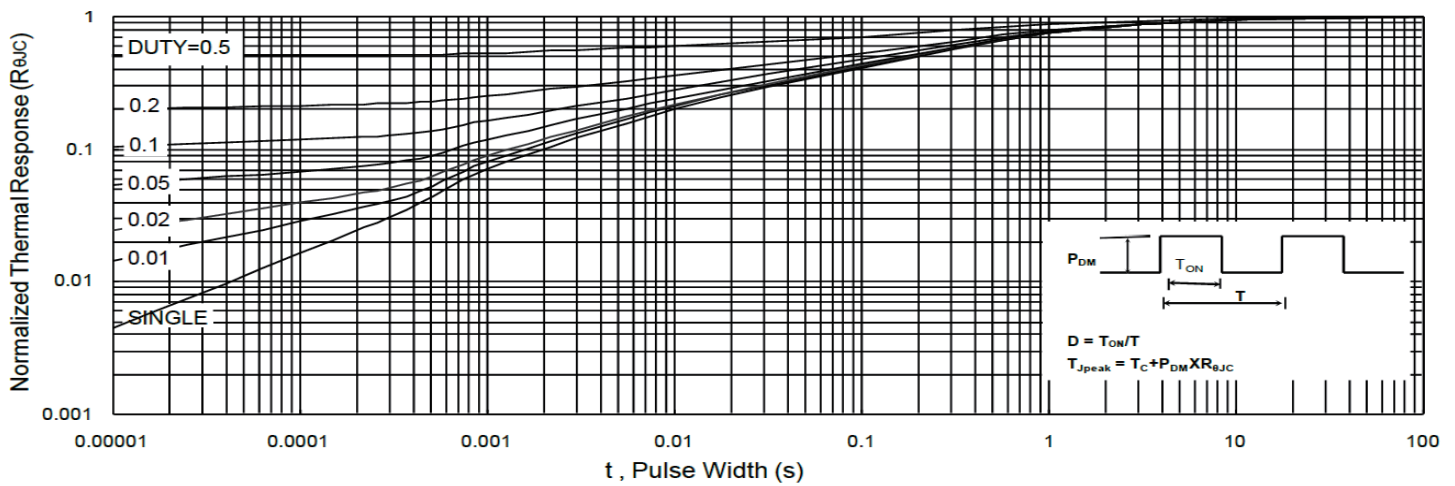


Figure 10: Switching Time Waveform

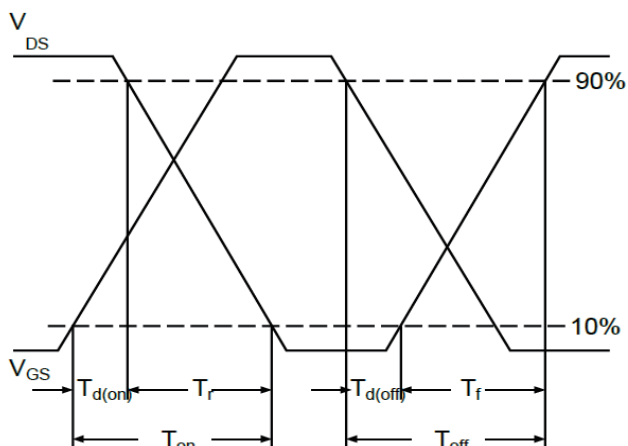
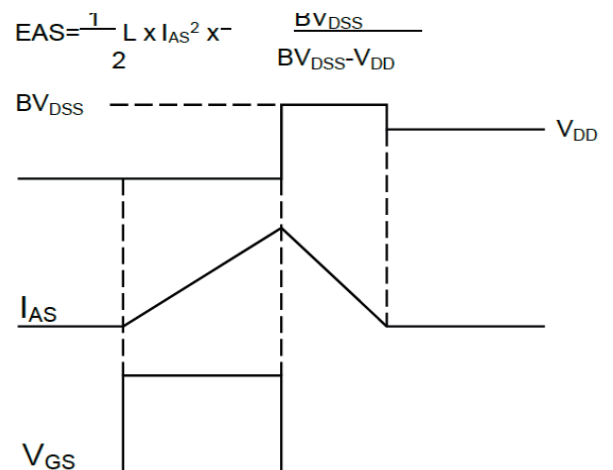
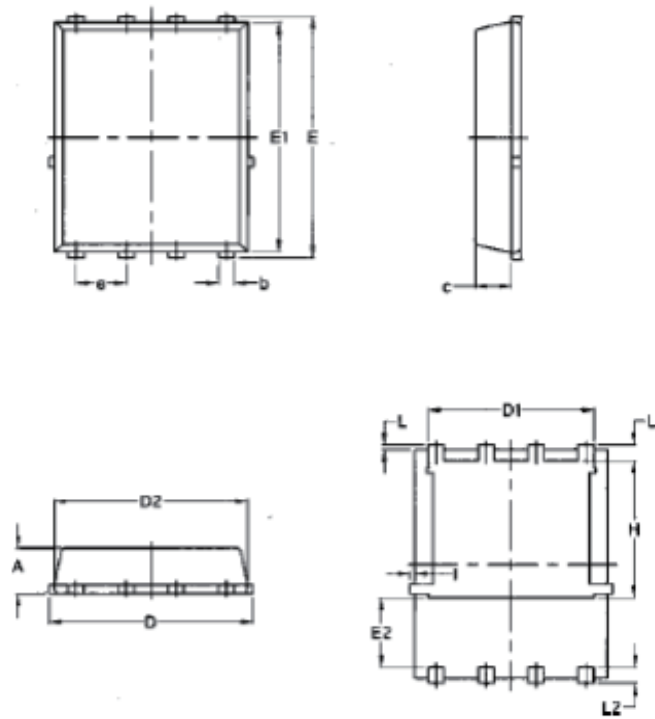


Figure 11: Unclamped Inductive Waveform



## Package Mechanical Data-DFN5\*6-8L-JQ Single



Symbol	Common			
	mm		Inch	
	Mim	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070