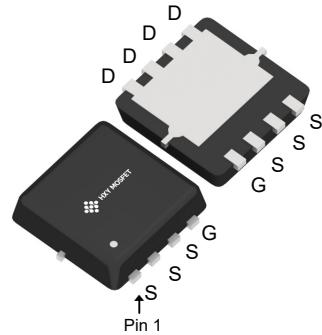




## Description

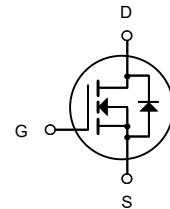
The FDMC8676 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



DFN3X3-8L

$V_{DS} = 30V$   $I_D = 55A$

$R_{DS(ON)} < 6 m\Omega$  @  $V_{GS}=10V$



N-Channel MOSFET

## Application

Battery protection

Load switch

Uninterruptible power supply

## Ordering Information

Product ID	Pack	Brand	Qty(PCS)
FDMC8676	DFN3X3-8L	HXY MOSFET	5000

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_c=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	55	A
$I_D@T_c=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	40	A
$I_{DM}$	Pulsed Drain Current	162	A
$E_{AS}$	Single Pulse Avalanche Energy	144.7	mJ
$I_{AS}$	Avalanche Current	53.8	A
$P_D@T_c=25^\circ C$	Total Power Dissipation	62.5	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	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case	2.4	°C/W



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$\text{BV}_{\text{DSS}}$	Drain-Source Breakdown Voltage	$\text{V}_{\text{GS}}=0\text{V}$ , $\text{I}_{\text{D}}=250\text{uA}$	30	---	---	V
$\Delta \text{BV}_{\text{DSS}}/\Delta T_J$	BVDSS Temperature Coefficient	Reference to $25^\circ\text{C}$ , $\text{I}_{\text{D}}=1\text{mA}$	---	0.0213	---	$\text{V}/^\circ\text{C}$
$\text{R}_{\text{DS}(\text{ON})}$	Static Drain-Source On-Resistance <sup>2</sup>	$\text{V}_{\text{GS}}=10\text{V}$ , $\text{I}_{\text{D}}=30\text{A}$	---	4.7	6	$\text{m}\Omega$
		$\text{V}_{\text{GS}}=4.5\text{V}$ , $\text{I}_{\text{D}}=15\text{A}$	---	5.9	8	
$\text{V}_{\text{GS}(\text{th})}$	Gate Threshold Voltage	$\text{V}_{\text{GS}}=\text{V}_{\text{DS}}$ , $\text{I}_{\text{D}}=250\text{uA}$	1.0	1.5	2.5	V
$\Delta \text{V}_{\text{GS}(\text{th})}$	$\text{V}_{\text{GS}(\text{th})}$ Temperature Coefficient		---	-5.73	---	$\text{mV}/^\circ\text{C}$
$\text{I}_{\text{DSS}}$	Drain-Source Leakage Current	$\text{V}_{\text{DS}}=24\text{V}$ , $\text{V}_{\text{GS}}=0\text{V}$ , $T_J=25^\circ\text{C}$	---	---	1	$\text{uA}$
		$\text{V}_{\text{DS}}=24\text{V}$ , $\text{V}_{\text{GS}}=0\text{V}$ , $T_J=55^\circ\text{C}$	---	---	5	
$\text{I}_{\text{GSS}}$	Gate-Source Leakage Current	$\text{V}_{\text{GS}}=\pm 20\text{V}$ , $\text{V}_{\text{DS}}=0\text{V}$	---	---	$\pm 100$	nA
$\text{gfs}$	Forward Transconductance	$\text{V}_{\text{DS}}=5\text{V}$ , $\text{I}_{\text{D}}=30\text{A}$	---	26.5	---	S
$\text{R}_{\text{g}}$	Gate Resistance	$\text{V}_{\text{DS}}=0\text{V}$ , $\text{V}_{\text{GS}}=0\text{V}$ , $f=1\text{MHz}$	---	1.4	2.8	$\Omega$
$\text{Q}_{\text{g}}$	Total Gate Charge (4.5V)	$\text{V}_{\text{DS}}=15\text{V}$ , $\text{V}_{\text{GS}}=4.5\text{V}$ , $\text{I}_{\text{D}}=15\text{A}$	---	31.6	---	$\text{nC}$
$\text{Q}_{\text{gs}}$	Gate-Source Charge		---	8.6	---	
$\text{Q}_{\text{gd}}$	Gate-Drain Charge		---	11.7	---	
$\text{T}_{\text{d}(\text{on})}$	Turn-On Delay Time	$\text{V}_{\text{DD}}=15\text{V}$ , $\text{V}_{\text{GS}}=10\text{V}$ , $\text{R}_{\text{G}}=3.3\Omega$	---	9	---	$\text{ns}$
$\text{T}_r$	Rise Time		---	19	---	
$\text{T}_{\text{d}(\text{off})}$	Turn-Off Delay Time		---	58	---	
$\text{T}_f$	Fall Time		---	15.2	---	
$\text{C}_{\text{iss}}$	Input Capacitance	$\text{V}_{\text{DS}}=15\text{V}$ , $\text{V}_{\text{GS}}=0\text{V}$ , $f=1\text{MHz}$	---	3075	4000	$\text{pF}$
$\text{C}_{\text{oss}}$	Output Capacitance		---	400	530	
$\text{C}_{\text{rss}}$	Reverse Transfer Capacitance		---	315	---	

**Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$\text{I}_{\text{S}}$	Continuous Source Current <sup>1,5</sup>	$\text{V}_{\text{G}}=\text{V}_{\text{D}}=0\text{V}$ , Force Current	---	---	55	A
$\text{I}_{\text{SM}}$	Pulsed Source Current <sup>2,5</sup>		---	---	162	A
$\text{V}_{\text{SD}}$	Diode Forward Voltage <sup>2</sup>	$\text{V}_{\text{GS}}=0\text{V}$ , $\text{I}_{\text{S}}=1\text{A}$ , $T_J=25^\circ\text{C}$	---	---	1	V
$\text{t}_{\text{rr}}$	Reverse Recovery Time	$\text{I}_{\text{F}}=30\text{A}$ , $\text{dI}/\text{dt}=100\text{A}/\mu\text{s}$ ,	---	18	---	nS
$\text{Q}_{\text{rr}}$	Reverse Recovery Charge	$T_J=25^\circ\text{C}$	---	8	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width  $\leq 300\mu\text{s}$  , duty cycle  $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is  $\text{V}_{\text{DD}}=25\text{V}$ ,  $\text{V}_{\text{GS}}=10\text{V}$ ,  $\text{L}=0.1\text{mH}$ ,  $\text{I}_{\text{AS}}=53.8\text{A}$
- 4.The power dissipation is limited by  $175^\circ\text{C}$  junction temperature
- 5.The data is theoretically the same as  $\text{I}_{\text{D}}$  and  $\text{I}_{\text{DM}}$  , in real applications , should be limited by total power dissipation.



## Typical Characteristics

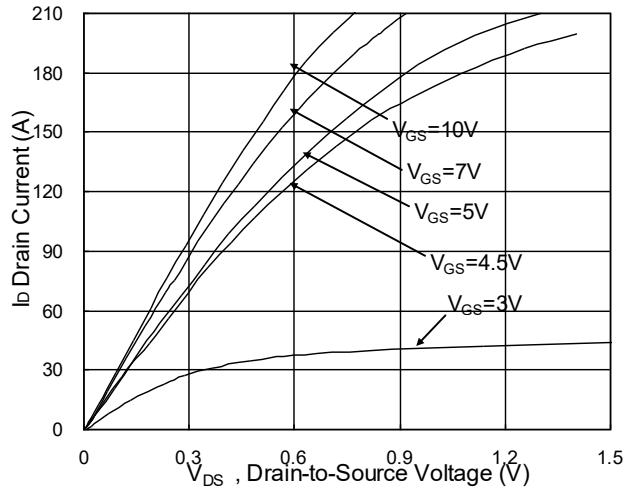


Fig.1 Typical Output Characteristics

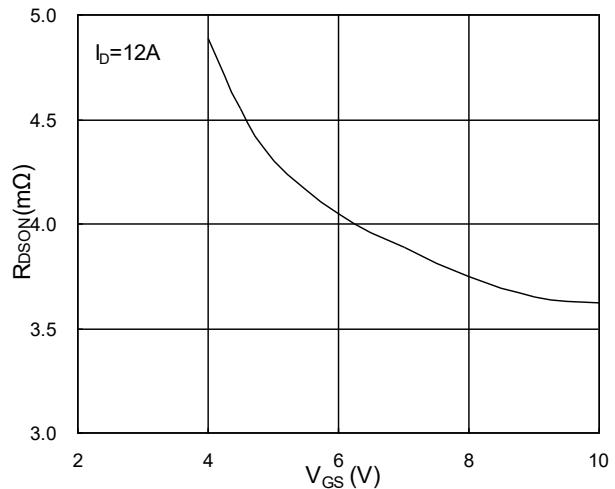


Fig.2 On-Resistance vs. G-S Voltage

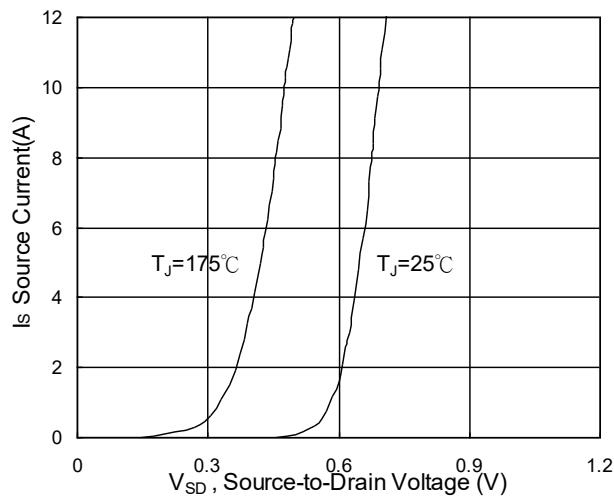


Fig.3 Forward Characteristics of Reverse

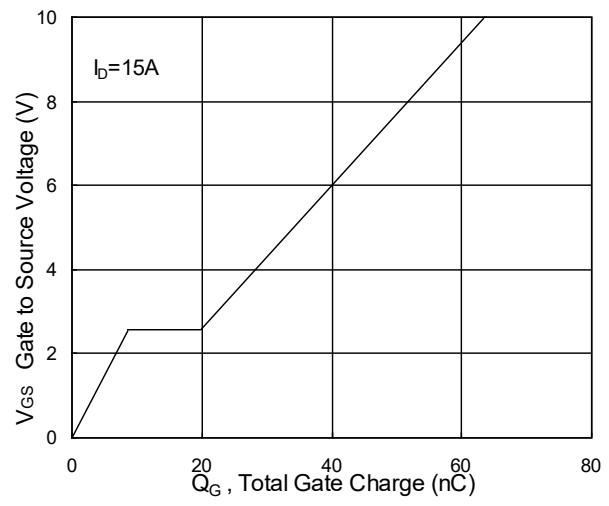


Fig.4 Gate-Charge Characteristics

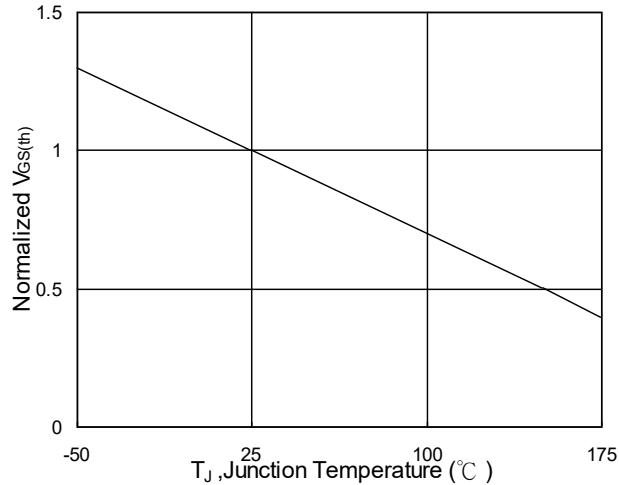


Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$

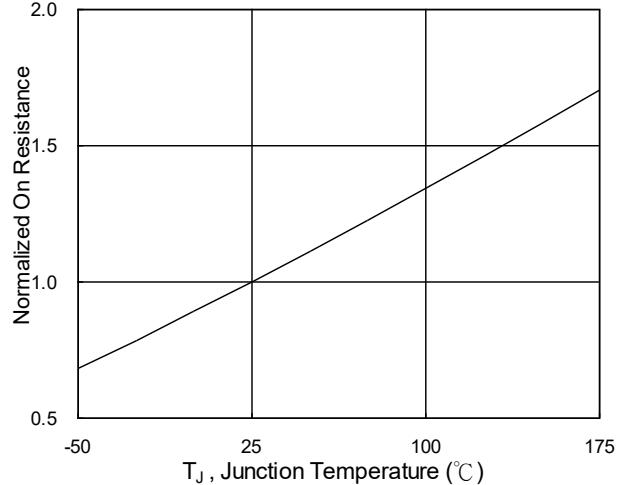


Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$

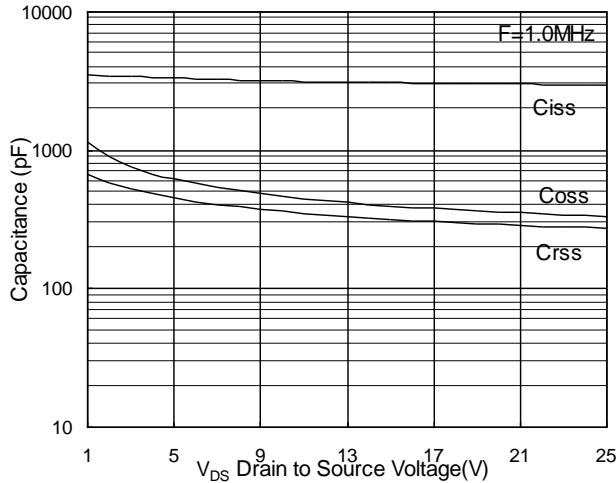


Fig.7 Capacitance

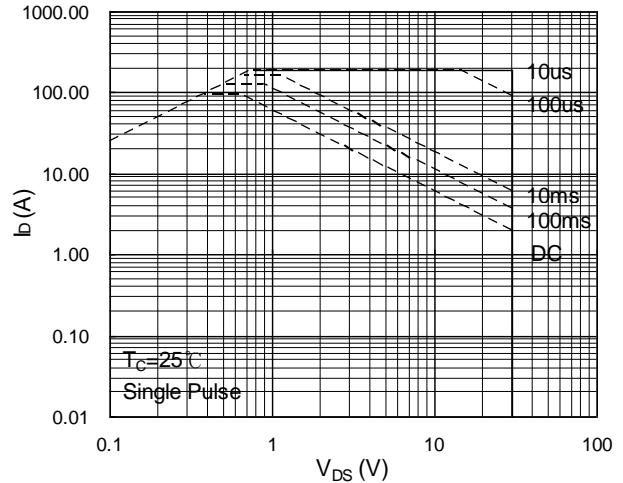


Fig.8 Safe Operating Area

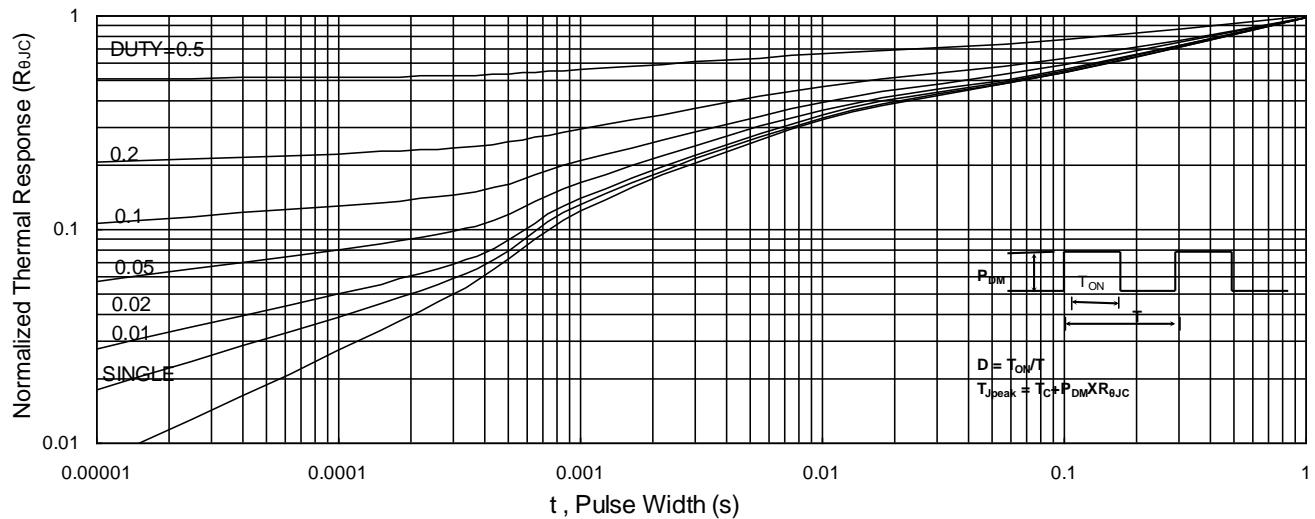


Fig.9 Normalized Maximum Transient Thermal Impedance

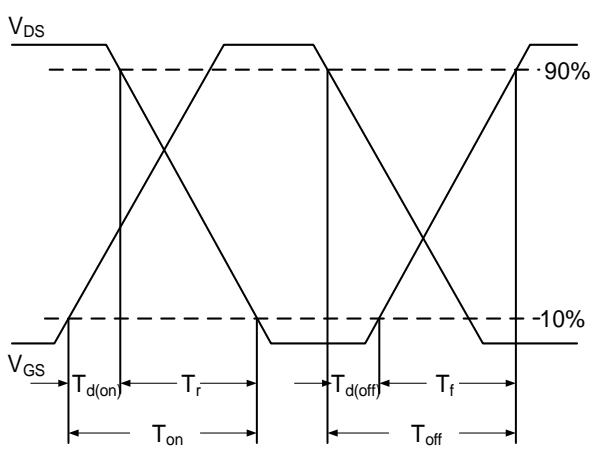


Fig.10 Switching Time Waveform

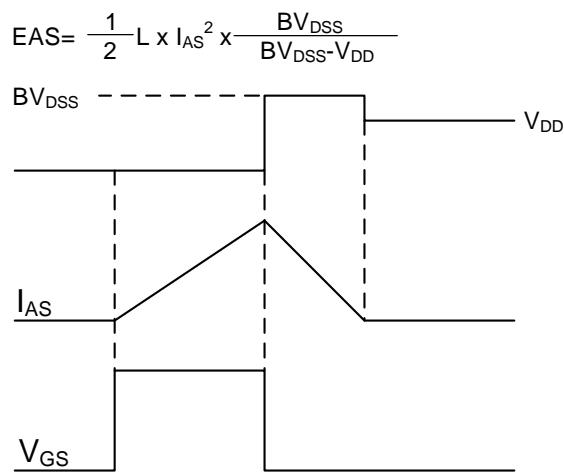
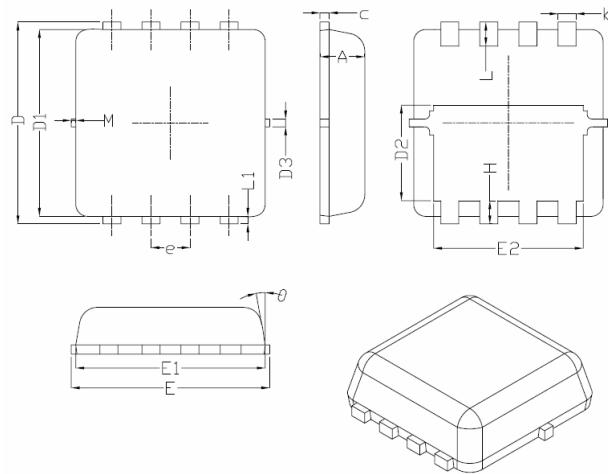


Fig.11 Unclamped Inductive Switching Waveform



## DFN3X3-8L Package Information



Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.48	1.58	1.68
D3	-	0.13	-
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	-	0.13	-
M	*	*	0.15
$\theta$		10°	12°



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