

General Description

The MYH4040M is the high cell density trench N-CH MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

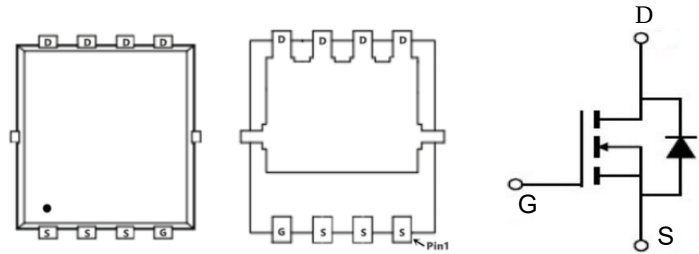


Features

V_{DSS}	40	V
I_D	60	A
$R_{DS(ON)}(at V_{GS} = 10V)$	5.9	m Ω
$R_{DS(ON)}(at V_{GS} = 4.5V)$	7.9	m Ω

Application

- Battery protection
- Load switch
- Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
MYH4040M	PDFN3333-8L	MYH4040M	5000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_{D@T_A=25^\circ\text{C}}$	Continuous Drain Current, $V_{GS} @ 10V^1$	60	A
$I_{D@T_A=70^\circ\text{C}}$	Continuous Drain Current, $V_{GS} @ 10V^1$	35	A
I_{DM}	Pulsed Drain Current ²	130	A
EAS	Single Pulse Avalanche Energy ³	48	mJ
I_{AS}	Avalanche Current	35	A
$P_{D@T_A=25^\circ\text{C}}$	Total Power Dissipation ⁴	39	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	60	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	3.2	$^\circ\text{C/W}$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	40	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V$, $I_D=12A$	---	5.9	7.0	$m\Omega$
		$V_{GS}=4.5V$, $I_D=10A$	---	7.9	9.5	
$V_{GS(th)}$	Gate Threshold Voltage		1.35	--	3	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=32V$, $V_{GS}=0V$, $T_J=25\text{ }^{\circ}\text{C}$	---	---	1	μA
		$V_{DS}=32V$, $V_{GS}=0V$, $T_J=55\text{ }^{\circ}\text{C}$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1MHz$	---	1.7	---	Ω
Q_g	Total Gate Charge (4.5V)	$V_{DS}=20V$, $V_{GS}=4.5V$, $I_D=12A$	---	5.8	---	nC
Q_{gs}	Gate-Source Charge		---	3	---	
Q_{gd}	Gate-Drain Charge		---	1.2	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=15V$, $V_{GS}=10V$, $R_G=3.3\Omega$, $I_D=10A$	---	14.3	---	ns
T_r	Rise Time		---	5.6	---	
$T_{d(off)}$	Turn-Off Delay Time		---	20	---	
T_f	Fall Time		---	11	---	
C_{iss}	Input Capacitance	$V_{DS}=15V$, $V_{GS}=0V$, $f=1MHz$	---	690	---	pF
C_{oss}	Output Capacitance		---	193	---	
C_{rss}	Reverse Transfer Capacitance		---	38	---	
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	60	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=1A$, $T_J=25\text{ }^{\circ}\text{C}$	---	---	1	V

Note :

- 1 .The data tested by surface mounted on a 1 inch² 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 $V_{DD}=25V$, $V_{GS}=10V$, $L=0.1mH$, $I_{AS}=35A$
- 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 Characteristics

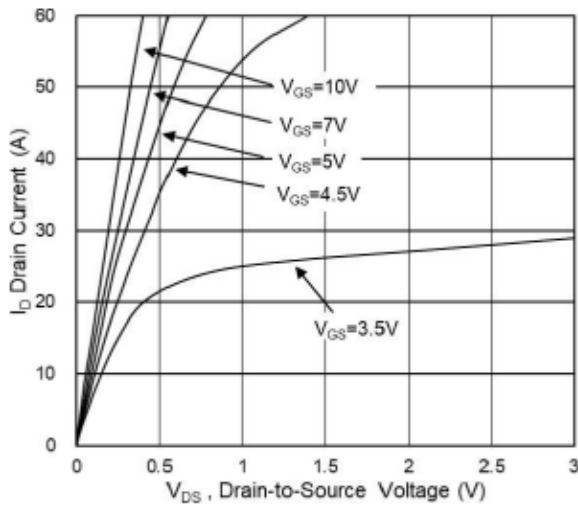


Fig.1 Typical Output Characteristics

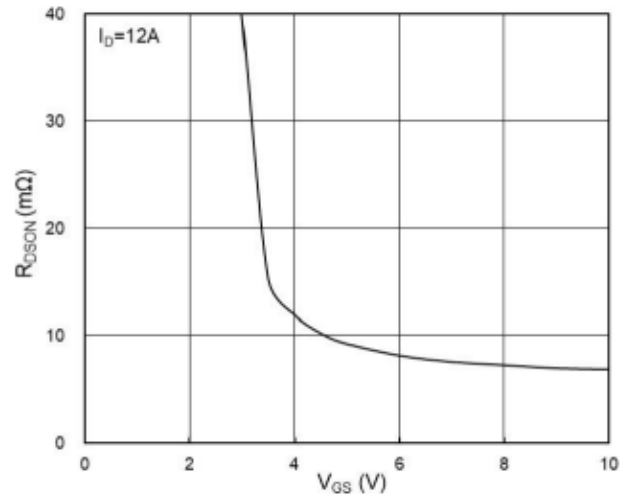


Fig.2 On-Resistance vs G-S Voltage

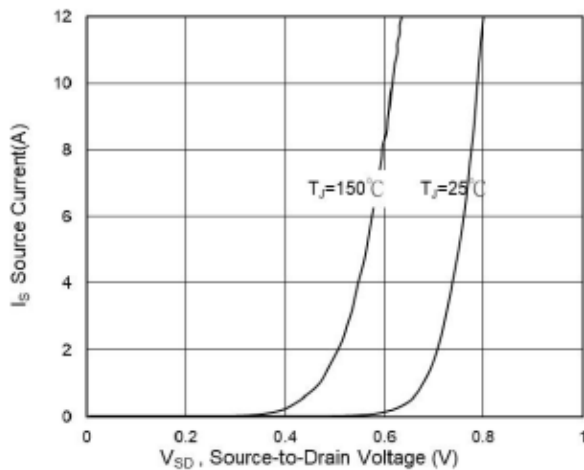


Fig.3 Source Drain Forward Characteristics

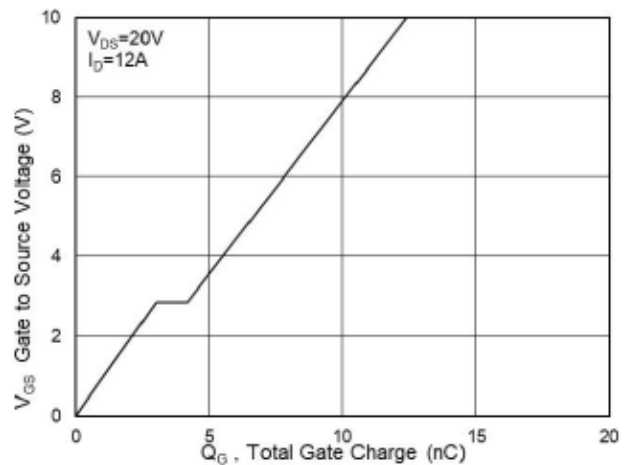


Fig.4 Gate-Charge Characteristics

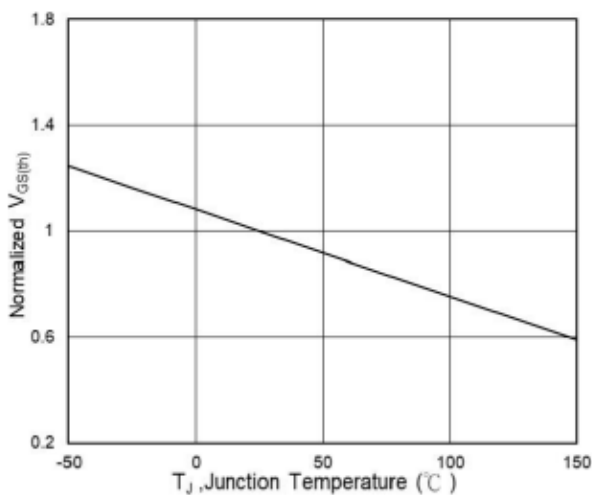


Fig.5 Normalized $V_{GS(th)}$ vs T_J

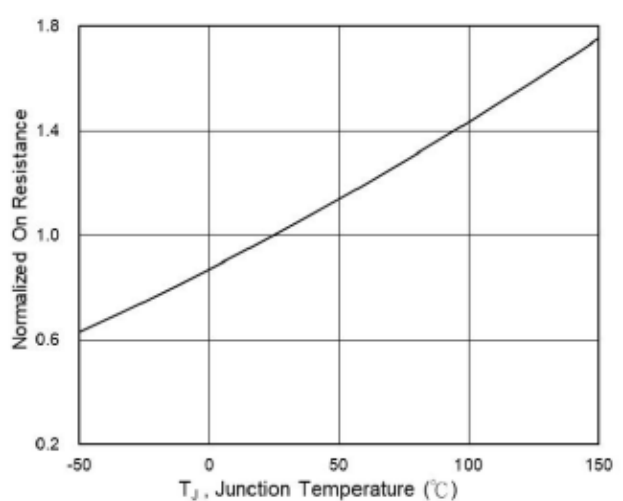


Fig.6 Normalized $R_{DS(on)}$ vs T_J

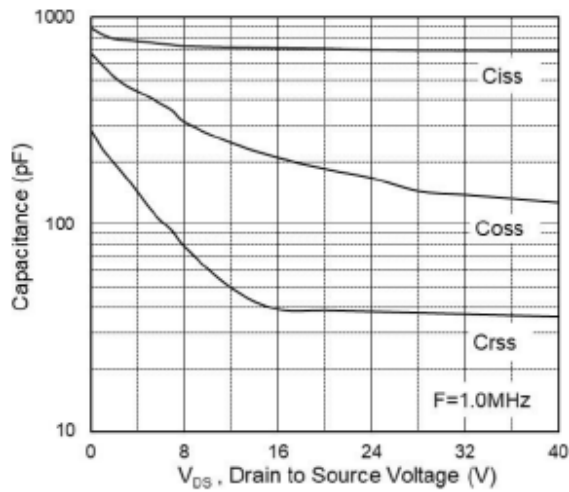


Fig.7 Capacitance

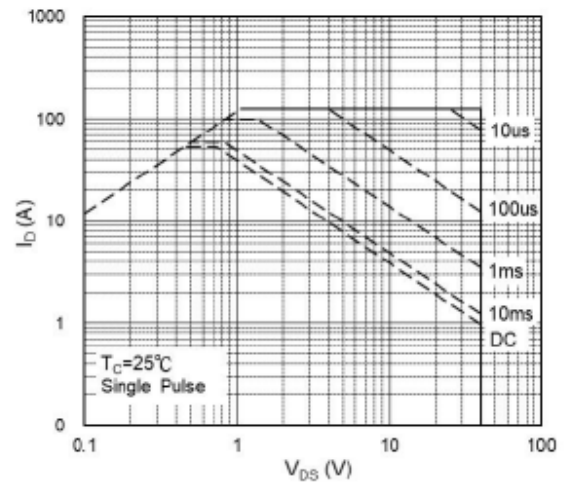


Fig.8 Safe Operating Area

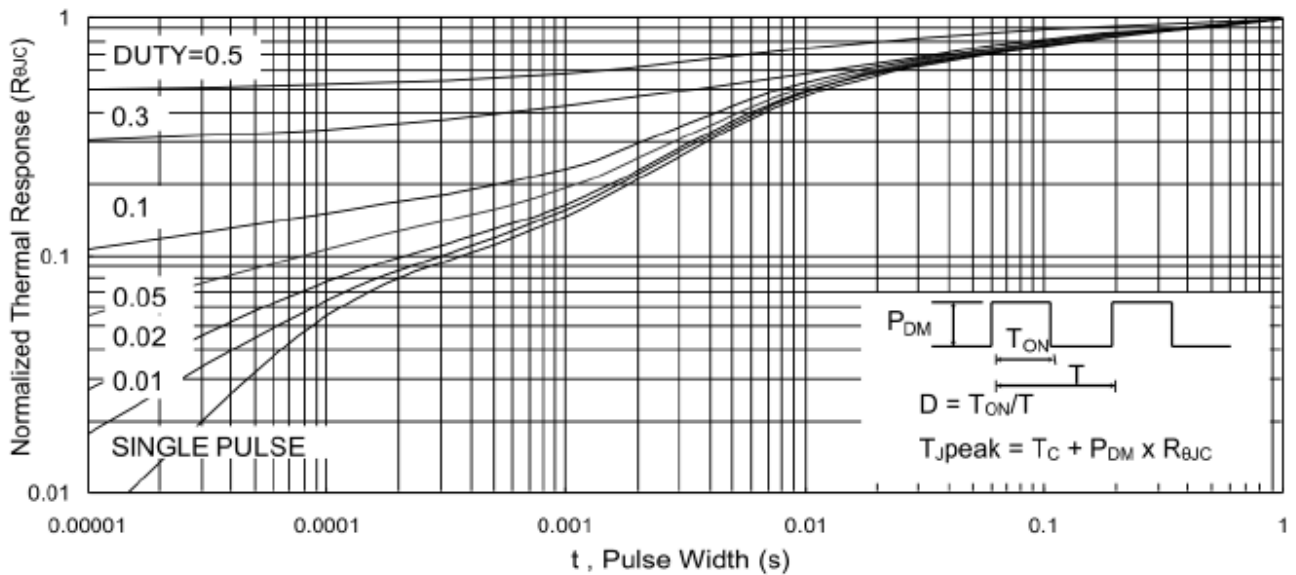


Fig.9 Normalized Maximum Transient Thermal Impedance

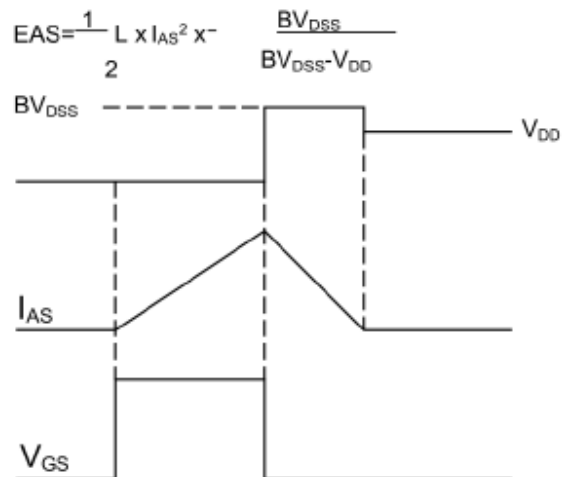
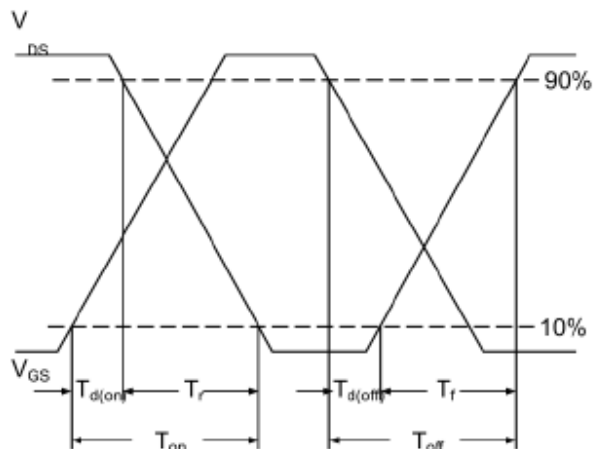
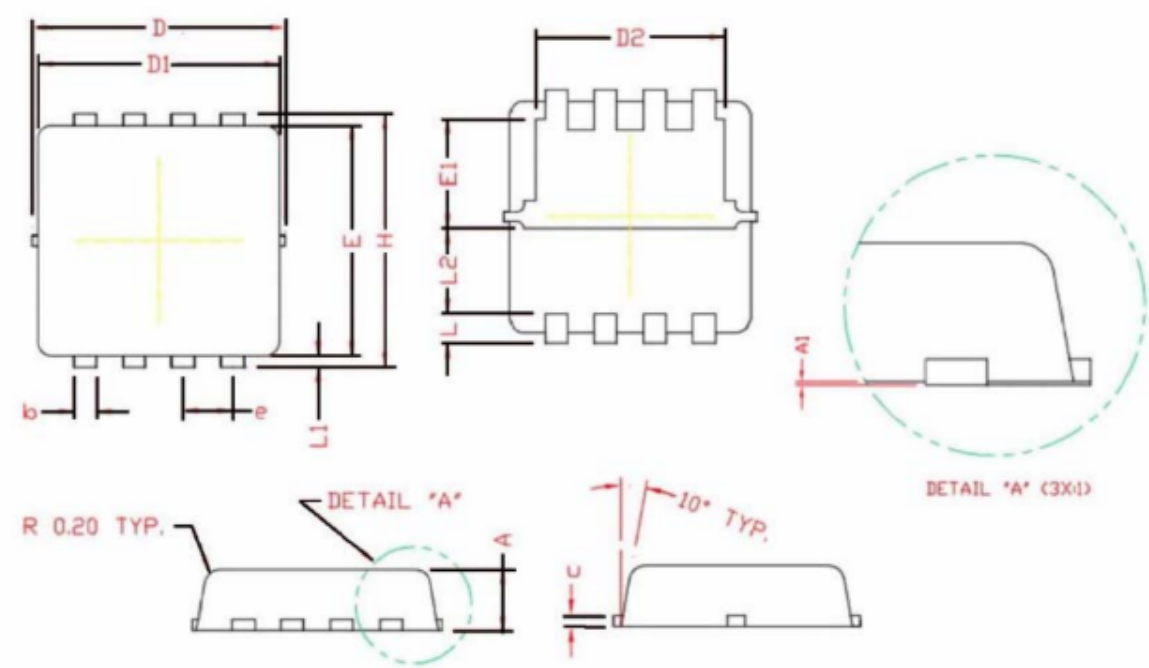


Fig.11 Unclamped Inductive Waveform

Package Mechanical Data-PDFN3333-8L Single



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.70	0.80	0.90
A1	0.00	0.03	0.05
b	0.24	0.30	0.35
c	0.10	0.15	0.20
D	3.25	3.32	3.40
D1	3.05	3.15	3.25
D2	2.40	2.50	2.60
E	3.00	3.10	3.20
E1	1.35	1.45	1.55
e	0.65 BSC.		
H	3.20	3.30	3.40
L	0.30	0.40	0.50
L1	0.10	0.15	0.20
L2	1.13 REF.		