MYP015DNE3
-40V P-Channel Enhancement Mode MOSFET

MAOYUANWEI semiconductor

General Description

The MYP015DNE3 use 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.
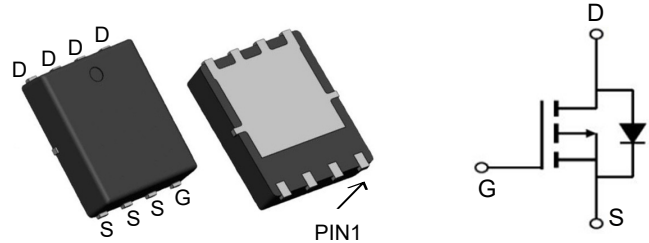
Features

V_{DSS}	-40	V
I_D	-50	A
$R_{DS(ON)}(at V_{GS}=10V)$	10.5	mΩ
$R_{DS(ON)}(at V_{GS}=4.5V)$	13	mΩ

Application

➤ Battery protection
➤ Load switch
➤ Uninterruptible power supply

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
MYP015DNE3	PDFN3*3-8	MYP015DNE3	5000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ -10V[1]	-50	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ -10V[1]	-30	A
I_D@T_A=25℃	Continuous Drain Current, V_{GS} @ -10V[1]	-10	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ -10V[1]	-8	A
I_{DM}	Pulsed Drain Current[2]	-105	A
EAS	Single Pulse Avalanche Energy[3]	146	mJ
I_{AS}	Avalanche Current	-54	A
P_D@T_C=25℃	Total Power Dissipation[4]	52.1	W
P_D@T_A=25℃	Total Power Dissipation[4]	2	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{θJA}$	Thermal Resistance Junction-Ambient [1]	62	℃/W
$R_{θJC}$	Thermal Resistance Junction-Case[1]	2.4	℃/W

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

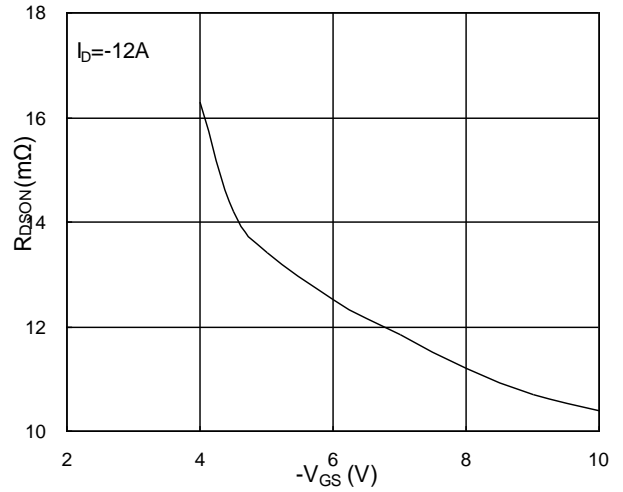| Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250uA	-40	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , I_D=-1mA	---	-0.023	---	V/$^\circ$C
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=-10V , I_D=-18A	---	10.5	15	mΩ
		V_{GS}=-4.5V , I_D=-12A	---	13	20	
$V_{GS(th)}$	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		---	4.74	---	mV/$^\circ$C
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-32V , V_{GS}=0V , T_J=25 $^\circ$C	---	---	1	uA
		V_{DS}=-32V , V_{GS}=0V , T_J=55°C	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=$\pm$20V , V_{DS}=0V	---	---	$\pm$100	nA
gfs	Forward Transconductance	V_{DS}=-5V , I_D=-18A	---	24	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	7	14	
Q_g	Total Gate Charge (-4.5V)	V_{DS}=-20V , V_{GS}=-4.5V , I_D=-12A	---	27.9	---	nC
Q_{gs}	Gate-Source Charge		---	7.7	---	
Q_{gd}	Gate-Drain Charge		---	7.5	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=-15V , V_{GS}=-10V R_G=3.3 , I_D=-1A	---	40	---	ns
T_r	Rise Time		---	35.2	---	
$T_{d(off)}$	Turn-Off Delay Time		---	100	---	
T_f	Fall Time		---	9.6	---	
C_{iss}	Input Capacitance	V_{DS}=-15V , V_{GS}=0V , f=1MHz	---	3500	---	pF
C_{oss}	Output Capacitance		---	323	---	
C_{rss}	Reverse Transfer Capacitance		---	222	---	
I_s	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	-52	A
I_{SM}	Pulsed Source Current[2,5]		---	---	-105	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_s=-1A , T_J=25°C	---	---	-1	V

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 $\leq$ 300us , 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}=-54A

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.
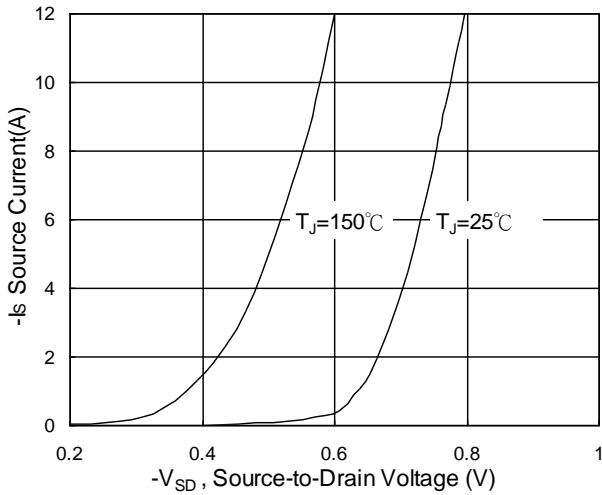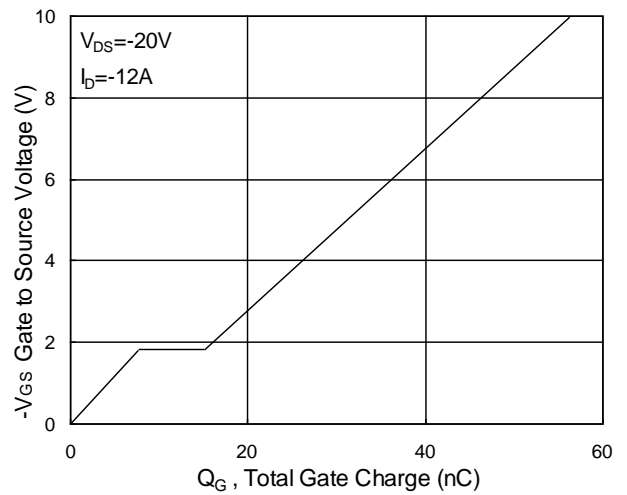
Typical Characteristics

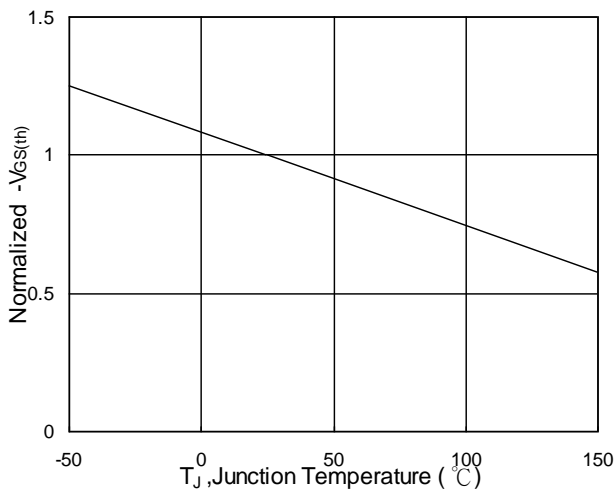**Fig.1 Typical Output Characteristics**
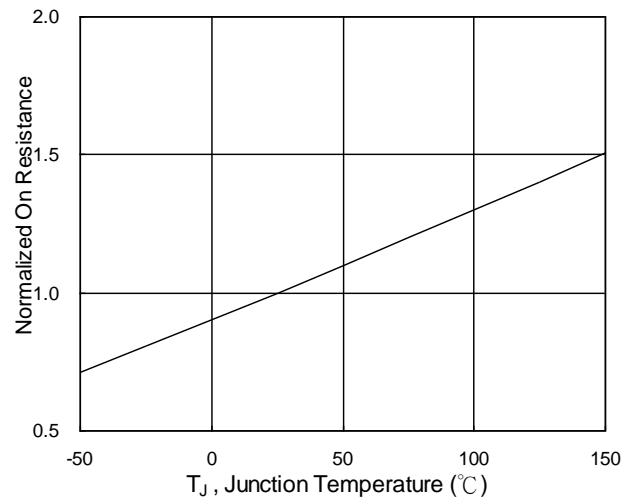

Fig.2 On-Resistance v.s Gate-Source
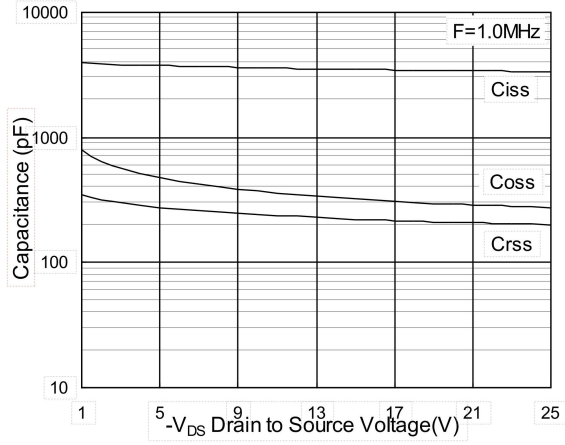

Fig.3 Forward Characteristics Of Reverse
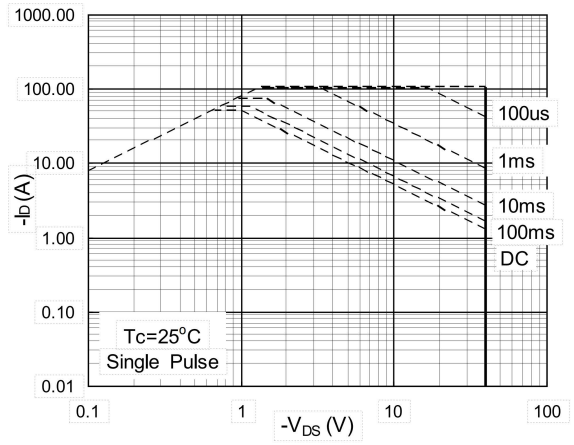

Fig.4 Gate-Charge Characteristics
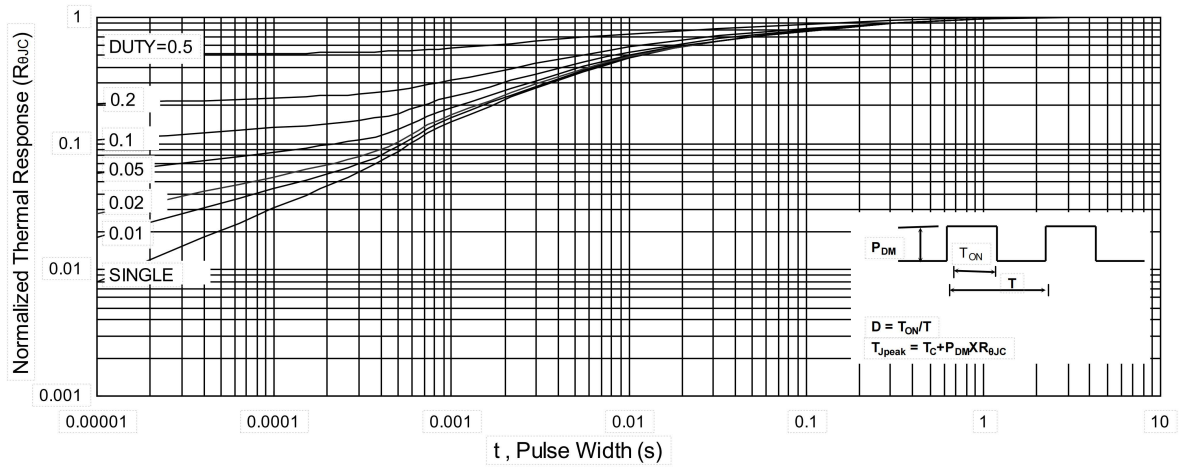

Fig.5 Normalized $V_{GS(th)}$ v.s T_J

Fig.6 Normalized R_{DSON} v.s T_J

Fig.7 Capacitance
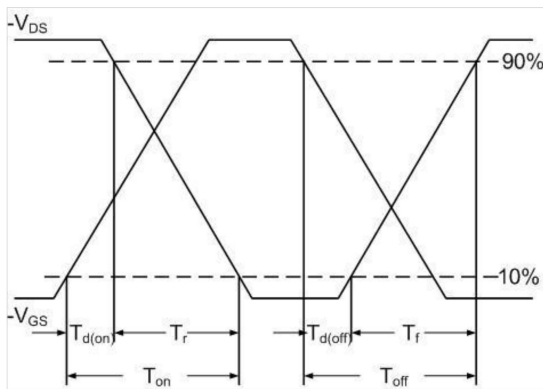
Fig.8 Safe Operating Area

Fig.9 Normalized Maximum Transient Thermal Impedance
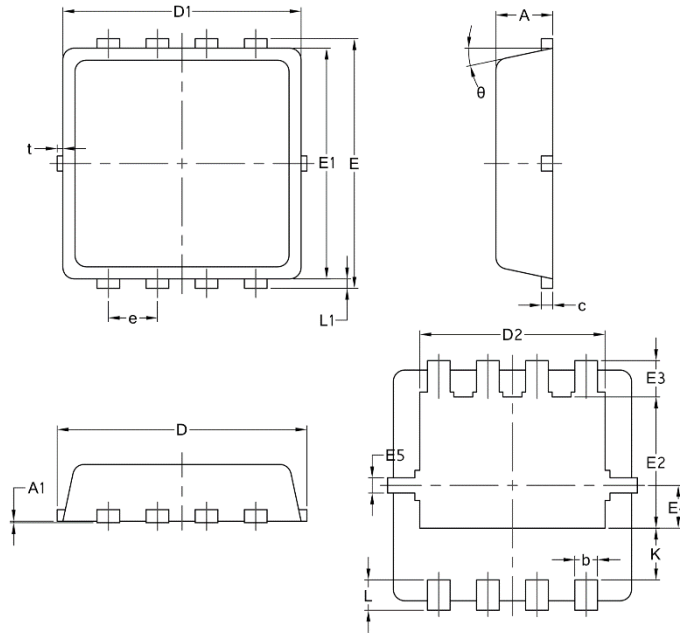
$$D = T_{ON}/T$$
$$T_{Jpeak} = T_C + P_{DM} \times R_{\theta JC}$$

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 Waveform

Package Mechanical Data-DFN3*3-8L-JQ Single

Symbol	Common		
	mm		
	Mim	Nom	Max
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.20	0.30	0.40
c	0.10	0.152	0.25
D	3.15	3.30	3.45
D1	3.00	3.15	3.25
D2	2.29	2.45	2.65
E	3.15	3.30	3.45
E1	2.90	3.05	3.20
E2	1.54	1.74	1.94
E3	0.28	0.48	0.65
E4	0.37	0.57	0.77
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.59	0.69	0.89
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
t	0	0.075	0.13
Φ	10	12	14