



Description

The DMTH6016LPSQ-13 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.

General Features

$V_{DS} = 60V$ $I_D = 50A$

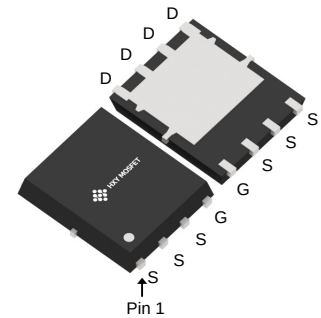
$R_{DS(ON)} < 20\text{ m}\Omega @ V_{GS}=10V$

Application

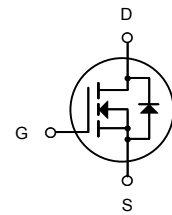
Battery protection

Load switch

Uninterruptible power supply



DFN5X6-8L



N-Channel MOSFET

Ordering Information

Product ID	Pack	Brand	Qty(PCS)
DMTH6016LPSQ-13	DFN5X6-8L	HXY MOSFET	5000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_c=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V$	50	A
I_{DM}	Pulsed Drain Current	200	A
EAS	Single Pulse Avalanche Energy	300	mJ
$P_D @ T_c=25^\circ\text{C}$	Total Power Dissipation	60	W
T_{STG}	Storage Temperature Range	-55 to 175	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 175	$^\circ\text{C}$
$R_{\theta JC}$	Thermal Resistance Junction-Case	1.8	$^\circ\text{C/W}$



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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	60	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V,V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V,V _{DS} =0V	-	-	±100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	1.4	1.9	2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =20A	-	14	20	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V,I _D =20A	18	-	-	S
Dynamic Characteristics ^(Note4)						
Input Capacitance	C _{iss}	V _{DS} =30V,V _{GS} =0V, F=1.0MHz	-	2050	-	PF
Output Capacitance	C _{oss}		-	158	-	PF
Reverse Transfer Capacitance	C _{rss}		-	120	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =30V, R _L =6.7Ω V _{GS} =10V,R _G =3Ω	-	7.4	-	nS
Turn-on Rise Time	t _r		-	5.1	-	nS
Turn-Off Delay Time	t _{d(off)}		-	28.2	-	nS
Turn-Off Fall Time	t _f		-	5.5	-	nS
Total Gate Charge	Q _g	V _{DS} =30V,I _D =20A, V _{GS} =10V	-	50		nC
Gate-Source Charge	Q _{gs}		-	6		nC
Gate-Drain Charge	Q _{gd}		-	15		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V _{SD}	V _{GS} =0V,I _S =20A	-		1.2	V
Diode Forward Current ^(Note 2)	I _S		-	-	50	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F =20A di/dt = 100A/μs ^(Note3)	-	28	-	nS
Reverse Recovery Charge	Q _{rr}		-	40	-	nC
Forward Turn-On Time	t _{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition : $T_J=25^{\circ}\text{C}, V_{DD}=30V, V_G=10V, L=0.5mH, R_g=25\Omega$



Typical Characteristics

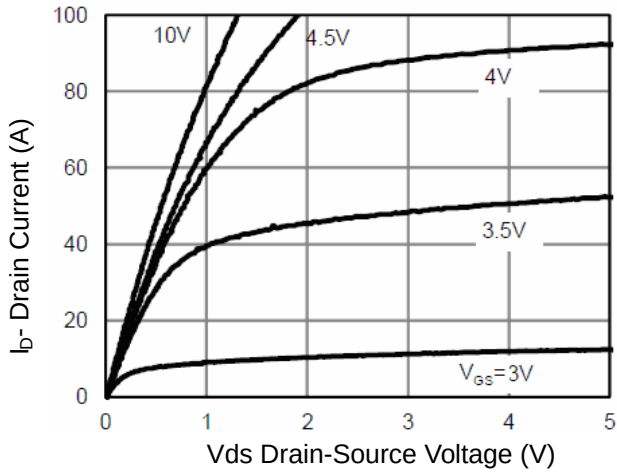


Figure 1 Output Characteristics

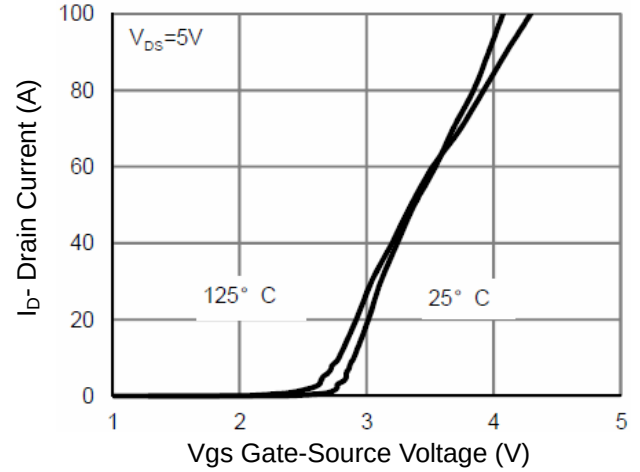


Figure 2 Transfer Characteristics

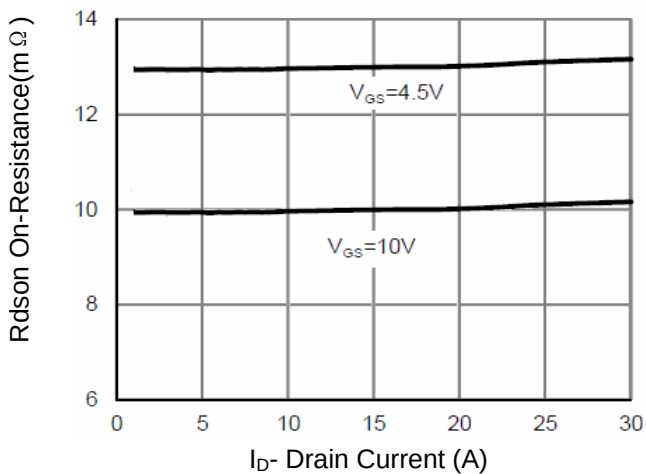


Figure 3 $R_{DS(on)}$ - Drain Current

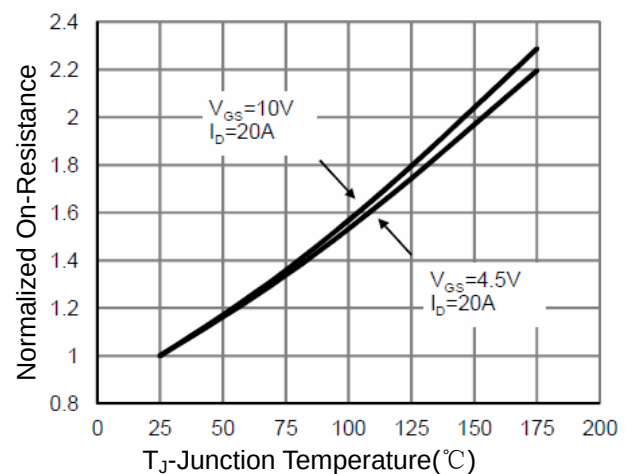


Figure 4 $R_{DS(on)}$ -Junction Temperature

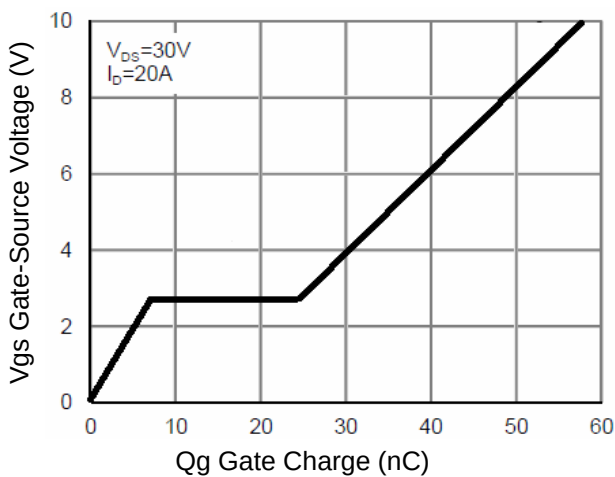


Figure 5 Gate Charge

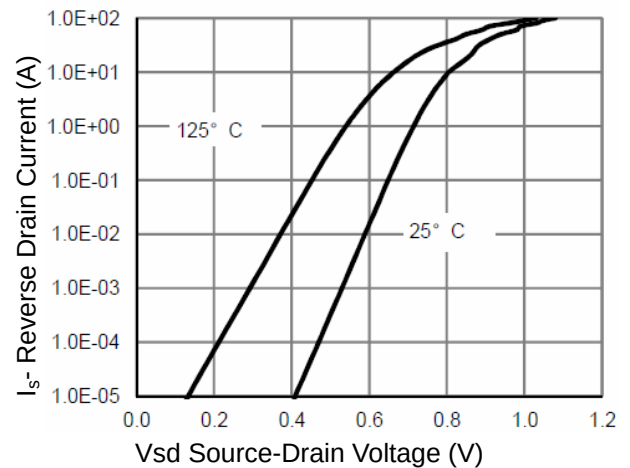


Figure 6 Source- Drain Diode Forward

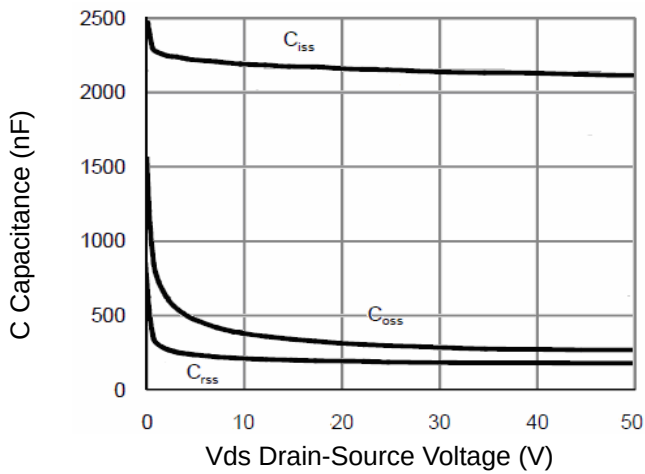


Figure 7 Capacitance vs Vds

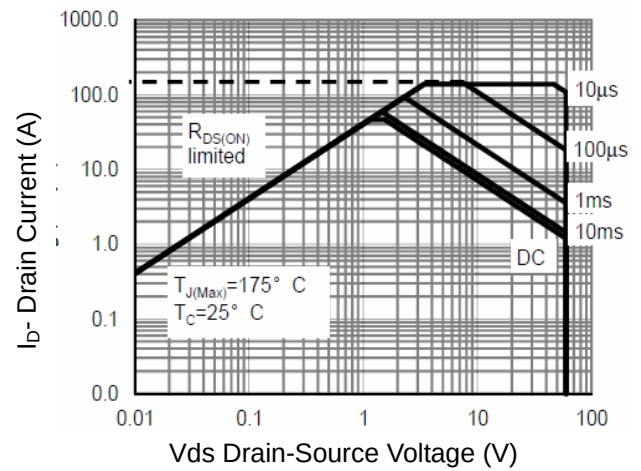


Figure 8 Safe Operation Area

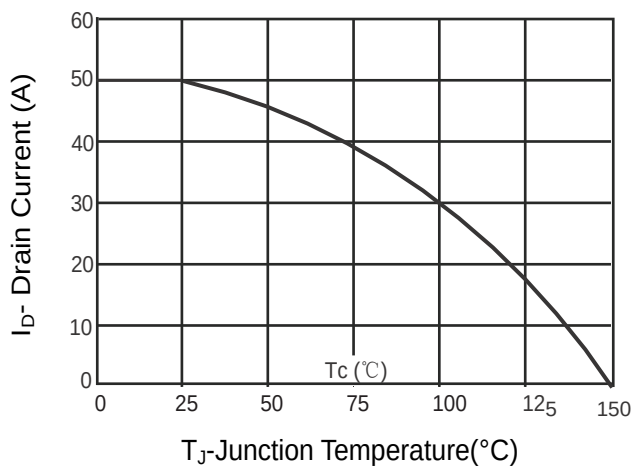


Figure 9 Current De-rating

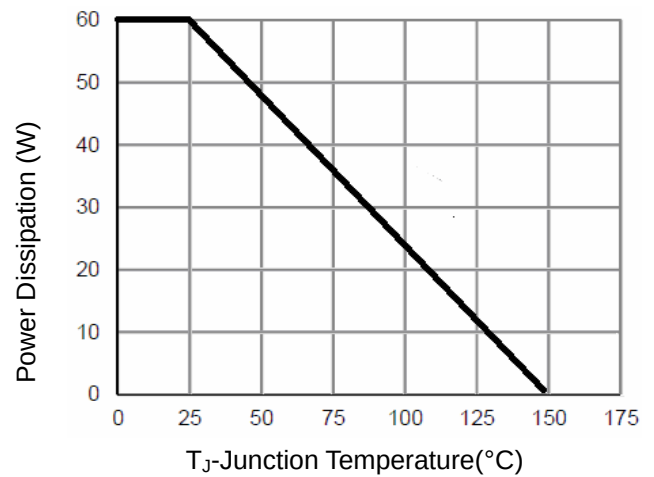


Figure 10 Power De-rating

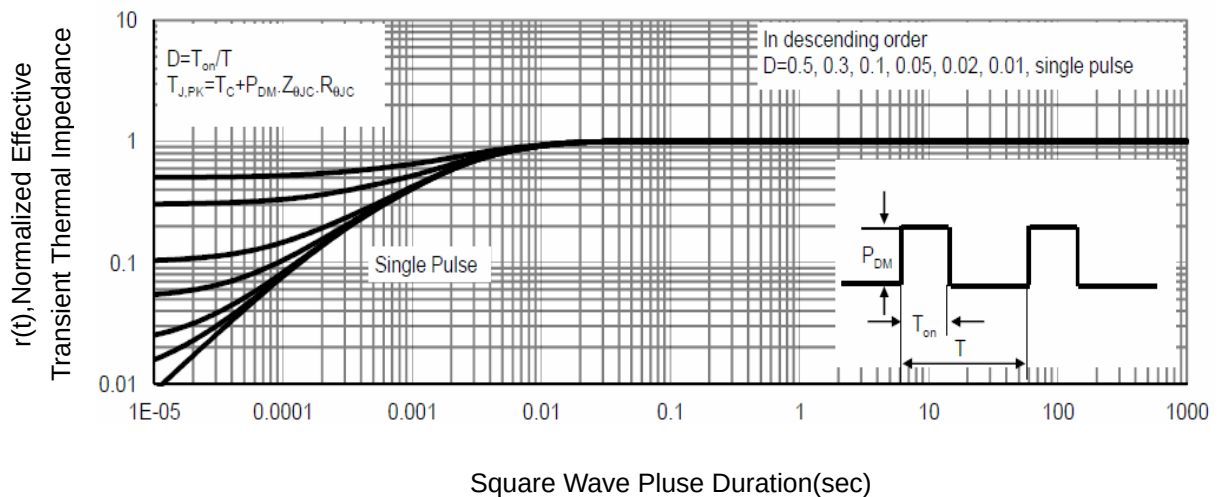
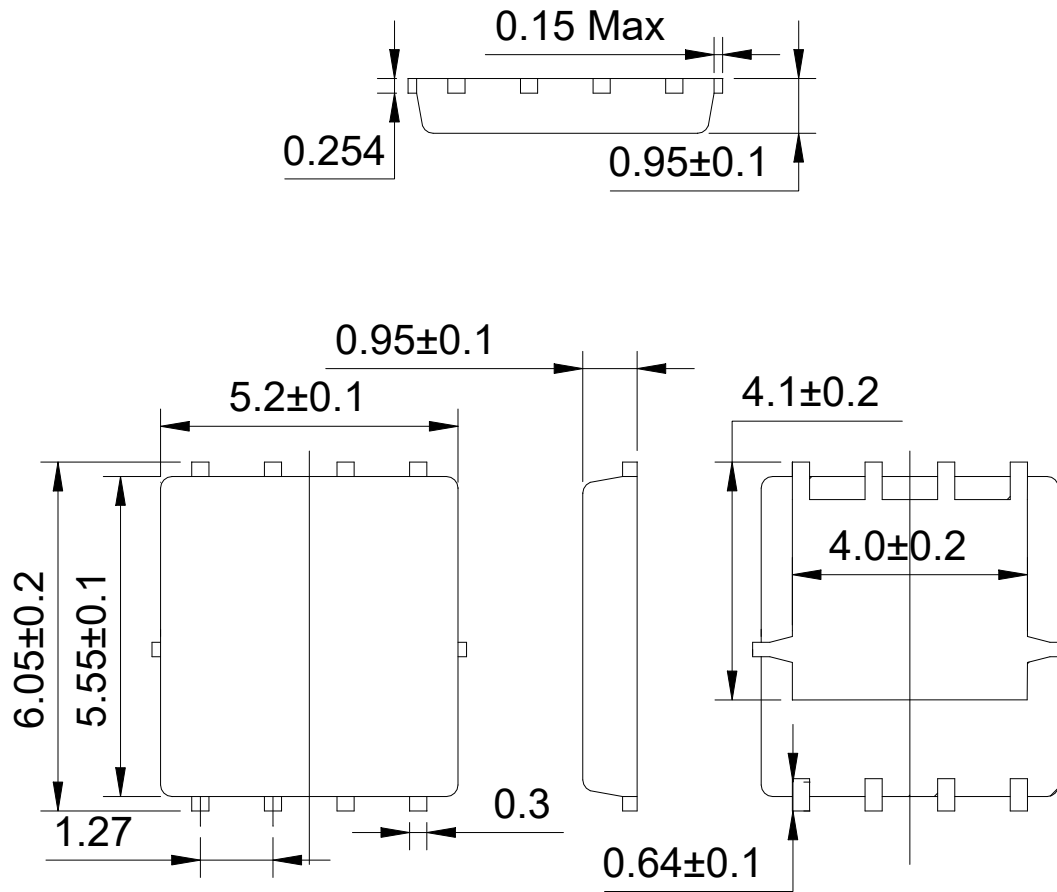


Figure 11 Normalized Maximum Transient Thermal Impedance



DFN5X6-8L Package Information

Unit:mm





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