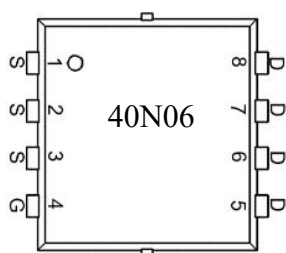


**Features**

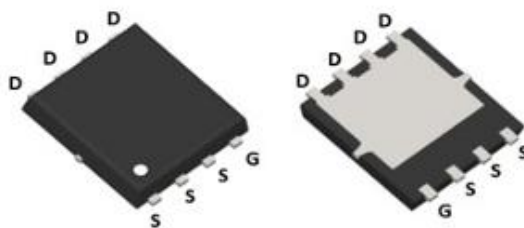
- Super Low Gate Charge
- Green Device Available
- Fast Switching Speed
- 100% EAS Guaranteed
- Advanced high cell density Trench technology

Bvdss**60V*****Rdson*****12mΩ*****ID*****40A****Application**

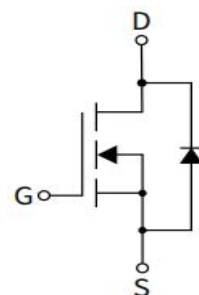
- DC-DC Converters
- Power management functions
- Synchronous-rectification applications

RoHS**Package**

Marking and pin assignment



PDFN3x3-8L top view



Schematic diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Quantity
40N06	40N06D	PDFN3x3-8L	5000

Absolute Maximum Ratings ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current, $V_{GS}@10\text{V}$	I_D	40	A
		23	A
Pulsed Drain Current ¹	I_{DM}	100	A
Single Pulsed Avalanche Energy ²	EAS	48	mJ
Avalanche Current	I_{AS}	-	A
Total Power Dissipation	P_D	37.7	W
Operating Junction Temperature Range	T_J	$-55 \sim 175$	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	$-55 \sim 175$	$^{\circ}\text{C}$



Thermal Resistance Ratings

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance Junction-to-Case ¹	$R_{\theta JC}$	--	1.6	$^{\circ}\text{C/W}$
Thermal Resistance Junction-to-Ambient ¹	$R_{\theta JA}$	--	--	$^{\circ}\text{C/W}$

Ordering Information

Ordering Number	Package	Pin Assignment			Packing
Halogen Free		G	D	S	
HL40N06D	PDFN3x3-8L	4	5,6,7,8	1,2,3	Tape Reel

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$	-	-	1	μA
Gate-Source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.6	2.5	V
Static Drain-Source On-Resistance ³	$R_{DS(on)}$	$V_{GS}=10V, I_D=30A$	-	12	17	m Ω
		$V_{GS}=4.5V, I_D=20A$	-	16	25	
Gate Resistance	R_g	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	-	-	-	Ω
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V,$ $f=1MHz$	-	2900	-	pF
Output Capacitance	C_{oss}		-	140	-	
Reverse Transfer Capacitance	C_{rss}		-	120	-	
Total Gate Charge	Q_g	$V_{DS}=30V, V_{GS}=10V,$ $I_D=30A$	-	50	-	nC
Gate-Source Charge	Q_{gs}		-	6	-	
Gate-Drain Charge	Q_{gd}		-	15	-	
Turn-on Delay Time	$T_{d(on)}$	$V_{GS}=10V, V_{DS}=30V,$ $R_G=1.8\Omega, I_D=30A$	-	7.4	-	nS
Turn-on Rise Time	T_r		-	5.1	-	
Turn-Off Delay Time	$T_{d(off)}$		-	28.2	-	
Turn-Off Fall Time	T_f		-	5.5	-	
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=30A$	-	-	1.2	V
Continuous Source Current	I_S	$V_G=V_D=0V, \text{Force Current}$	-	-	40	A
Pulsed Source Current	I_{SM}		-	-	100	
Body Diode Reverse Recovery Time	t_{rr}	$I_F=30A, dI/dt=100A/\mu s$	-	28	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	40	-	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. EAS condition : $T_J=25^{\circ}\text{C}, V_{DD}=30V, V_G=10V, L=0.5mH, R_g=25\Omega, I_{AS}=16A$.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$.



Typical Performance Characteristics

Figure 1: Output Characteristics

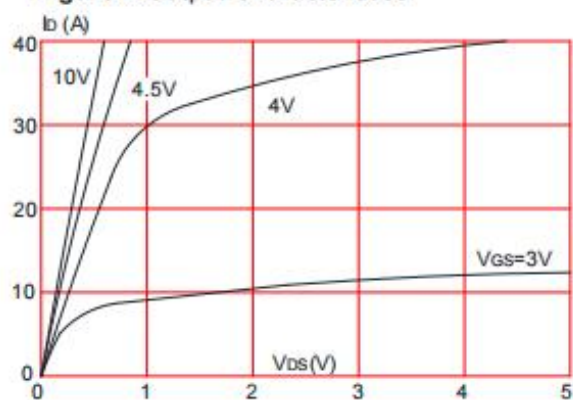


Figure 2: Typical Transfer Characteristics

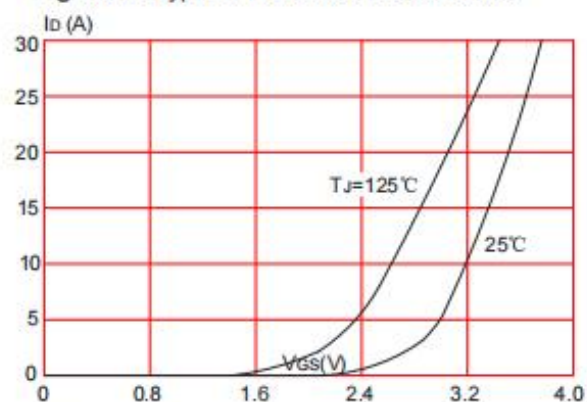


Figure 3: On-resistance vs. Drain Current

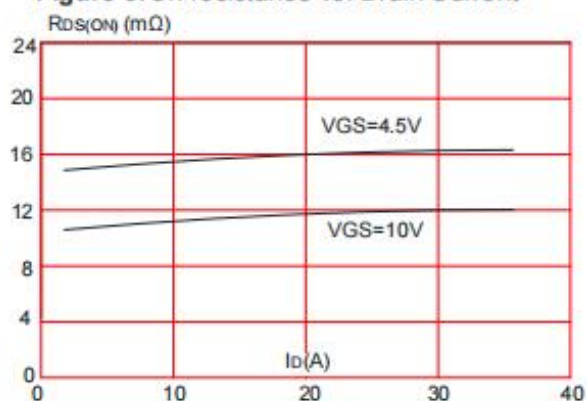


Figure 4: Body Diode Characteristics

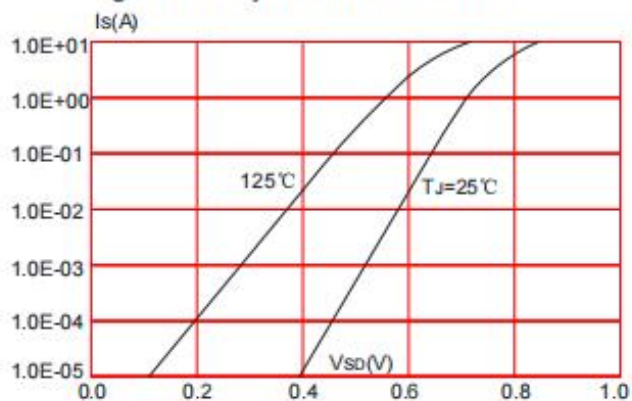


Figure 5: Gate Charge Characteristics

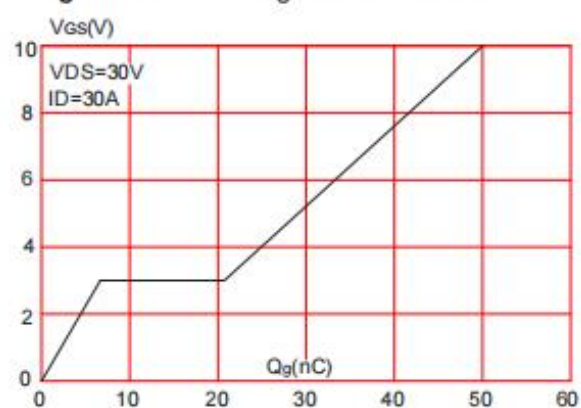


Figure 6: Capacitance Characteristics

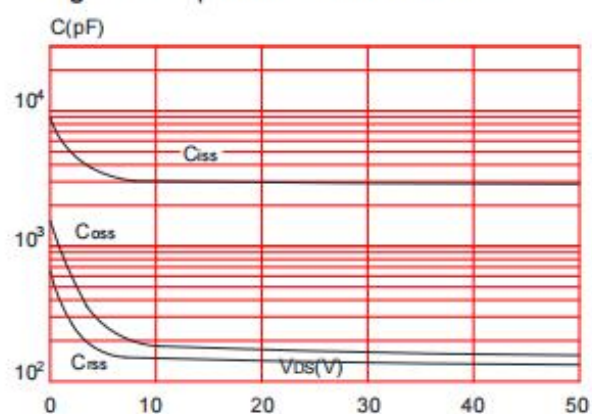




Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

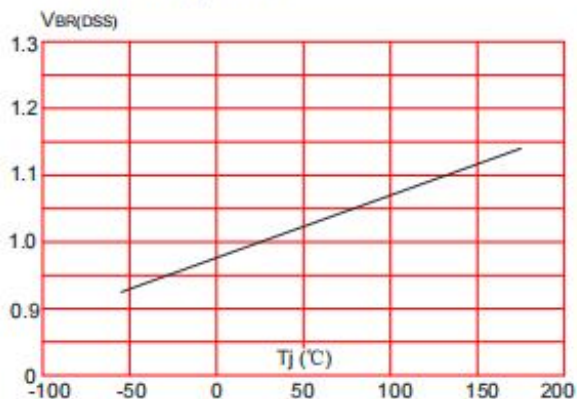


Figure 8: Normalized on Resistance vs. Junction Temperature

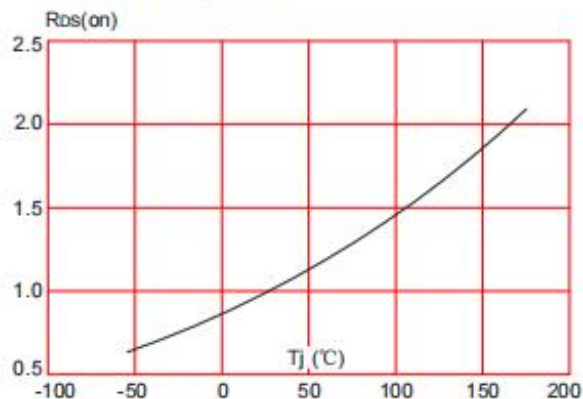


Figure 9: Maximum Safe Operating Area

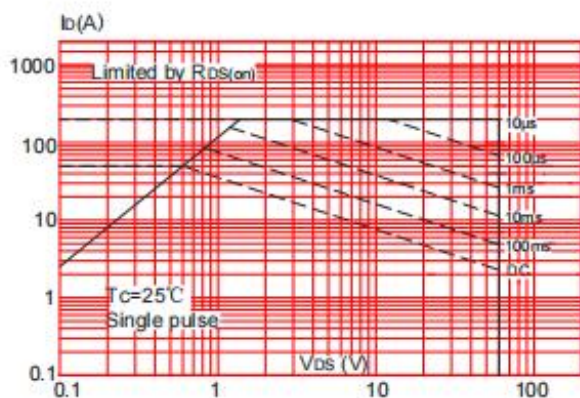


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

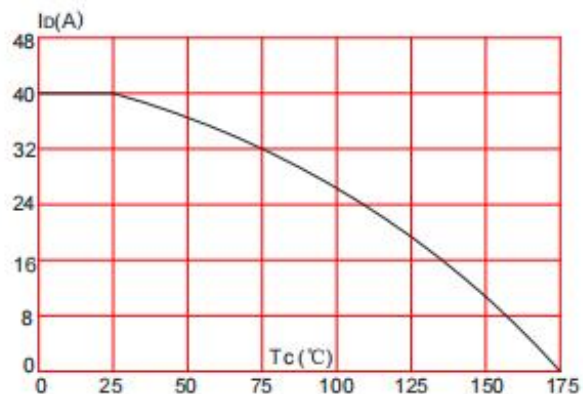
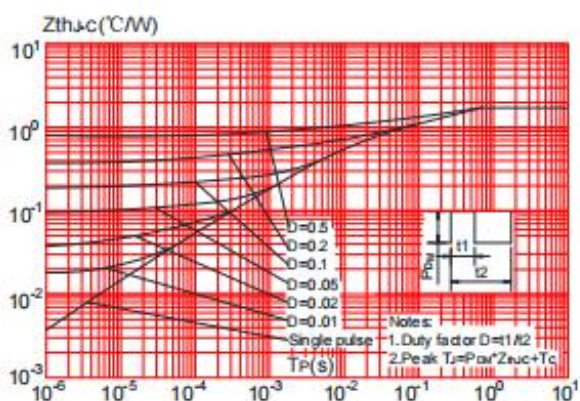
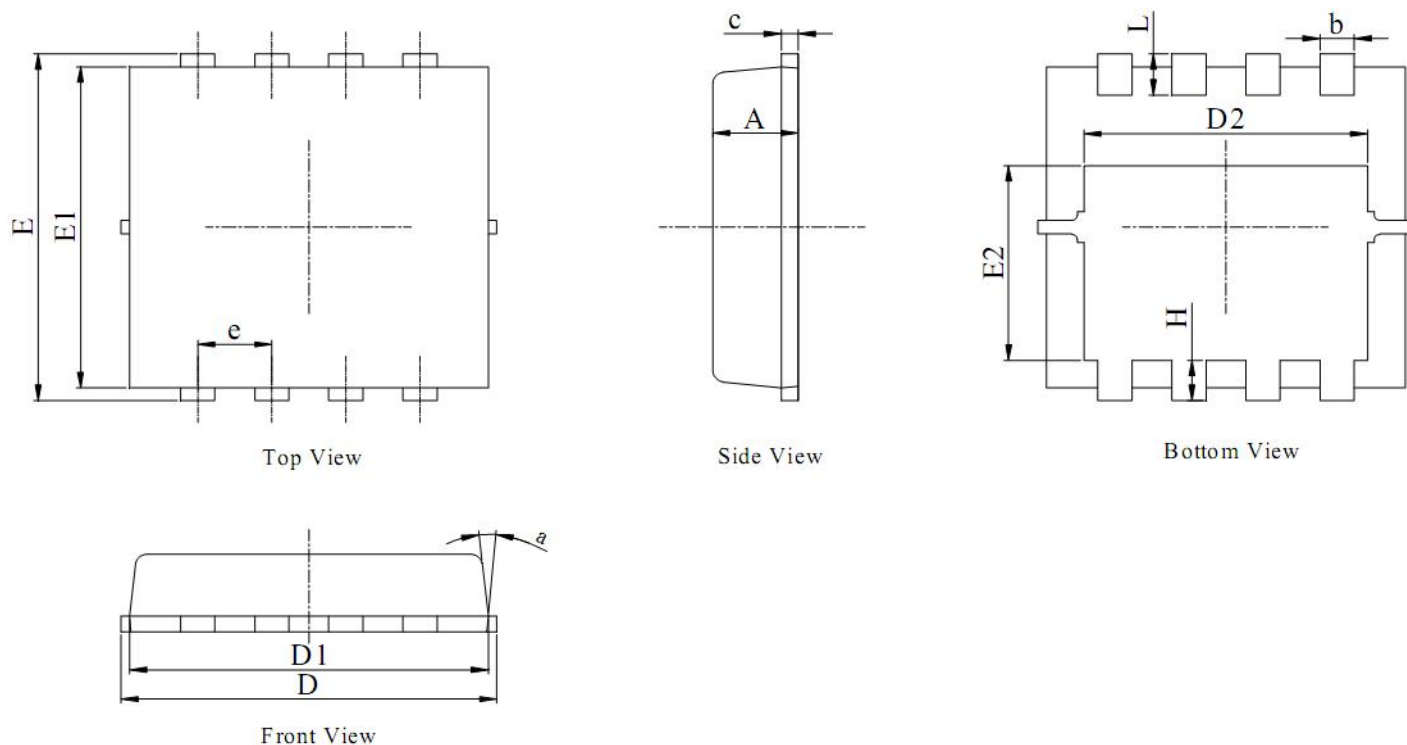


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



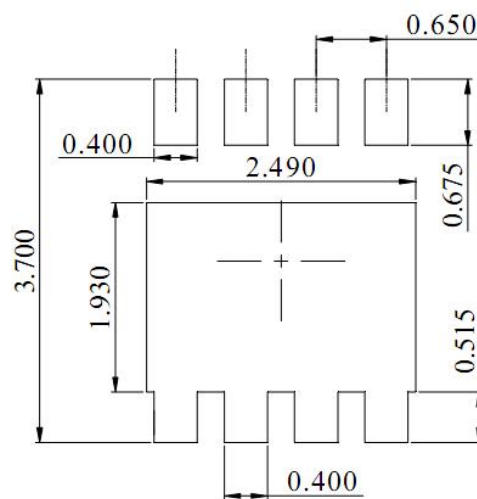
Package Mechanical Data PDFN3x3-8L



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M,1994.
2. ALL DIMNESIONS IN MILLIMETER (ANNGLE IN DEGREE).
3. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.20	0.25
D	3.00	3.15	3.25
D1	2.95	3.05	3.15
D2	2.39	2.49	2.59
E	3.20	3.30	3.40
E1	2.95	3.05	3.15
E2	1.70	1.80	1.90
e	0.65 BSC		
H	0.30	0.40	0.50
L	0.25	0.40	0.50
a	---	---	15°



DIMENSIONS:MILLIMETERS



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