

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

Product Summary

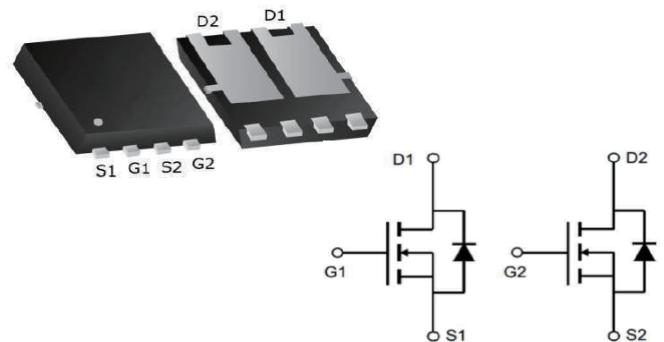
BVDSS	RDS(ON)	ID
30V	5mΩ	40A

Description

The 306D 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 306D meet the RoHS and Green Product, requirement 100% EAS guaranteed with full function reliability approved.

PDFN3X3-8 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V _{DS}	Drain-Source Voltage	30	V
V _{GS}	Gate-Source Voltage	±20	V
I _D @T _C =25°C	Continuous Drain Current, V _{GS} @ 10V ¹	40	A
I _D @T _C =100°C	Continuous Drain Current, V _{GS} @ 10V ¹	28	A
I _D @T _A =25°C	Continuous Drain Current, V _{GS} @ 10V ¹	17	A
I _D @T _A =70°C	Continuous Drain Current, V _{GS} @ 10V ¹	14	A
I _{DM}	Pulsed Drain Current ²	135	A
EAS	Single Pulse Avalanche Energy ³	39.8	mJ
I _{AS}	Avalanche Current	27	A
P _D @T _C =25°C	Total Power Dissipation ⁴	30	W
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Units
R _{θJA}	Thermal Resistance Junction-Ambient ¹	---	50	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	---	4.6	°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	$V_{GS}=0V, I_D=250\mu A$	30	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=20A$	---	5	6.3	m Ω
		$V_{GS}=4.5V, I_D=15A$	---	6.9	9	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	---	2.5	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=24V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	uA
		$V_{DS}=24V, V_{GS}=0V, T_J=55^\circ\text{C}$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=5V, I_D=20A$	---	67	---	S
R_g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	1.7	---	Ω
Q_g	Total Gate Charge (4.5V)	$V_{DS}=15V, V_{GS}=4.5V, I_D=15A$	---	8	---	nC
Q_{gs}	Gate-Source Charge		---	2.4	---	
Q_{gd}	Gate-Drain Charge		---	3.2	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=15V, V_{GS}=10V, R_G=3.3\Omega, I_D=15A$	---	7.1	---	ns
T_r	Rise Time		---	40	---	
$T_{d(off)}$	Turn-Off Delay Time		---	15	---	
T_f	Fall Time		---	6	---	
C_{iss}	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$	---	814	---	pF
C_{oss}	Output Capacitance		---	208	---	
C_{rss}	Reverse Transfer Capacitance		---	201	---	

Diode Characteristics

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Units
I_S	Continuous Source Current ^{1,6}	$V_G=V_D=0V$, Force Current	---	---	40	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1	V
t_{rr}	Reverse Recovery Time	$I_F=20A, di/dt=100A/\mu s, T_J=25^\circ\text{C}$	---	15	---	nS
Q_{rr}	Reverse Recovery Charge	$T_J=25^\circ\text{C}$	---	25	---	nC

Note :

1.The data tested by surface mounted on a 1 inch² 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 $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=24A$

4.The power dissipation is limited by 150°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 Performance Characteristics

Figure 1: Output Characteristics

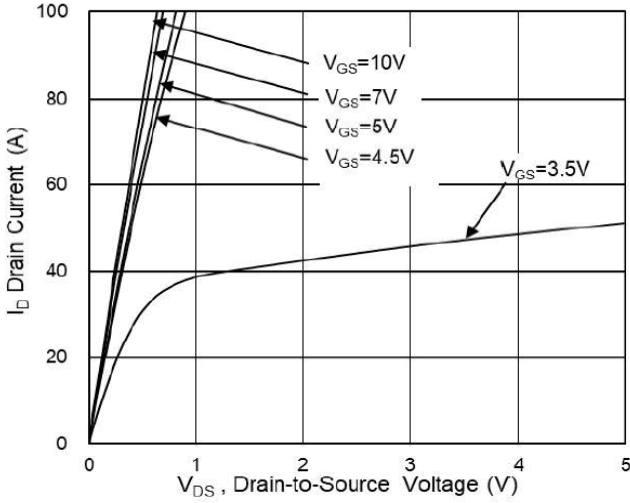


Figure 2: On-Resistance vs G-S Voltage

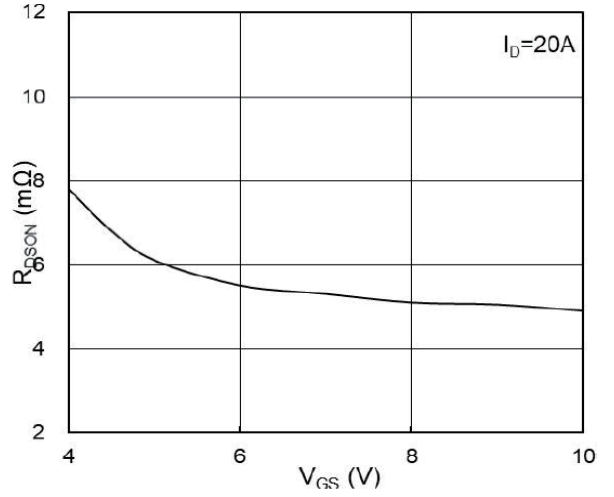


Figure 3: Source Drain Forward Characteristic

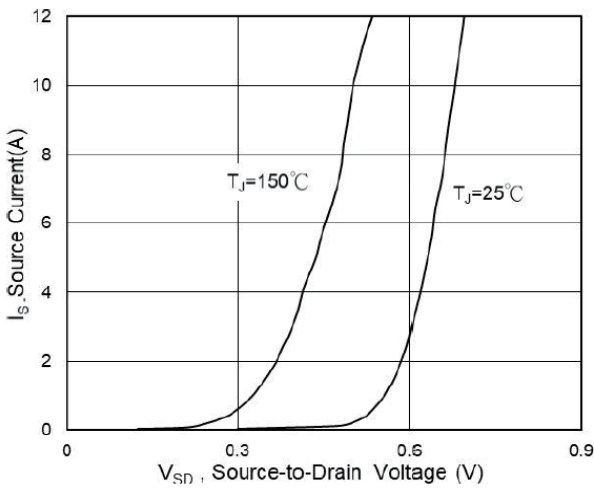


Figure 4: Gate-Charge Characteristics

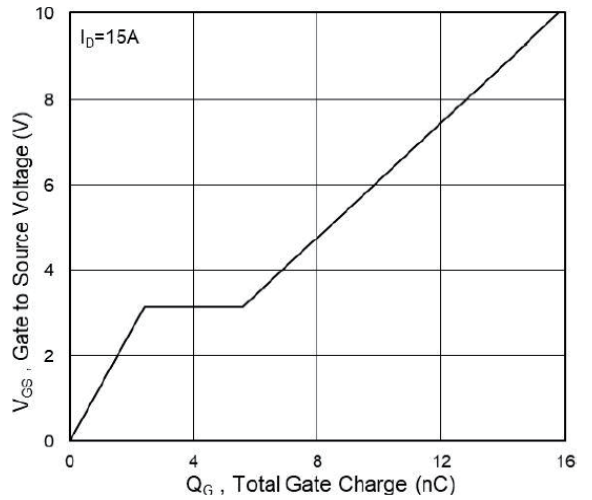


Figure 5: Normalized VGS(th) vs TJ

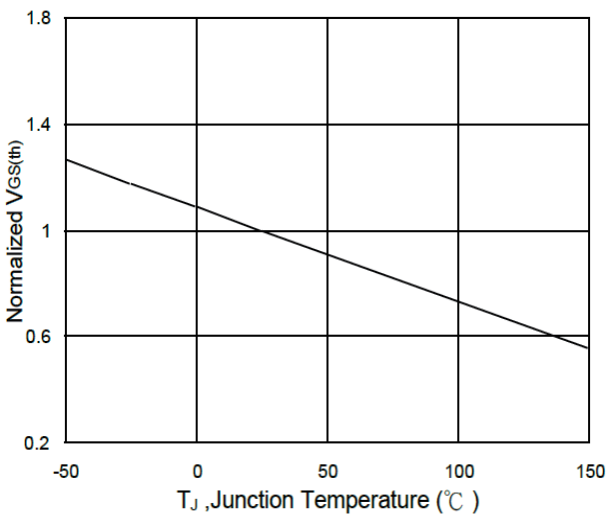
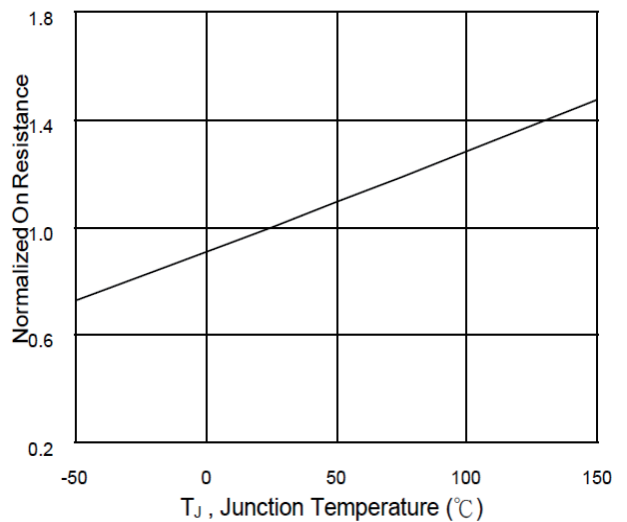


Figure 6: Normalized RDS(on) vs TJ



Typical Performance Characteristics

Figure 7: Capacitance

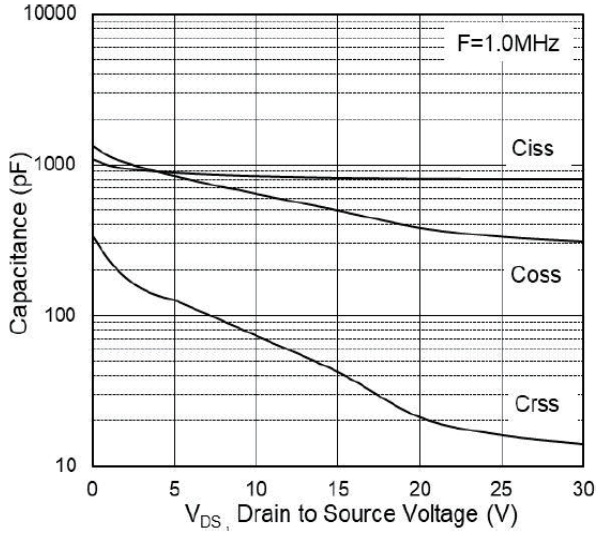


Figure 8: Safe Operating Area

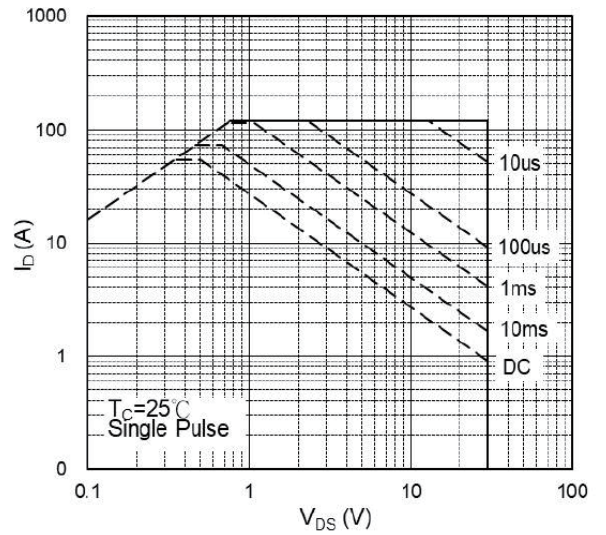


Figure 9: Normalized Maximum Transient Thermal Impedance

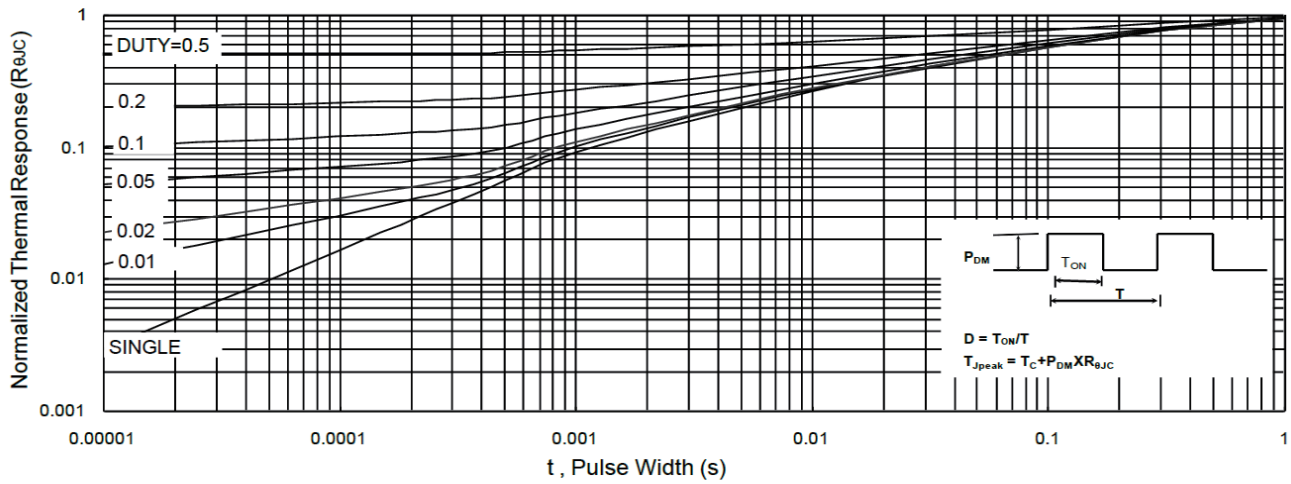


Figure 10: Switching Time Waveform

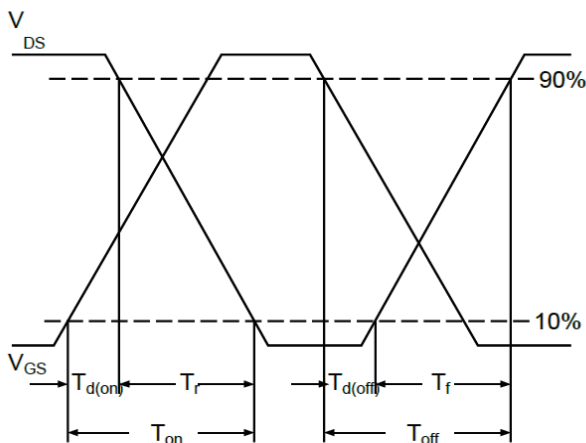
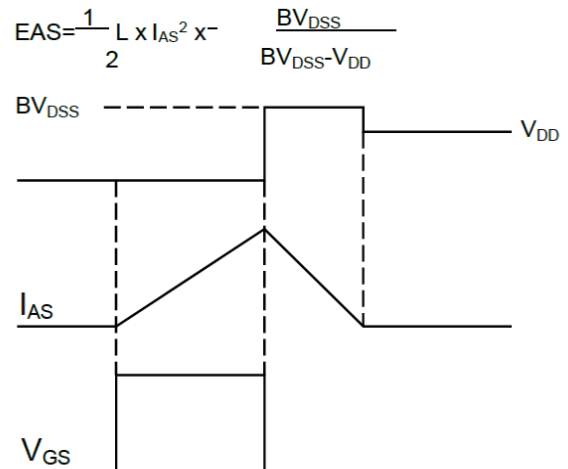
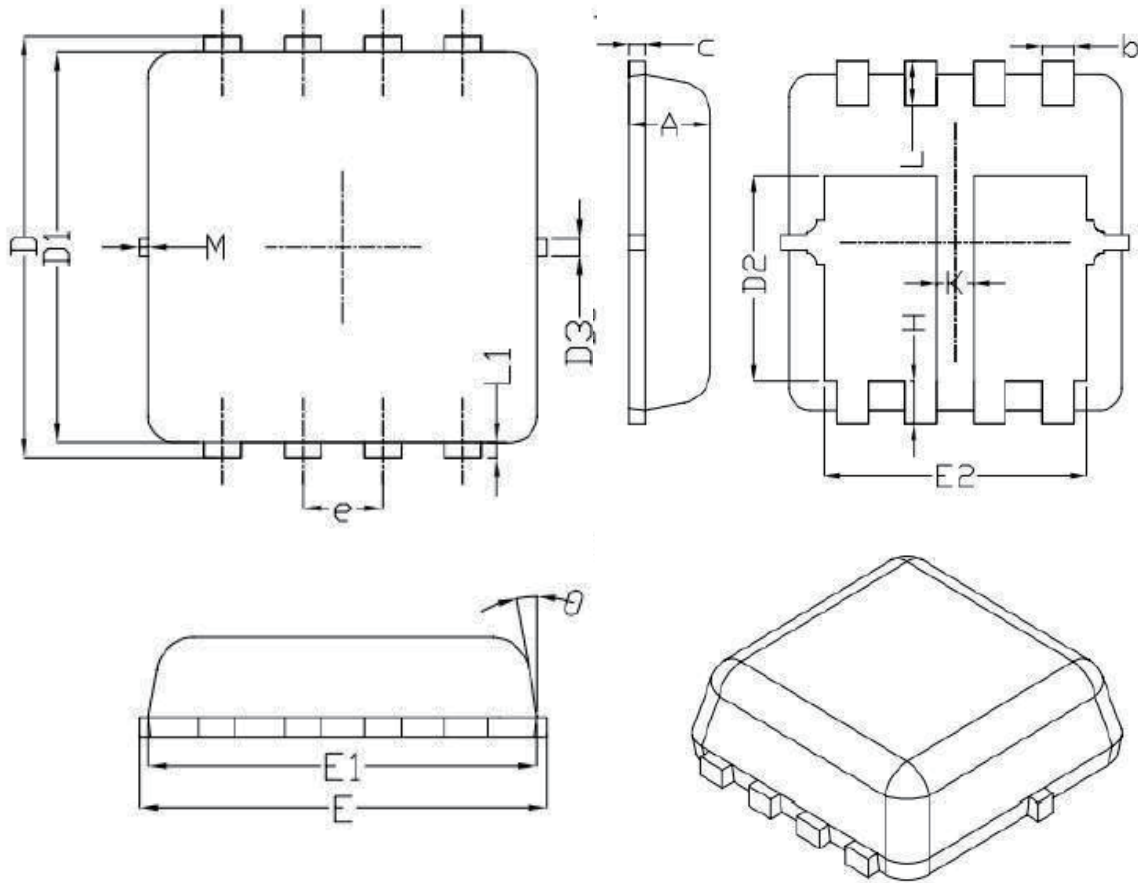


Figure 11: Unclamped Inductive Switching



Dual PDFN3X3 Package Outline Data



Symbol	Dimensions (unit: mm)		
	Min	Typ	Max
A	0.7	0.75	0.8
b	0.25	0.3	0.35
c	0.1	0.15	0.25
D	3.25	3.35	3.45
D1	3	3.1	3.2
D2	1.78	1.88	1.98
D3	--	0.13	--
E	3.2	3.3	3.4
E1	3	3.15	3.2
E2	2.39	2.49	2.59
e	0.65 BSC		
H	0.3	0.39	0.5
L	0.3	0.4	0.5
L1	--	0.13	--
K	0.3	--	--
θ	--	10°	12°
M	*	*	0.15
* Not Specified			

Notes:

- 1.Refer to JEDEC MO-240 variation CA.
- 2.Dimensions "D1" and "E1" do NOT include mold flash protrusions or gate burrs.
- 3.Dimensions "D1" and "E1" include interterminal flash or protrusion.