Dual N-Channel Enhancement Mode Power MOSFET MX8205L

DESCRIPTION

The MX8205L 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.
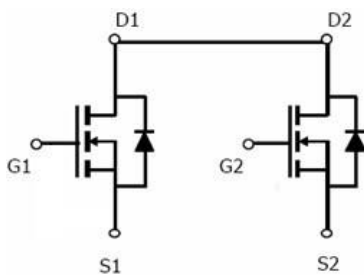
GENERAL FEATURES

- V_{DS}=20V, I_D=6A
  $R_{DS(ON)}$(Typ.)=21mΩ @ V_{GS}=2.5V
  $R_{DS(ON)}$(Typ.)=17mΩ @ V_{GS}=3.8V
  $R_{DS(ON)}$(Typ.)=16mΩ @ V_{GS}=4.5V
- High Power and current handing capability
- Lead free product is acquired
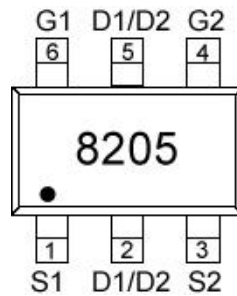- Surface Mount Package

APPLICATION

- Battery protection
- Load switch
- Power management

PINOUT

Schematic diagram   Marking and Pin Assignment   SOT23-6 top view

ORDERING INFORMATION

Part Number	StorageTemperature	Package	Devices Per Reel
MX8205L	-55°C to 150°C	SOT23-6	3000

ABSOLUTE MAXIMUM RATINGS(T$_A$=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	I_D	6	A
Drain Current-Pulsed [Note1]	I_{DM}	24	A
Maximum Power Dissipation	P_D	1.25	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C

THERMAL RESISTANCE

Thermal Resistance, Junction-to-Ambient[Note2]	$R_{\theta JA}$	83	°C/W

Note 1. Repetitive Rating: Pulse width limited by maximum junction temperature.
Note 2. Surface Mounted on FR4 Board, t ≤ 10 sec.

ELECTRICAL CHARACTERISTICS(T_A=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250µA	20	21	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=19.5V, V_{GS}=0V	-	-	1	µA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±12V, V_{DS}=0V	-	-	±100	nA
On Characteristics[Note 3]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250µA	0.4	0.65	1	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=2.5V, I_D=3.5A	-	21	28	mΩ
		V_{GS}=3.8V, I_D=4A	-	17	21	mΩ
		V_{GS}=4.5V, I_D=4.5A	-	16	20	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=4.5A	-	10	-	S
Dynamic Characteristics[Note4]						
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
Switching Characteristics[Note4]						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=10V, I_D=1A V_{GS}=4.5V,R_{GEN}=6Ω	-	10	20	nS
Turn-on Rise Time	t_r		-	11	25	nS
Turn-Off Delay Time	$t_{d(off)}$		-	35	70	nS
Turn-Off Fall Time	t_f		-	30	60	nS
Total Gate Charge	Q_g	V_{DS}=10V, I_D=6A, V_{GS}=4.5V	-	10	15	nC
Gate-Source Charge	Q_{gs}		-	2.3	-	nC
Gate-Drain Charge	Q_{gd}		-	1.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage[Note 3]	V_{SD}	V_{GS}=0V, I_S=1.7A	-	0.75	1.2	V
Diode Forward Current[Note 2]	I_S		-	-	1.7	A

Note 2. Surface Mounted on FR4 Board, t ≤ 10 sec.
Note 3. Pulse Test: Pulse Width ≤ 300µs, Duty Cycle ≤ 2%.
Note 4. Guaranteed by design, not subject to product.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS
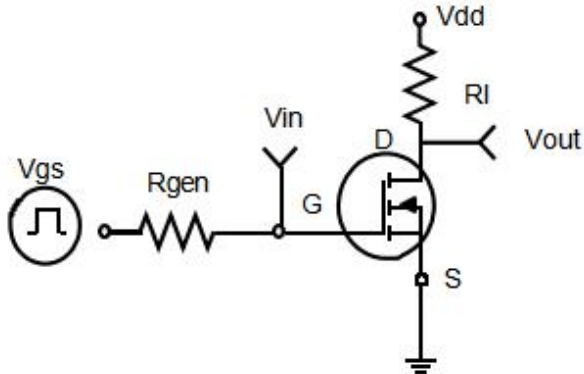
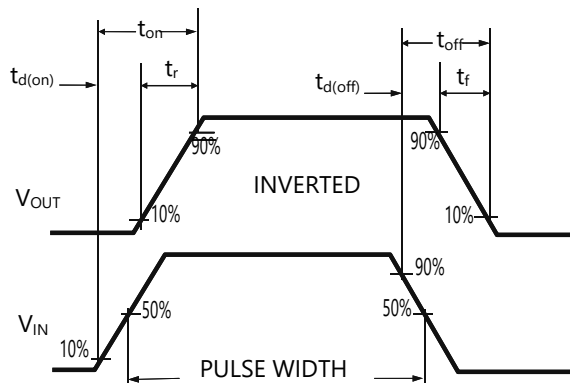**Figure 1. Switching Test Circuit**

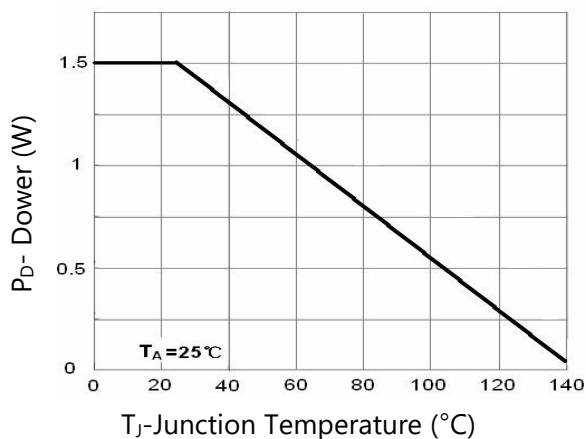**Figure 2. Switching Waveform**

Figure 3. Power Dissipation
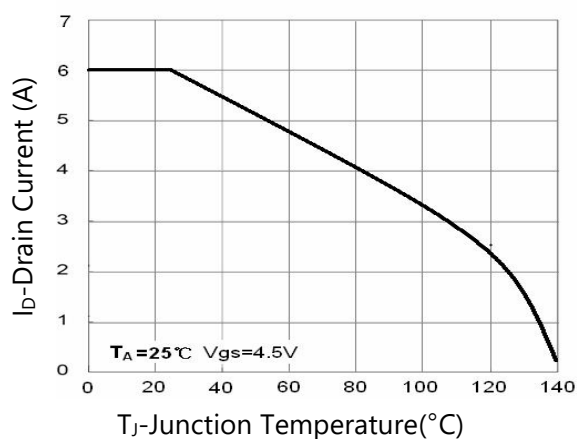

Figure 4. Drain Current

Figure 5. Output Characteristics

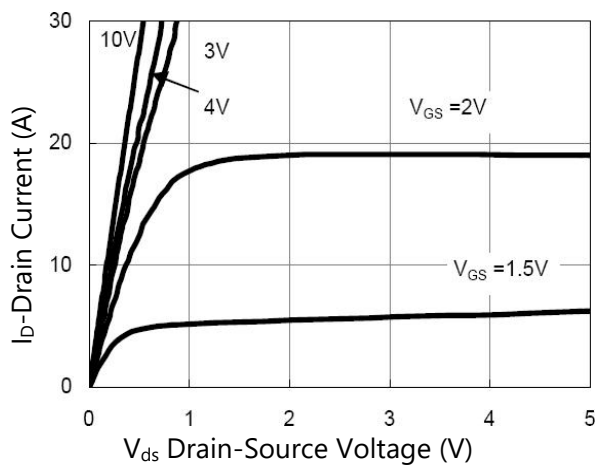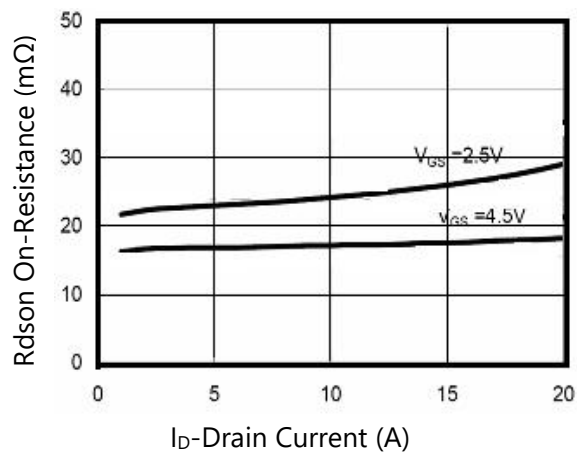**Figure 6. Drain-Source On-Resistance**

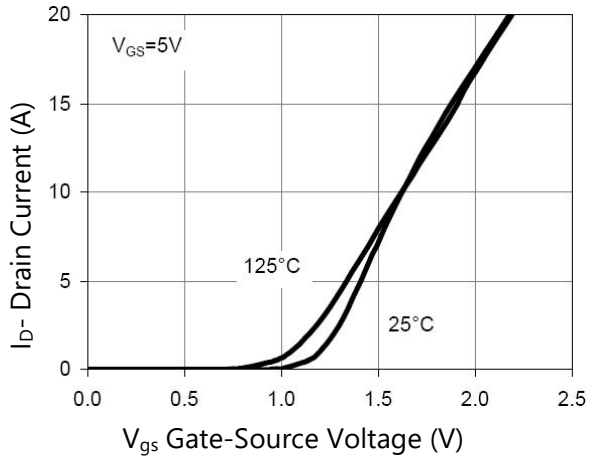## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 7. Transfer Characteristics

V_{GS}=5V

125°C

25°C

I_D- Drain Current (A)

V_{gs} Gate-Source Voltage (V)

Figure 8. R_{dson} vs Junction Temperature

Vgs=4.5V

Normalized On-Resistance

T_J-Junction Temperature(°C)

Figure 9. R_{dson} vs V_{gs}

I_D= 6A

125°C

25°C

R_{dson} On-Resistance (mΩ)

V_{gs} Gate-Source Voltage (V)

Figure 10. Capacitance vs V_{ds}

C_{iss}

C_{oss}

C_{rss}

C Capacitance (pF)

V_{ds} Drain-Source Voltage (V)

Figure 11. Gate Charge

V_{DS}=10V
I_D= 6A

V_{gs} Gate-Source Voltage (V)

Qg Gate Charge (nC)

Figure 12. Source-Drain Diode Forward

Vgs=0V

T_J =150°C

T_J =25°C

T_J =-55°C

I_S- Reverse Drain Current (A)
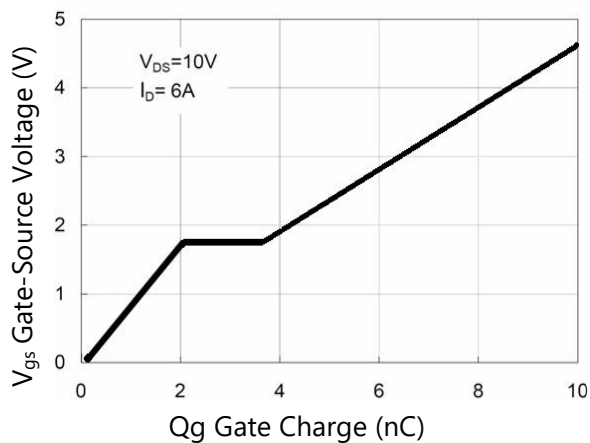
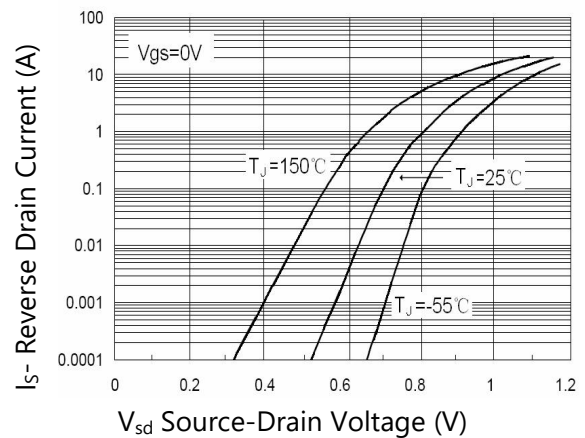V_{sd} Source-Drain Voltage (V)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 13. Safe Operation Area

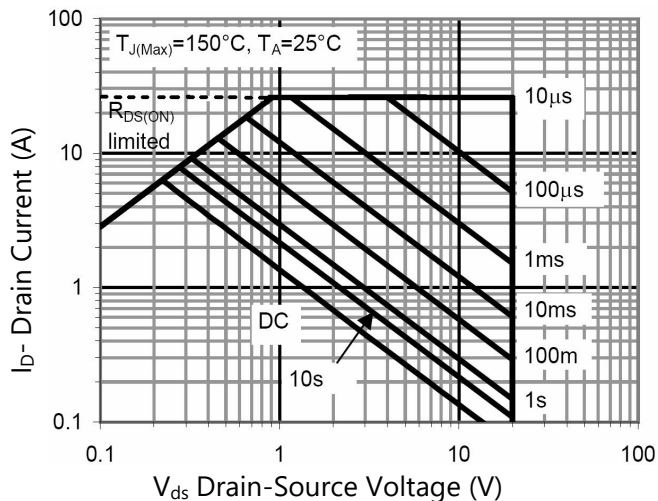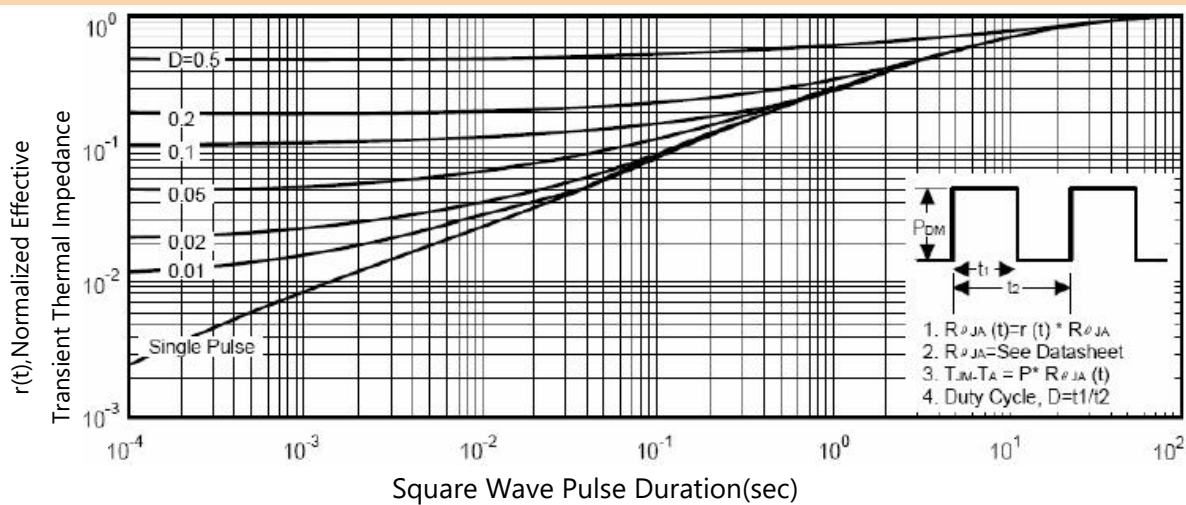**Figure 14. Normalized Maximum Transient Thermal Impedance**

PACKAGE INFORMATION

SOT23-6