General Description

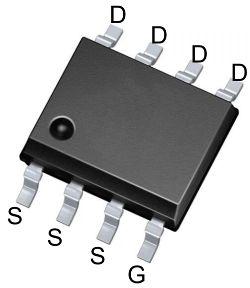
The MY040FNC uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

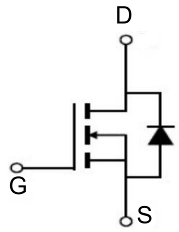
Features

V_{DSS}	60	V
I_D	6.5	A
$R_{DS(ON)}$(atV_{GS} =10V)	<37	mÝ
$R_{DS(ON)}$(atV_{GS} =4.5V)	<48	mÝ

Application

- Battery protection
- Load switch
- Uninterruptible power supply





Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
MY040FNC	SOP-8	040FNC	3000

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_A=25°C	Continuous Drain Current, V_{GS} @ 10V[1]	6.5	A
I_D@T_A=70°C	Continuous Drain Current, V_{GS} @ 10V[1]	5.5	A
I_{DM}	Pulsed Drain Current[2]	18	A
EAS	Single Pulse Avalanche Energy[3]	22	mJ
I_{AS}	Avalanche Current	21	A
P_D@T_A=25°C	Total Power Dissipation[4]	1.5	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1]	85	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	25	°C/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	60	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.044	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=4A	---	28	37	mΩ
		V_{GS}=4.5V , I_D=2A	---	35	48	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	1.6	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4.8	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=48V , V_{GS}=0V , T_J=25 ℃	---	---	1	uA
		V_{DS}=48V , V_{GS}=0V , T_J=55℃	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=4A	---	28.3	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	2.5	---	
Q_g	Total Gate Charge (10V)	V_{DS}=48V , V_{GS}=10V , I_D=4A	---	19	---	nC
Q_{gs}	Gate-Source Charge		---	2.6	---	
Q_{gd}	Gate-Drain Charge		---	4.1	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=30V , V_{GS}=10V , R_G=3.3 I_D=4A	---	3	---	ns
T_r	Rise Time		---	34	---	
$T_{d(off)}$	Turn-Off Delay Time		---	23	---	
T_f	Fall Time		---	6	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	1027	---	pF
C_{oss}	Output Capacitance		---	65	---	
C_{rss}	Reverse Transfer Capacitance		---	46	---	
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	4.5	A
I_{SM}	Pulsed Source Current[2,5]		---	---	18	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V
t_{rr}	Reverse Recovery Time	I_F=4A,dI/dt=100A/μs,	---	12.1	---	nS
Q_{rr}	Reverse Recovery Charge		---	6.7	---	nC

Note :

1 .The data tested by surface mounted on a 1 $inch^2$ FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3 .The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=21A
4.The power dissipation is limited by 150℃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

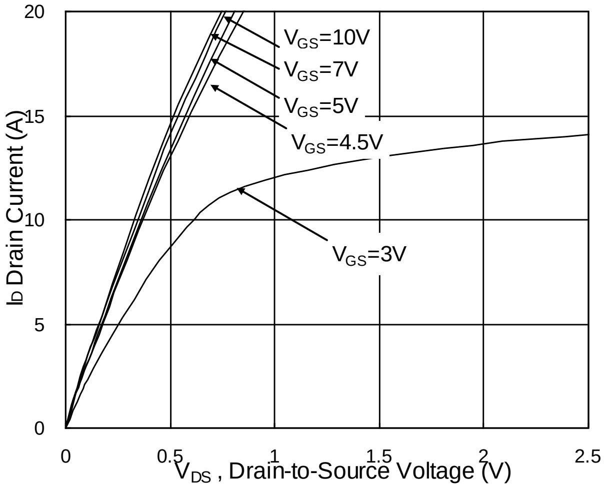


Fig.1 Typical Output Characteristics

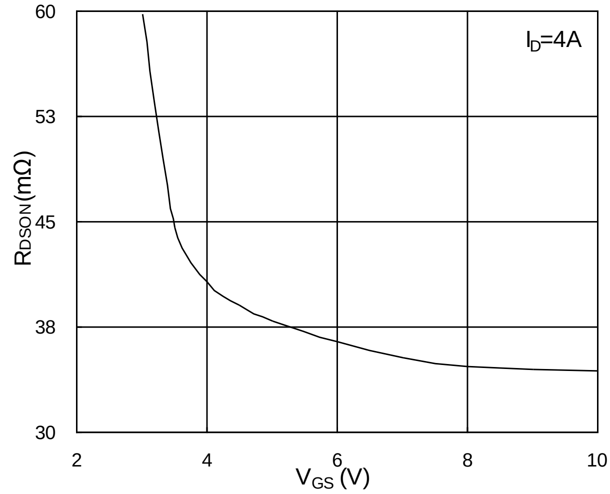


Fig.2 On-Resistance vs. Gate-Source

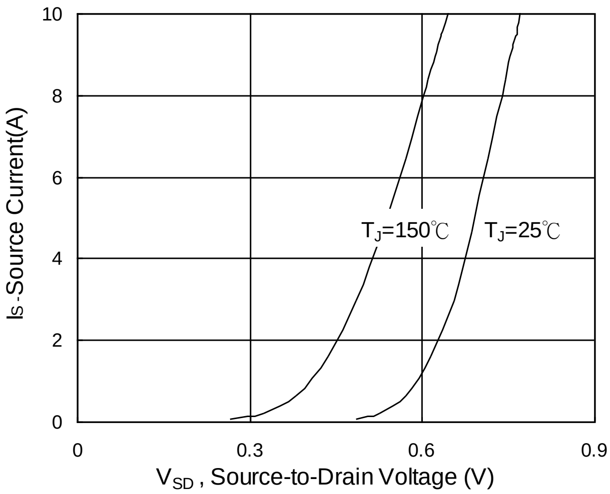


Fig.3 Forward Characteristics Of Reverse

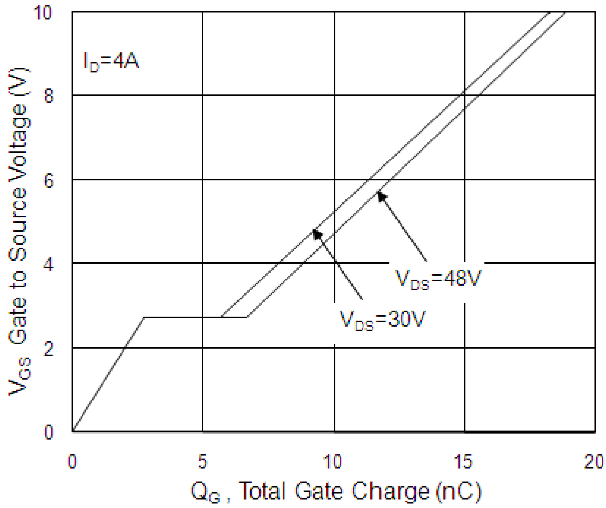


Fig.4 Gate-Charge Characteristics

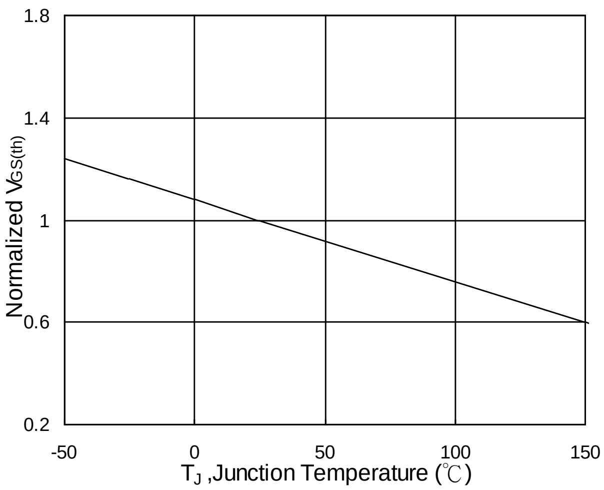


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

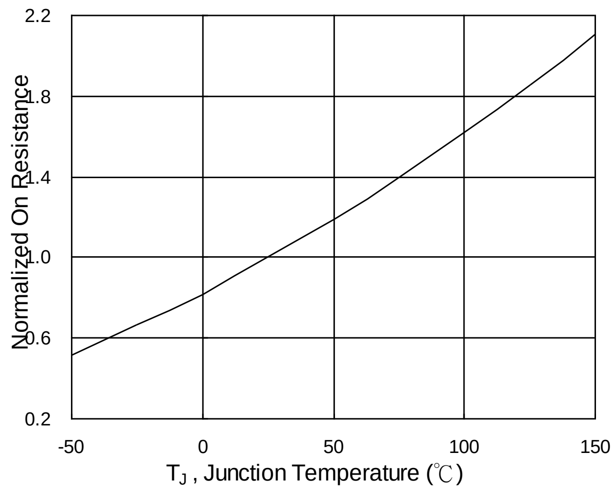


Fig.6 Normalized R_{DSON} vs. T_J

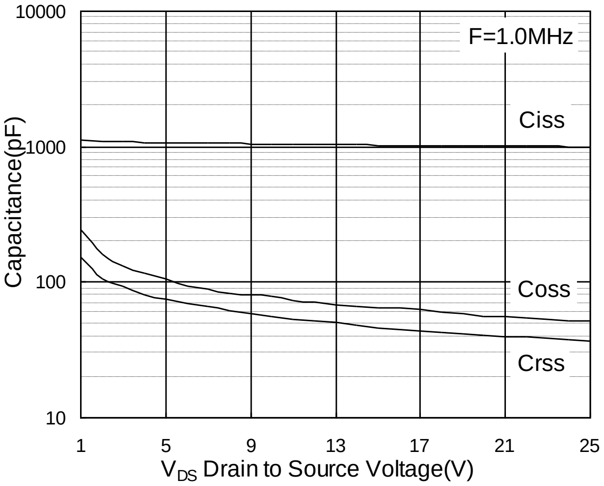


Fig.7 Capacitance

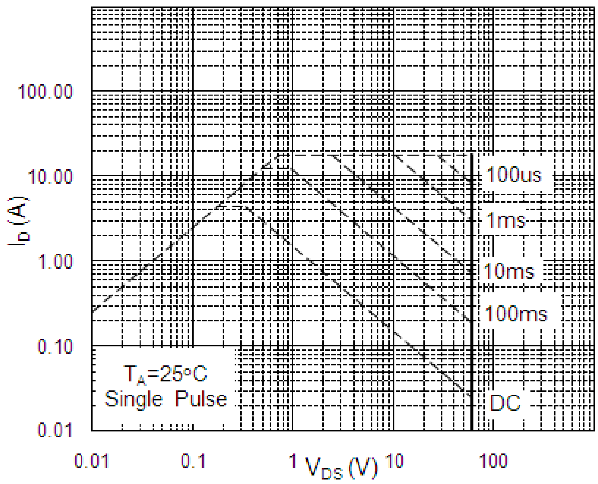


Fig.8 Safe Operating Area

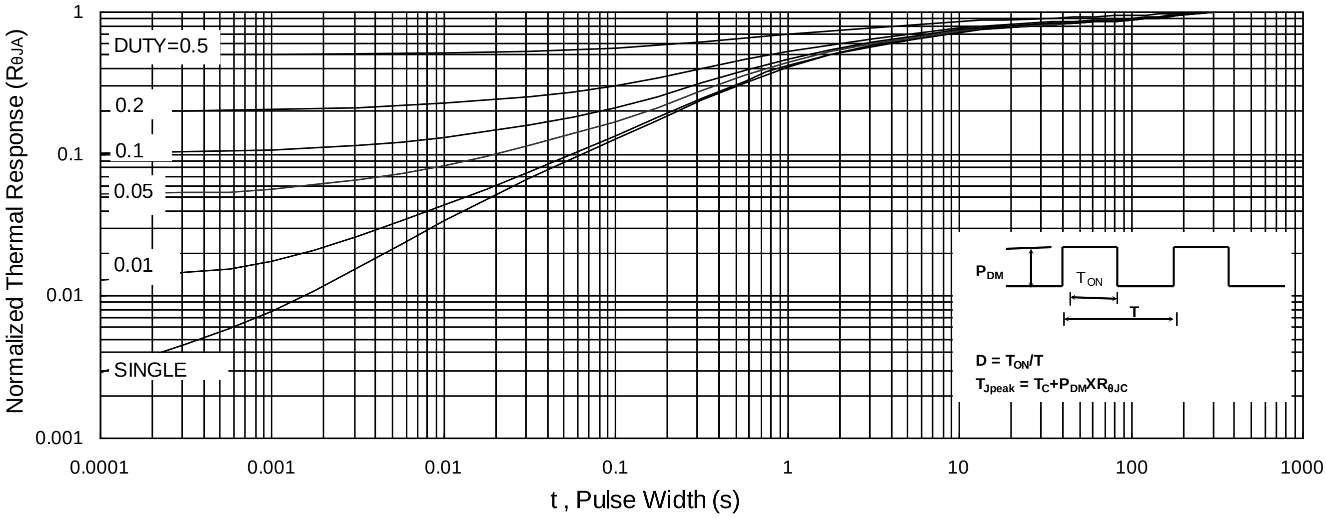


Fig.9 Normalized Maximum Transient Thermal Impedance

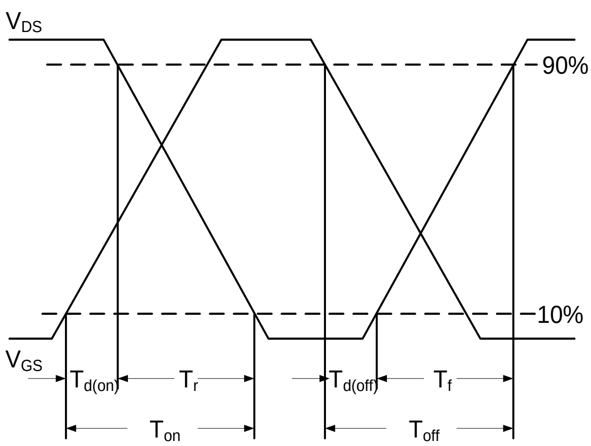


Fig.10 Switching Time Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

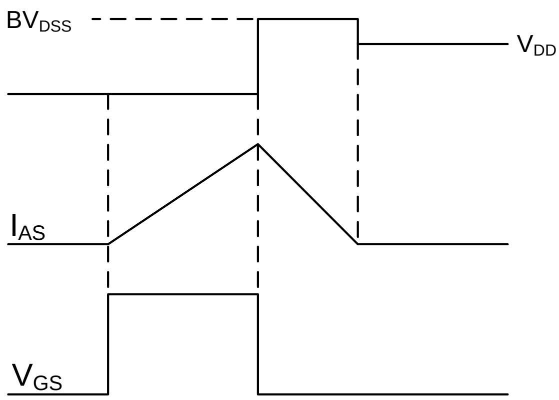
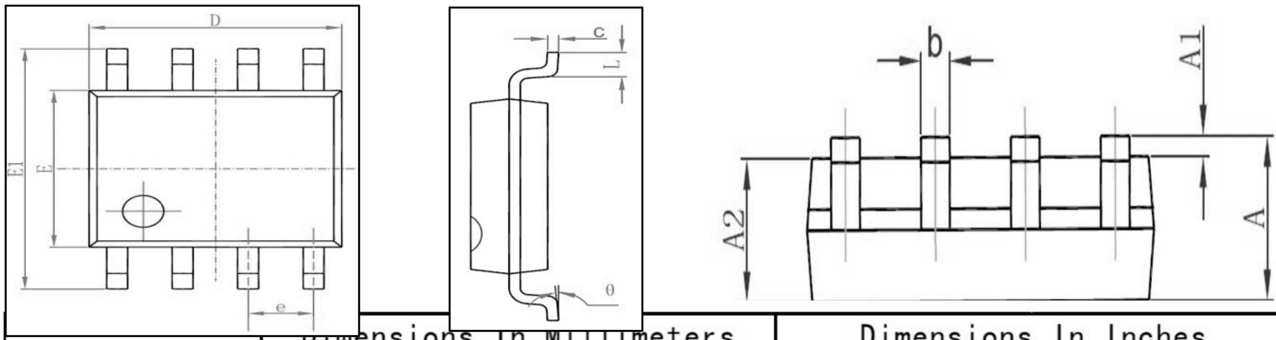
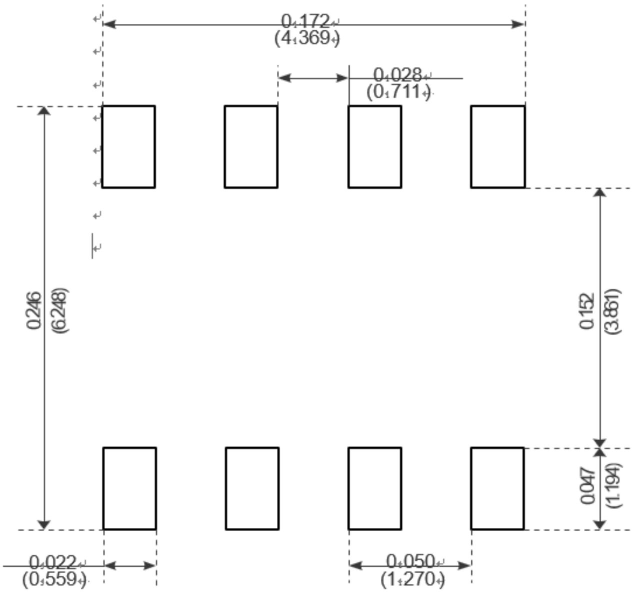


Fig.11 Unclamped Inductive Switching Waveform

Package Mechanical Data-SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



Recommended Minimum Pads