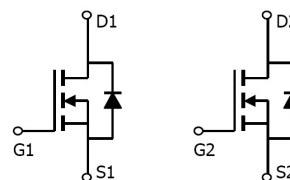


TP4008QD

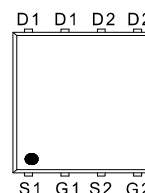
N-Channel Power MOSFET

Feature

- 40V,20A
 $R_{DS(on)} < 22m\Omega @ V_{GS}=10V$
 $R_{DS(on)} < 30m\Omega @ V_{GS}=4.5V$
- Trench DMOS Power MOSFET
- Fast Switching
- Exceptional on-resistance and maximum DC current capability



Schematic diagram



Marking and pin assignment

Application

- DC/DC Converter
- Load Switch for Portable Devices
- Battery Switch

ABSOLUTE MAXIMUM RATINGS ($T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_a=25^\circ\text{C}$)	I_D	20	A
Continuous Drain Current ($T_a=100^\circ\text{C}$)	I_D	13	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	48	A
Power Dissipation	P_D	21	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	6.25	$^\circ\text{C/W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~ +150	$^\circ\text{C}$

MOSFET ELECTRICAL CHARACTERISTICS($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D =250μA	40	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =40V, V _{GS} = 0V	-	-	1	μA
Gate-body leakage current	I _{GSS}	V _{GS} =± 20V, V _{DS} = 0V	-	-	±100	nA
Gate threshold voltage ⁽²⁾	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1	1.6	2.5	V
Drain-source on-resistance ⁽²⁾	R _{DS(on)}	V _{GS} =10V, I _D =10A	-	17	22	mΩ
		V _{GS} =4.5V, I _D =6A	-	22	30	
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V, f =1MHz	-	1050	-	pF
Output Capacitance	C _{oss}		-	84	-	
Reverse Transfer Capacitance	C _{rss}		-	72	-	
Switching characteristics						
Turn-on delay time	t _{d(on)}	V _{DD} =20V, R _L =1.5Ω V _{GS} =10V, R _G =3Ω	-	11	-	ns
Turn-on rise time	t _r		-	13	-	
Turn-off delay time	t _{d(off)}		-	36	-	
Turn-off fall time	t _f		-	9	-	
Total Gate Charge	Qg	V _{DS} =20V, I _D =5A, V _{GS} =10V	-	11	-	nC
Gate-Source Charge	Qgs		-	1.9	-	
Gate-Drain Charge	Qgd		-	2.2	-	
Source-Drain Diode characteristics						
Diode Forward voltage ⁽²⁾	V _{DS}	V _{GS} =0V, I _S =10A	-	-	1.2	V
Diode Forward current ⁽³⁾	I _S		-	-	40	A

Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. Pulse Test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. Surface Mounted on FR4 Board, $t \leq 10$ sec

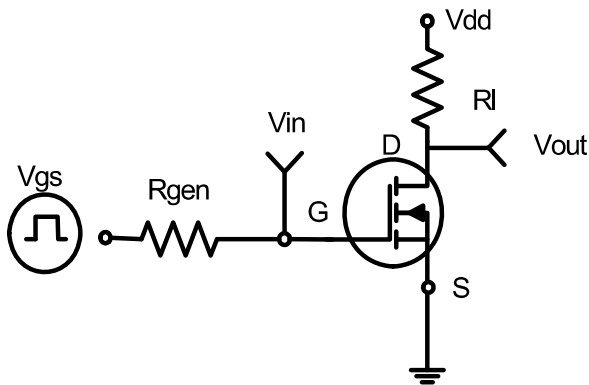


Figure 1: Switching Test Circuit

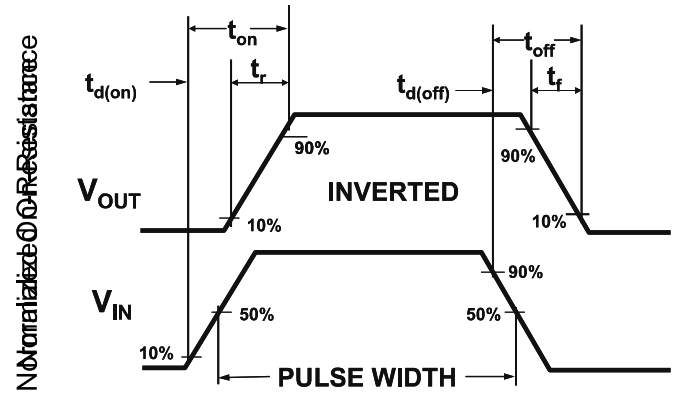
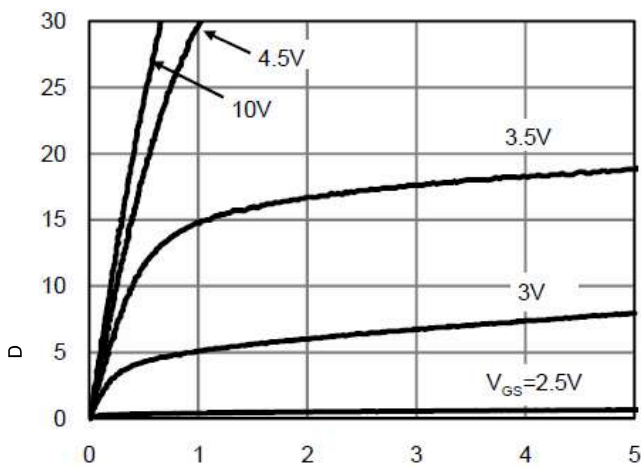
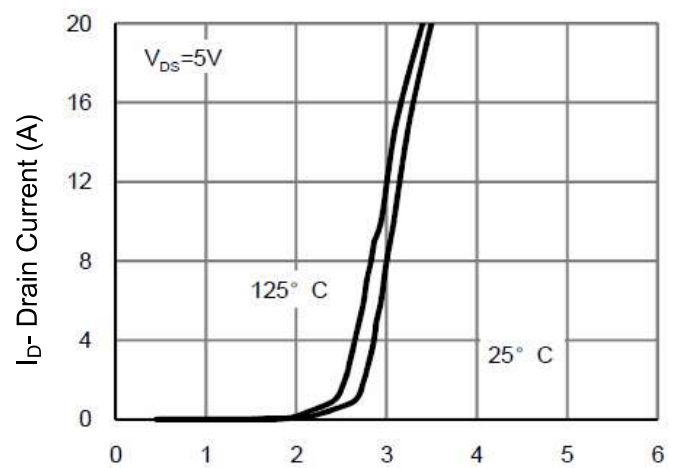


Figure 2: Switching Waveforms



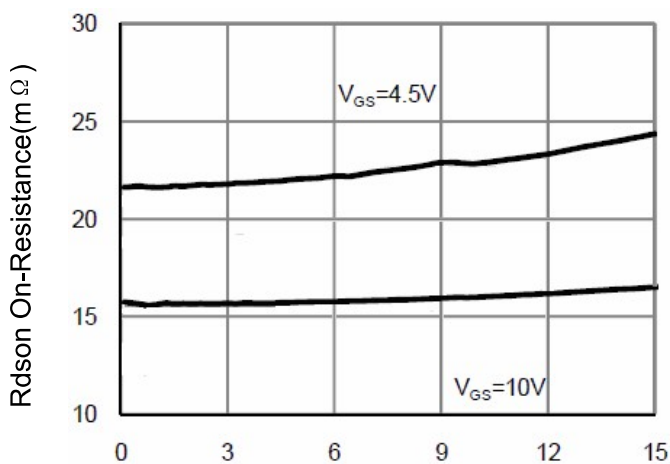
Vds Drain-Source Voltage (V)

Figure 3 Output Characteristics



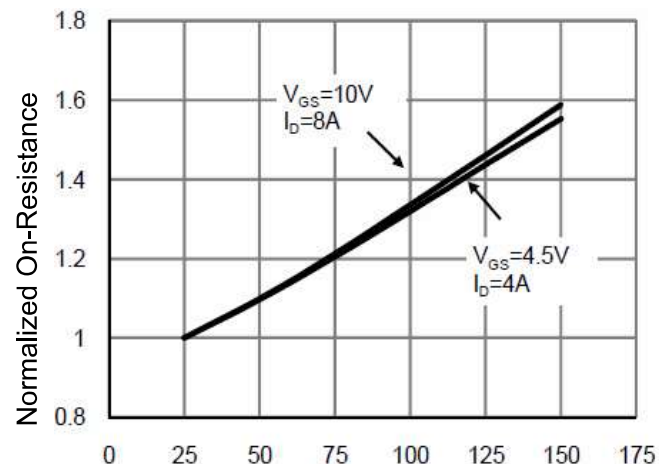
Vgs Gate-Source Voltage (V)

Figure 4 Transfer Characteristics



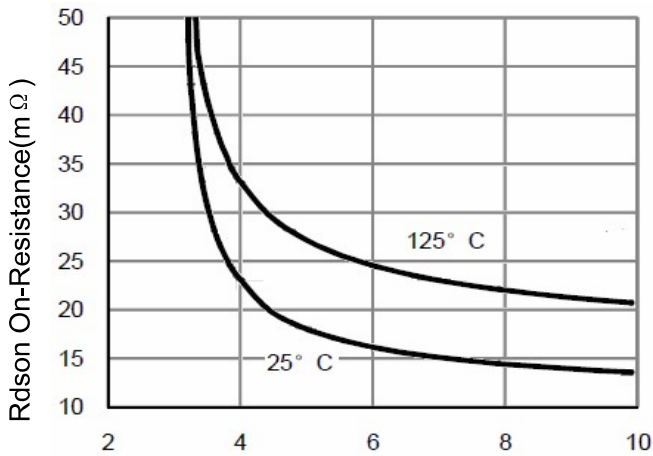
ID- Drain Current (A)

Figure 5 Drain-Source On-Resistance

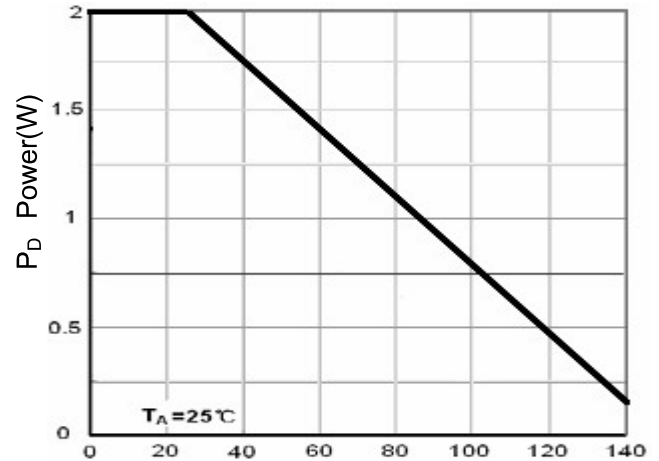


TJ-Junction Temperature(°C)

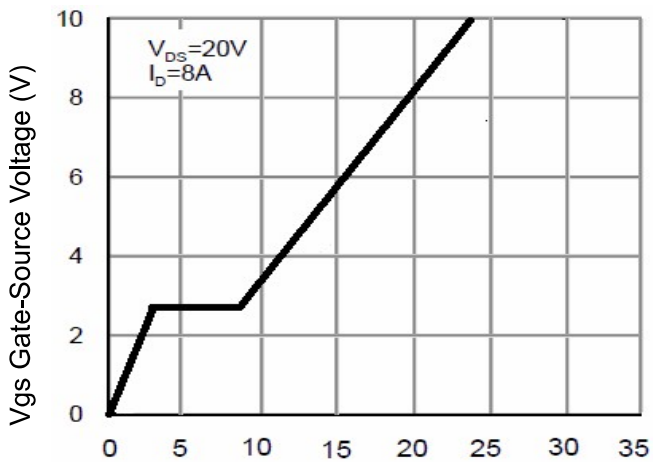
Figure 6 Drain-Source On-Resistance



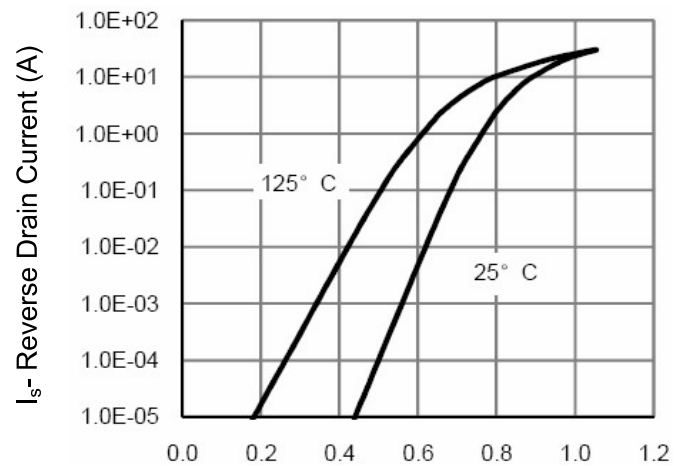
Vgs Gate-Source Voltage (V)
Figure 7 Rdson vs Vgs



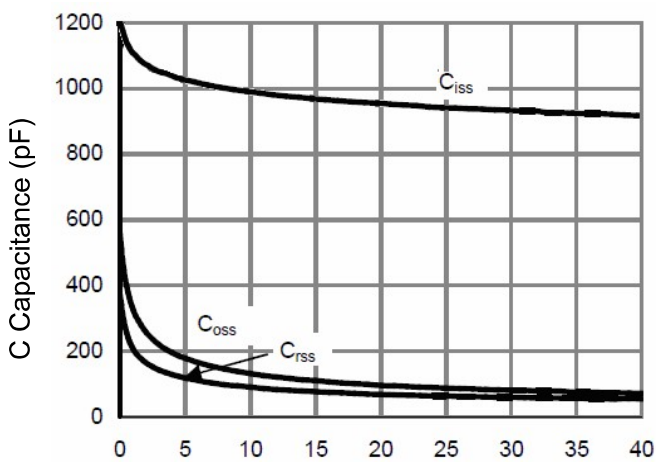
Tj Junction Temperature (°C)
Figure 8 Power Dissipation



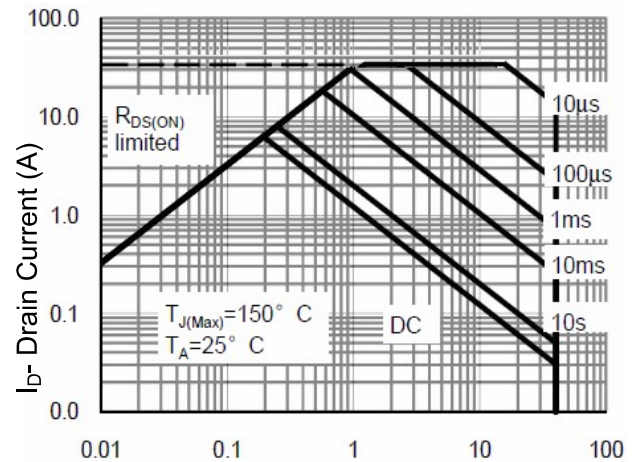
Qg Gate Charge (nC)
Figure 9 Gate Charge



Vds Drain-Source Voltage (V)
Figure 10 Source- Drain Diode Forward



Vds Drain-Source Voltage (V)
Figure 11 Capacitance vs Vds



Vds Drain-Source Voltage (V)
Figure 12 Safe Operation Area

PACKAGE OUTLINE DIMENSIONS

