

## Dual N-Ch Fast Switching MOSFETs

### General Description

The QM8205V is the highest performance trench N-ch MOSFETs with extreme high cell density, which provide excellent R<sub>DS(on)</sub> and gate charge for most of the small power switching and load switch applications.

The QM8205V meet the RoHS and Green Product requirement with full function reliability approved.

### Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent C<sub>dv/dt</sub> effect decline
- Green Device Available

### Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	20	V
V <sub>GS</sub>	Gate-Source Voltage	±8	V
I <sub>D</sub> @T <sub>A</sub> =25°C	Continuous Drain Current, V <sub>GS</sub> @ 4.5V <sup>1</sup>	6	A
I <sub>D</sub> @T <sub>A</sub> =70°C	Continuous Drain Current, V <sub>GS</sub> @ 4.5V <sup>1</sup>	4.8	A
I <sub>DM</sub>	Pulsed Drain Current <sup>2</sup>	30	A
P <sub>D</sub> @T <sub>A</sub> =25°C	Total Power Dissipation <sup>3</sup>	1.1	W
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C

### Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction-ambient <sup>1</sup>	---	110	°C/W
R <sub>θJA</sub>	Thermal Resistance Junction-Ambient <sup>1</sup> (t ≤ 10s)	---	85	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction-Case <sup>1</sup>	---	70	°C/W

### Product Summery

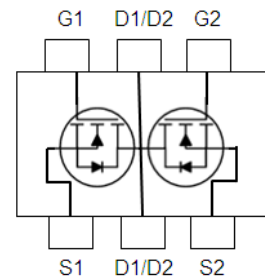
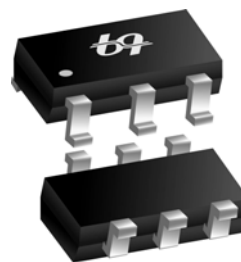


BVDSS	R <sub>DS(on)</sub>	ID
20V	25mΩ	6A

### Applications

- High Frequency Point-of-Load Synchronous s
- Small power switching for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load Switch

### TSOP6 Pin Configuration



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BVDSS Temperature Coefficient	Reference to $25^\circ\text{C}$ , $I_D=1\text{mA}$	---	0.014	---	V/ $^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=4.5V, I_D=6A$	---	20	25	m $\Omega$
		$V_{GS}=2.5V, I_D=5.2A$	---	25	32	
		$V_{GS}=1.8V, I_D=5A$	---	34	42	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	0.3	0.5	1	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-1.74	---	mV/ $^\circ\text{C}$
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=16V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	$\mu\text{A}$
		$V_{DS}=16V, V_{GS}=0V, T_J=55^\circ\text{C}$	---	---	5	
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 8V, V_{DS}=0V$	---	---	$\pm 100$	nA
gfs	Forward Transconductance	$V_{DS}=5V, I_D=6A$	---	29	---	S
$R_g$	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	1.1	2.2	$\Omega$
$Q_g$	Total Gate Charge (4.5V)	$V_{DS}=15V, V_{GS}=4.5V, I_D=6A$	---	10.4	14.6	nC
$Q_{gs}$	Gate-Source Charge		---	1.3	1.8	
$Q_{gd}$	Gate-Drain Charge		---	2.6	3.6	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=10V, V_{GS}=4.5V, R_G=3.3\Omega, I_D=6A$	---	3.2	6.4	ns
$T_r$	Rise Time		---	9.8	17.6	
$T_{d(off)}$	Turn-Off Delay Time		---	31	62	
$T_f$	Fall Time		---	3.6	7.2	
$C_{iss}$	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$	---	630	882	pF
$C_{oss}$	Output Capacitance		---	66	92	
$C_{rss}$	Reverse Transfer Capacitance		---	63	89	

**Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current <sup>1,4</sup>	$V_G=V_D=0V$ , Force Current	---	---	6	A
$I_{SM}$	Pulsed Source Current <sup>2,4</sup>		---	---	30	A
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1.2	V
$t_{rr}$	Reverse Recovery Time	$I_F=6A, di/dt=100A/\mu s, T_J=25^\circ\text{C}$	---	5.4	---	nS
$Q_{rr}$	Reverse Recovery Charge		---	7	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 20Z copper,  $t \leq 10s$ .
- 2.The data tested by pulsed , pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
- 3.The power dissipation is limited by  $150^\circ\text{C}$  junction temperature
- 4.The data is theoretically the same as  $I_D$  and  $I_{DM}$ , in real applications , should be limited by total power dissipation.

## Dual N-Ch Fast Switching MOSFETs

### N-Channel Typical Characteristics

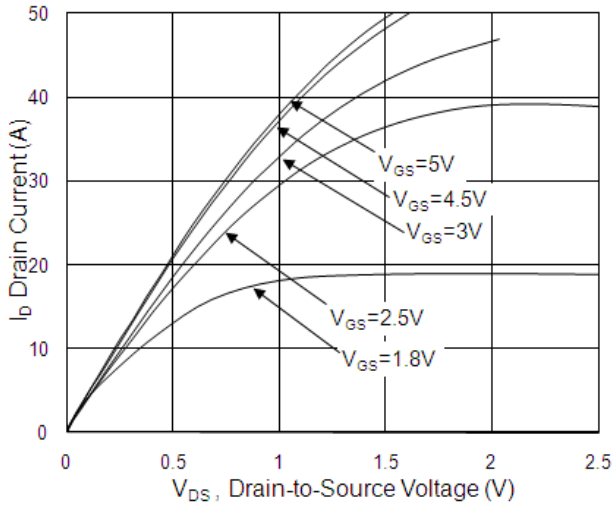


Fig.1 Typical Output Characteristics

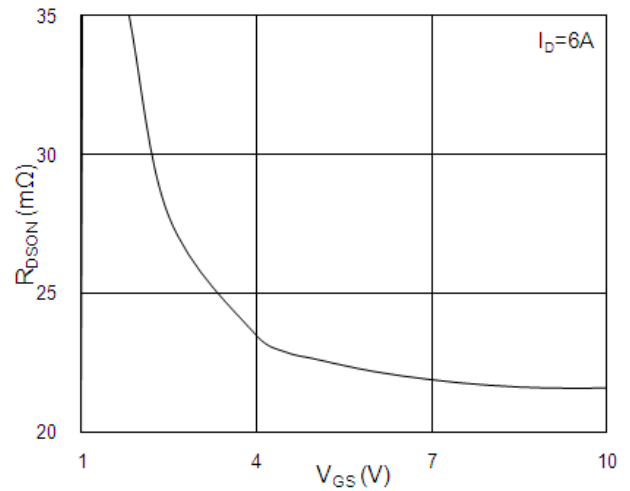


Fig.2 On-Resistance vs. Gate-Source

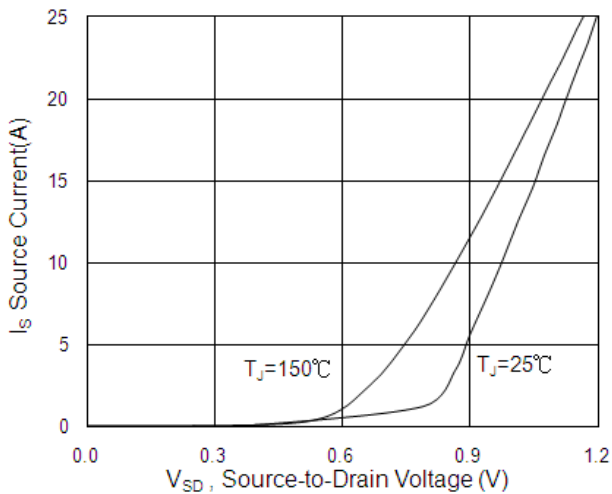


Fig.3 Forward Characteristics Of Reverse

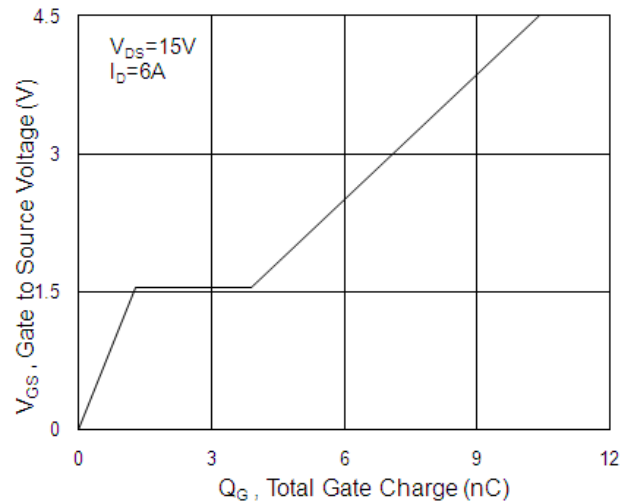


Fig.4 Gate-Charge Characteristics

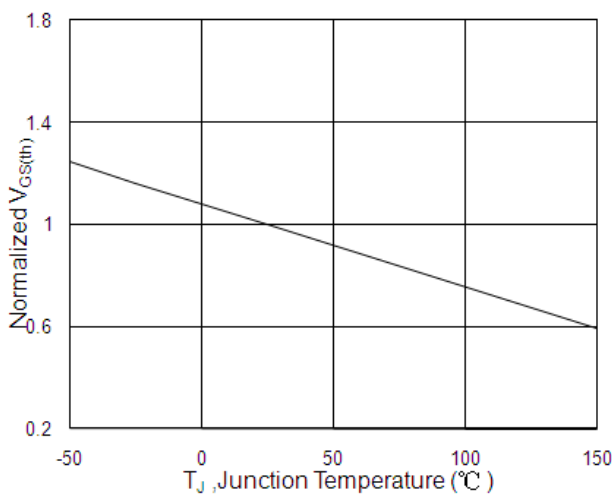


Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$

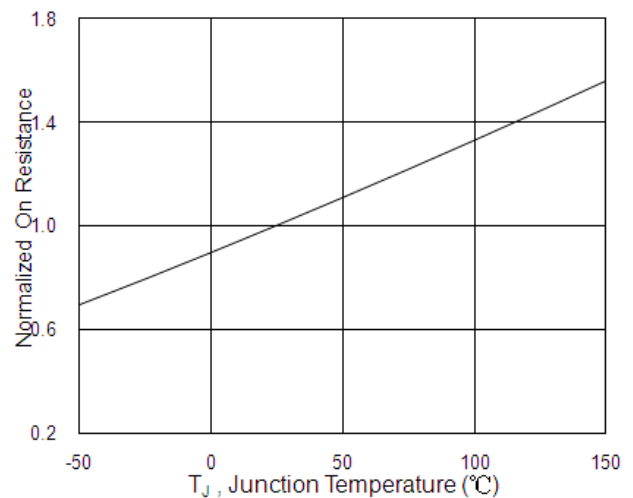


Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$

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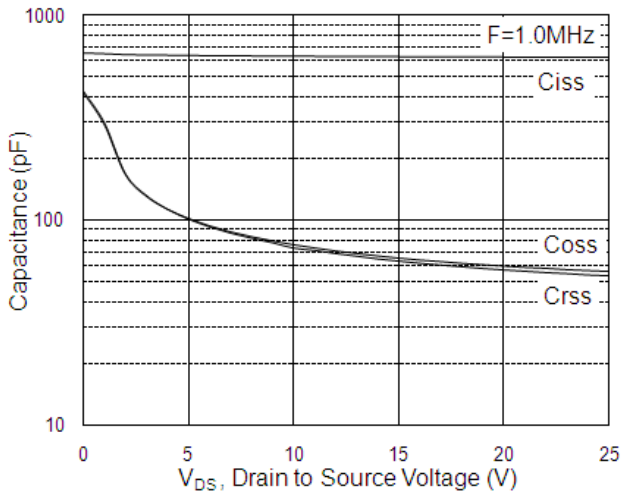


Fig.7 Capacitance

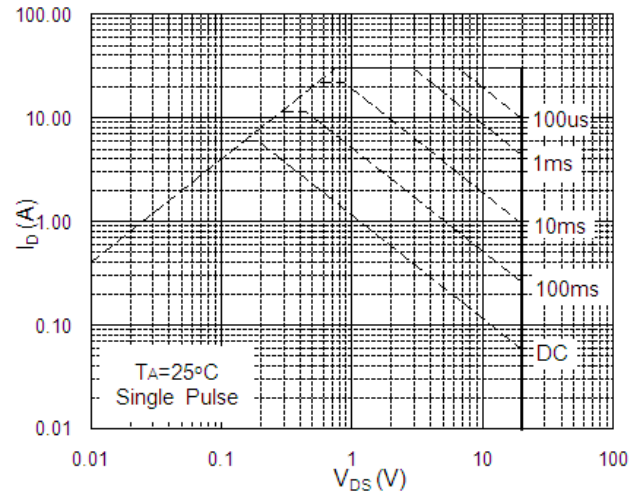


Fig.8 Safe Operating Area

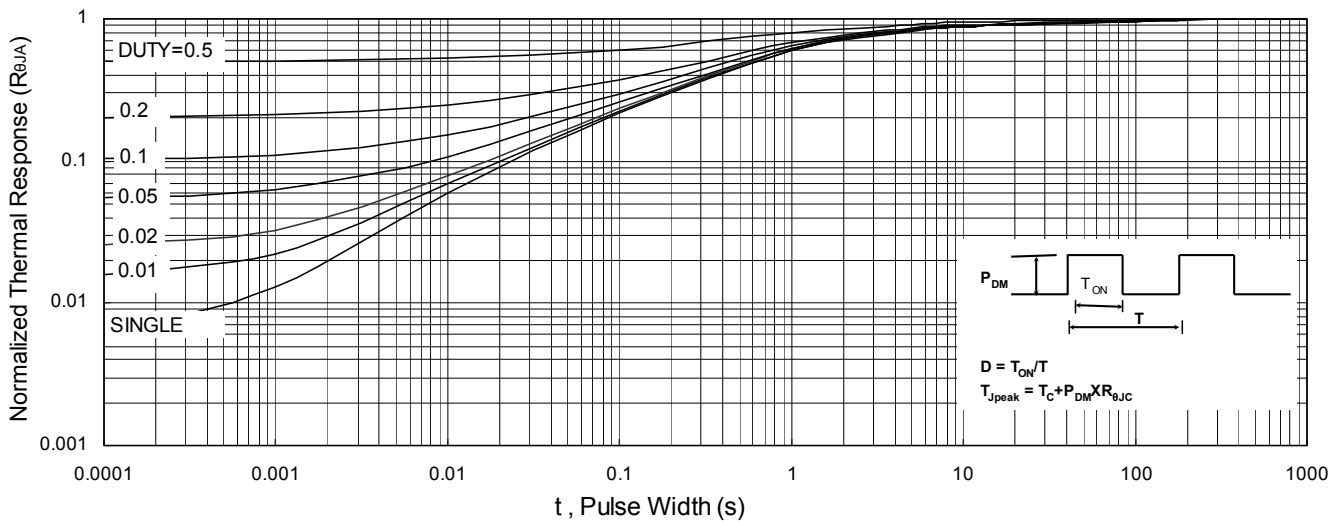


Fig.9 Normalized Maximum Transient Thermal Impedance

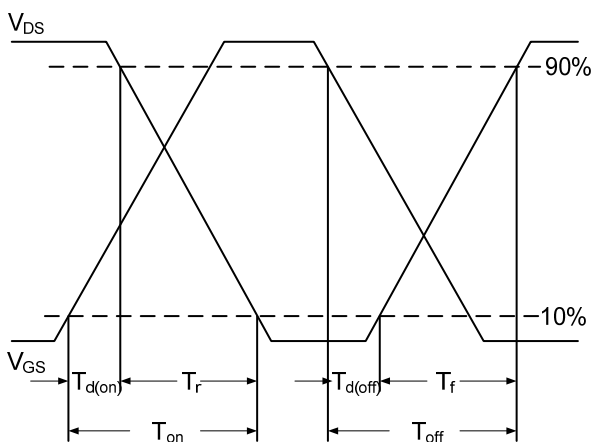


Fig.10 Switching Time Waveform

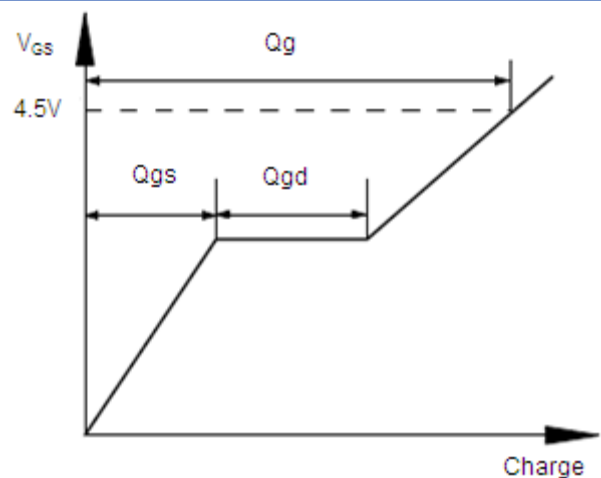


Fig.11 Gate Charge Waveform