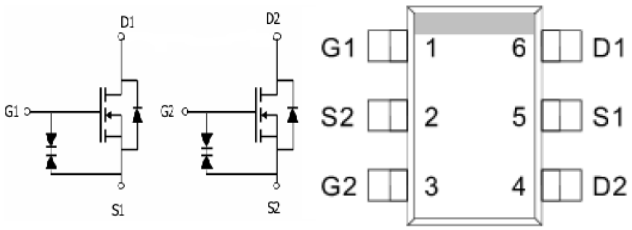
N-Channel Enhancement Mode Power MOSFET

Features

V_{DS}	$R_{DS(ON)TYP}$	I_D
20V	19.5mΩ @4.5V	6A
	25mΩ@4.5V	

Pin Configurations



Top View

General Description

The HGQ6N20MDE uses advanced trench technology to provide excellent $R_{DS(ON)}$,low gate charge and operation with gate voltages as low as 2.5V.This device is suitable for use as a Battery protection or in other Switching applications.

Absolute Maximum Ratings @T_A=25℃ unless otherwise noted

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DSS}	20	V
Gate-Source Voltage		V_{GSS}	±8	V
Drain Current (Continuous) *AC	T_C=25°C	I_D	6	A
	T_C=70°C		4.2	
Drain Current (Pulse) *B		I_{DM}	25	A
Power Dissipation	T_C=25°C	P_D	1.25	W
Operating Temperature/ Storage Temperature		T_J/T_{STG}	-55~150	℃

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-ambient	Rthj-amb	100	℃/W

Electrical Characteristics

T_A=25℃ unless otherwise noted

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D=250μA	20	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 20 V, V_{GS} = 0V	--	--	1	μA
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} =V_{DS} , I_{DS}=250μA	0.4	0.73	1.0	V
Gate Leakage Current	I_{GSS}	V_{GS}= ± 8V, V_{DS}=0V	--	--	10	μA
Drain-Source On-state Resistance	$R_{DS(on)}$	V_{GS} = 4.5V, I_D = 6A	--	19.5	25	mΩ
		V_{GS} = 2.5V, I_D = 5.2A	--	25	35	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=4A	8	--	--	S
Diode Forward Voltage	V_{SD}	I_{SD}=1A, V_{GS}=0V	--	0.75	1	V
Switching						
Total Gate Charge	Q_g	V_{GS}=4.5V, V_{DS}=10V, I_D=4A	--	11	--	nC
Gate-Source Charge	Q_{gs}		--	2.3	--	nC
Gate-Drain Charge	Q_{gd}		--	2.5	--	nC
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 10V, I_D = 1A V_{GS} = 4V, R_{GEN} = 10Ω	--	18	--	ns
Turn-on Rise Time	t_r		--	5	--	ns
Turn-off Delay Time	$t_{d(off)}$		--	43	--	ns
Turn-off Fall Time	t_f		--	20	--	ns
Dynamic						
Input Capacitance	C_{iss}	V_{DS} = 8V, V_{GS} = 0V,f = 1.0MHz	--	600	--	pF
Output Capacitance	C_{oss}		--	330	--	pF
Reverse Transfer Capacitance	C_{rss}		--	140	--	pF

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with TA=25°C. The value in any given application depends on the user's specific board design

B: Repetitive rating, pulse width limited by junction temperature.

C: The current rating is based on the t≤ 10s junction to ambient thermal resistance rating.

Typical Electrical and Thermal Characteristics

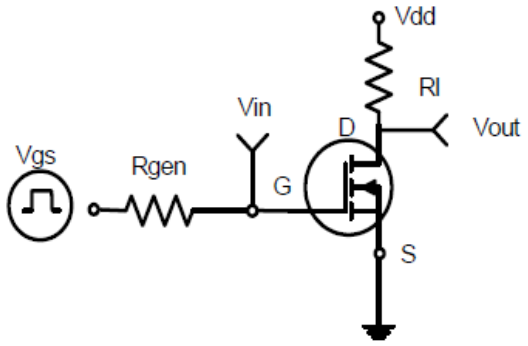


Figure 1:Switching Test Circuit

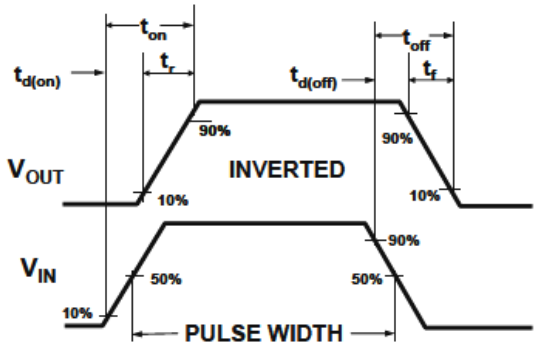


Figure 2:Switching Waveforms

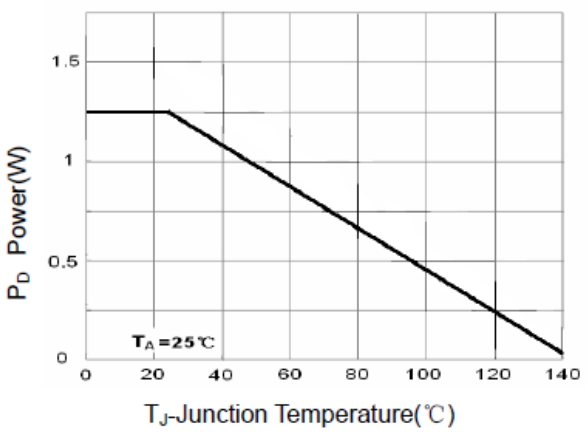


Figure 3 Power Dissipation

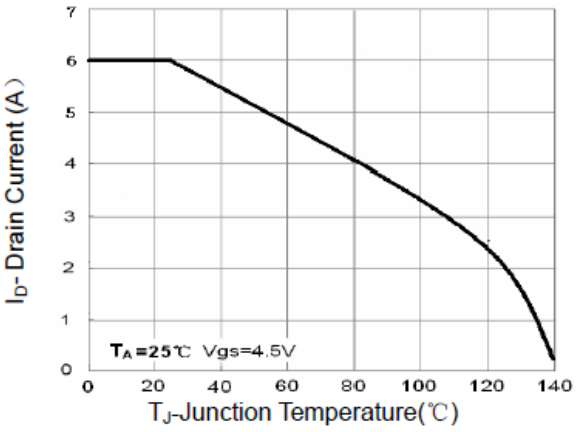


Figure 4 Drain Current

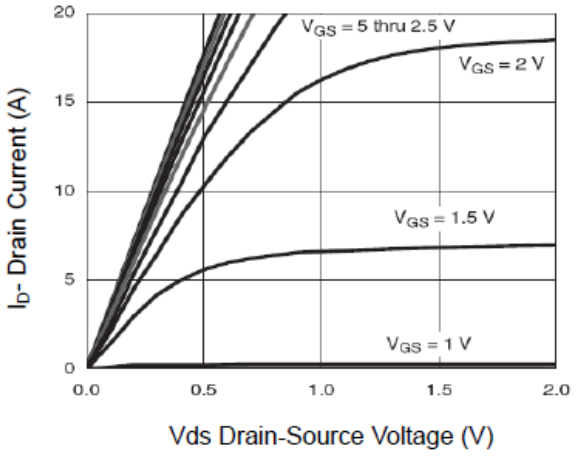


Figure 5 Output Characteristics

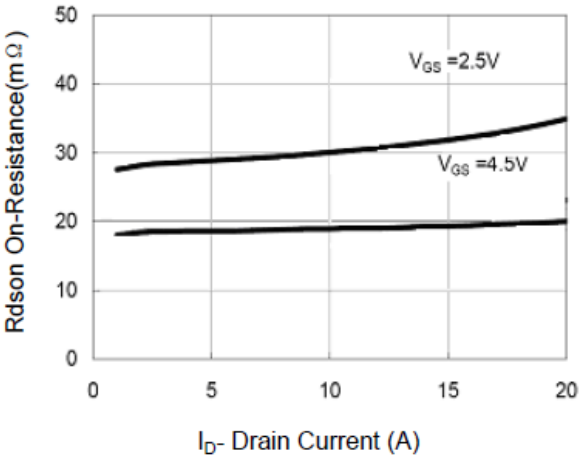


Figure 6 Drain-Source On-Resistance

Typical Electrical and Thermal Characteristics

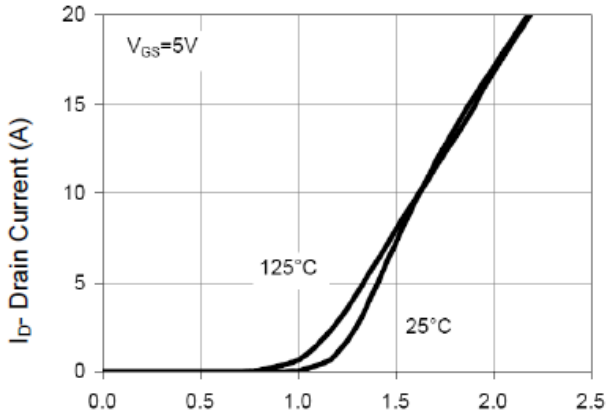


Figure 7 Transfer Characteristics

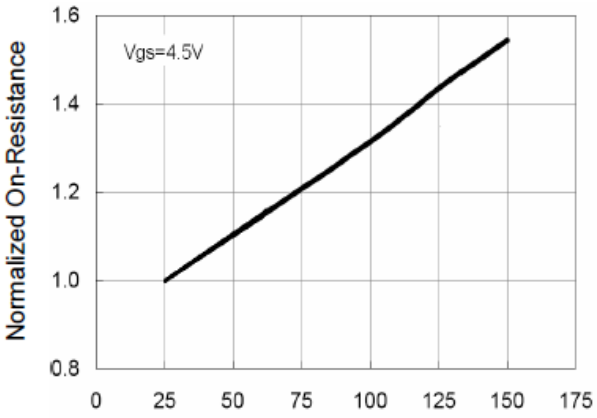


Figure 8 Drain-Source On-Resistance

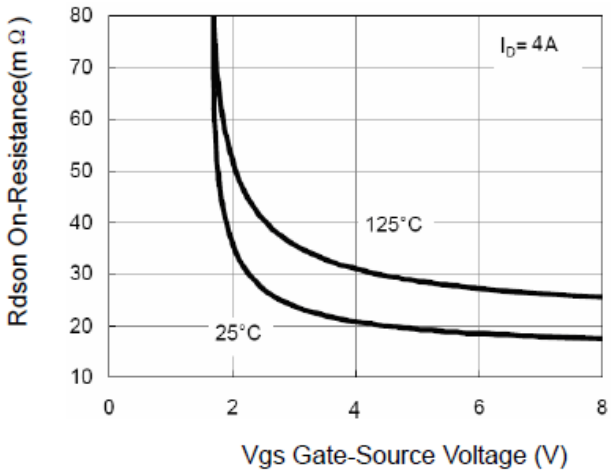


Figure 9 Rdson vs Vgs

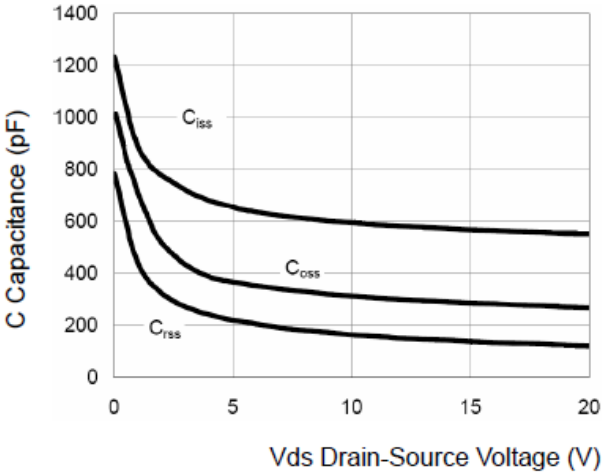


Figure 10 Capacitance vs Vds

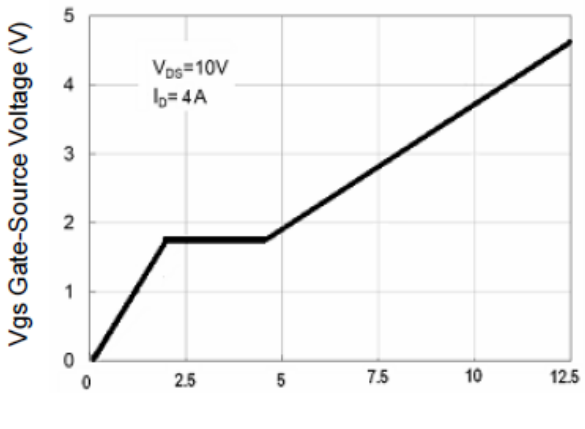


Figure 11 Gate Charge

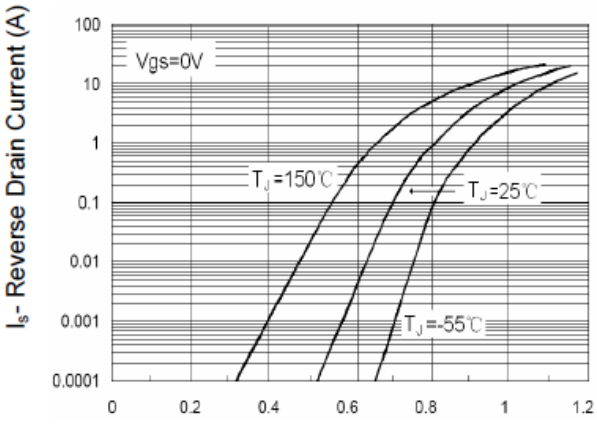


Figure 12 Source- Drain Diode Forward

Typical Electrical and Thermal Characteristics

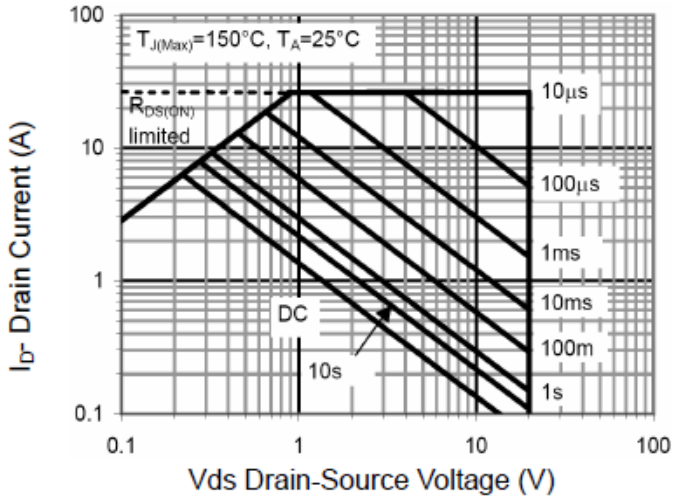


Figure 13 Safe Operation Area

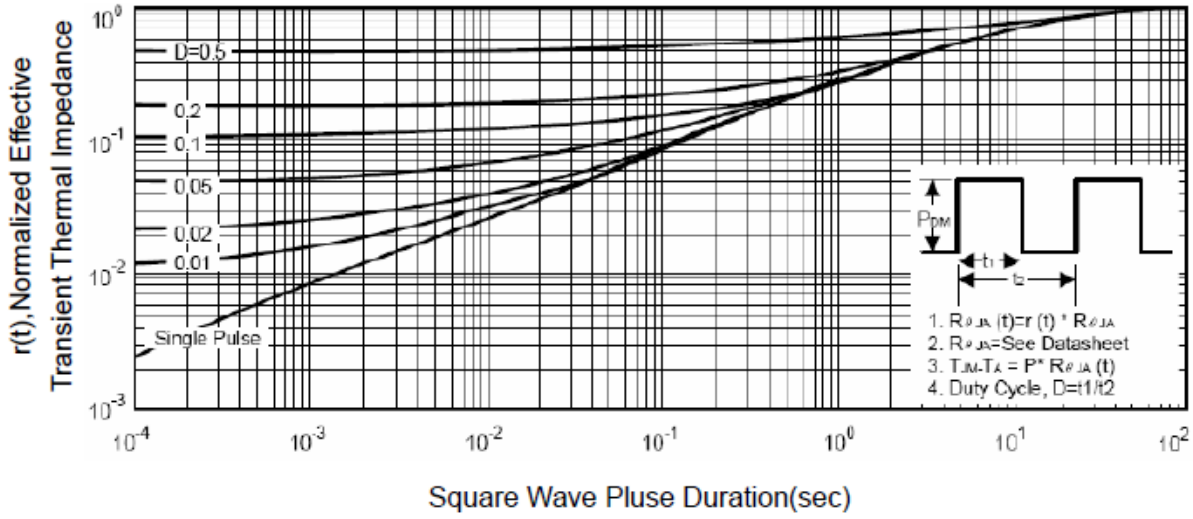


Figure 14 Normalized Maximum Transient Thermal Impedance

Package Information