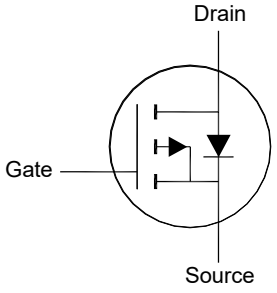
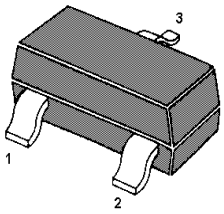
MMFTP2305A

P-Channel Enhancement Mode MOSFET





1. Gate 2. Source 3. Drain
SOT-23 Plastic Package

Absolute Maximum Ratings(T_a = 25℃)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$-V_{DS}$	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current	$-I_D$	4.2	A
Pulsed Drain Current [1)]	$-I_{DM}$	16	A
Power Dissipation	P_{tot}	1.38	W
Junction Temperature	T_j	150	℃
Storage Temperature Range	T_{stg}	- 55 to + 150	℃

Thermal Resistance Ratings

Parameter	Symbol	Max.	Unit
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	90 [2)] 270 [3)]	℃/W

[1)] Pulse Test: Pulse Width ≤ 100 μs, Duty Cycle ≤ 2%,Repetitive rating, pulse width limited by $T_{J(MAX)}$.

[2)] Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate.

[3)] Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad.

Dated: 24/02/2021 Rev: 02 CL

Characteristics at T_a= 25℃ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at $-I_D$ = 250 µA	$-V_{(BR)DSS}$	20	-	-	V
Zero Gate Voltage Drain Current at $-V_{DS}$ = 20 V	$-I_{DSS}$	-	-	1	µA
Gate-Source Leakage at V_{GS} = ± 12 V	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage at V_{DS} = V_{GS}, $-I_D$ = 250 µA	$-V_{GS(th)}$	0.5	-	1.2	V
Drain-Source On-State Resistance at $-V_{GS}$ = 10 V, $-I_D$ = 4.5 A at $-V_{GS}$ = 4.5 V, $-I_D$ = 4.2 A at $-V_{GS}$ = 2.5 V, $-I_D$ = 2 A at $-V_{GS}$ = 1.8 V, $-I_D$ = 1 A	$R_{DS(on)}$	- - - -	- - - -	53 65 100 250	mΩ mΩ mΩ mΩ
DYNAMIC PARAMETERS					
Gate Resistance at $-V_{DS}$ = 0 V, f = 1 MHz	Rg	-	3.6	-	Ω
Forward Transconductance at $-V_{DS}$ = 5 V, $-I_D$ = 4 A	$\lvert g_{FS} \rvert$	-	10	-	S
Input Capacitance at $-V_{DS}$ = 10 V, f = 1 MHz	C_{iss}	-	794	-	pF
Output Capacitance at $-V_{DS}$ = 10 V, f = 1 MHz	C_{oss}	-	92	-	pF
Reverse Transfer Capacitance at $-V_{DS}$ = 10 V, f = 1 MHz	C_{rss}	-	63	-	pF
Total Gate Charge at $-V_{DS}$ = 10 V, $-I_D$ = 1 A, $-V_{GS}$ = 4.5 V	Q_g	-	9	-	nC
Gate Source Charge at $-V_{DS}$ = 10 V, $-I_D$ = 1 A, $-V_{GS}$ = 4.5 V	Q_{gs}	-	2	-	nC
Gate Drain Charge at $-V_{DS}$ = 10 V, $-I_D$ = 1 A, $-V_{GS}$ = 4.5 V	Q_{gd}	-	2.7	-	nC
Turn-On Delay Time at $-V_{DS}$ = 10 V, $-V_{GS}$ = 5 V, $-I_D$ = 1 A, R_G = 4.7 Ω	$t_{d(on)}$	-	8.8	-	ns
Turn-On Rise Time at $-V_{DS}$ = 10 V, $-V_{GS}$ = 5 V, $-I_D$ = 1 A, R_G = 4.7 Ω	t_r	-	9	-	ns
Turn-Off Delay Time at $-V_{DS}$ = 10 V, $-V_{GS}$ = 5 V, $-I_D$ = 1 A, R_G = 4.7 Ω	$t_{d(off)}$	-	34	-	ns
Turn-Off Fall Time at $-V_{DS}$ = 10 V, $-V_{GS}$ = 5 V, $-I_D$ = 1 A, R_G = 4.7 Ω	t_f	-	18	-	ns
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at $-I_S$ = 1.2 A, V_{GS} = 0 V	$-V_{SD}$	-	-	1.2	V
Body Diodes Continuous Current	I_S	-	-	4.2	A
Body Diode Reverse Recovery Time at $-I_S$ = 1 A, di/dt = 100 A/µs	t_{rr}	-	8	-	ns
Body Diode Reverse Recovery Charge at $-I_S$ = 1 A, di/dt = 100 A/µs	Q_{rr}	-	2.3	-	nC

Electrical Characteristics Curves

Fig. 1 Typical Output Characteristic

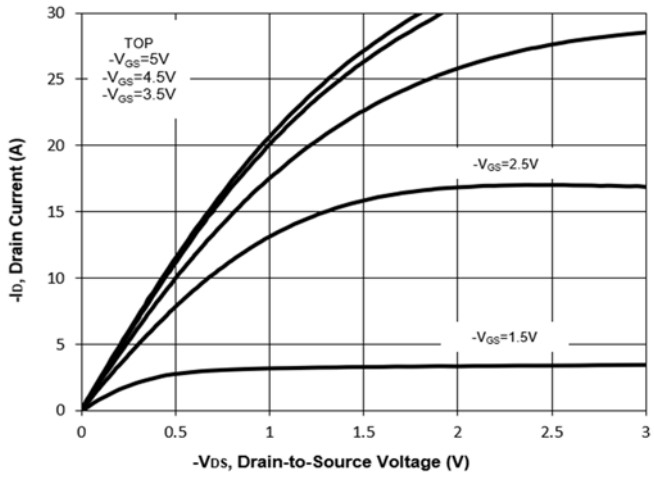


Fig. 2 Typical Transfer Characteristic

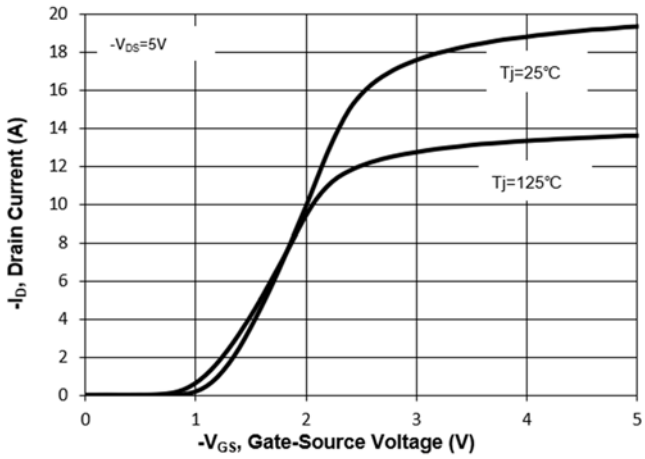


Fig. 3 on-Resistance vs Drain Current

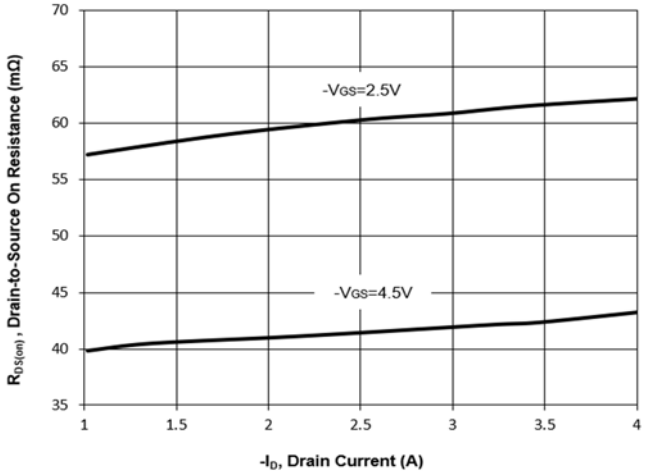


Fig. 4 on-Resistance vs. Gate Voltage

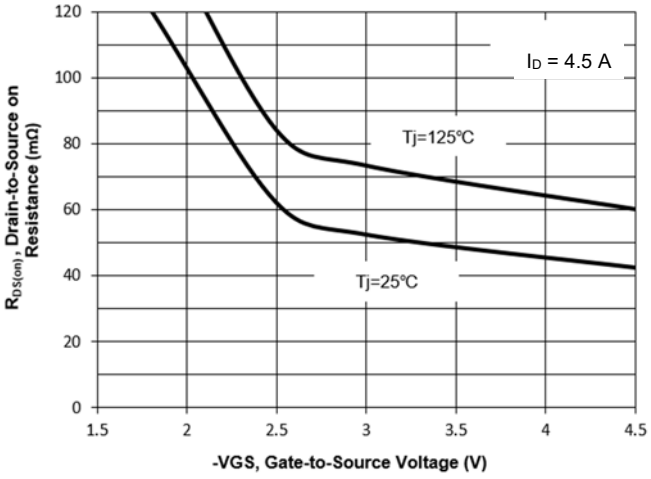


Fig. 5 on-Resistance vs.T_j

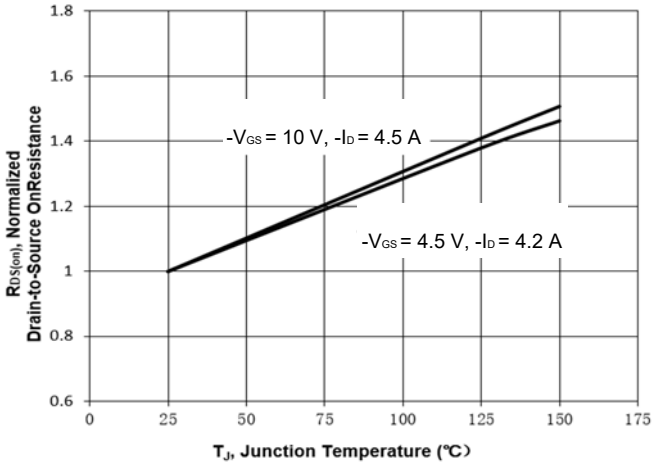
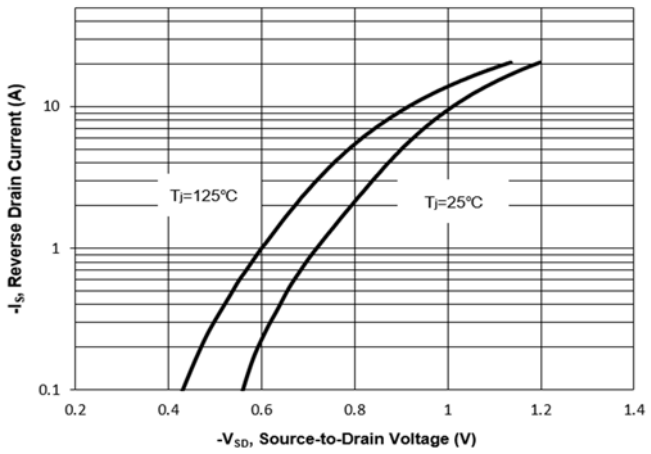


Fig. 6 Typical Forward Characteristic



Electrical Characteristics Curves

Fig. 7 Typical Junction Capacitance

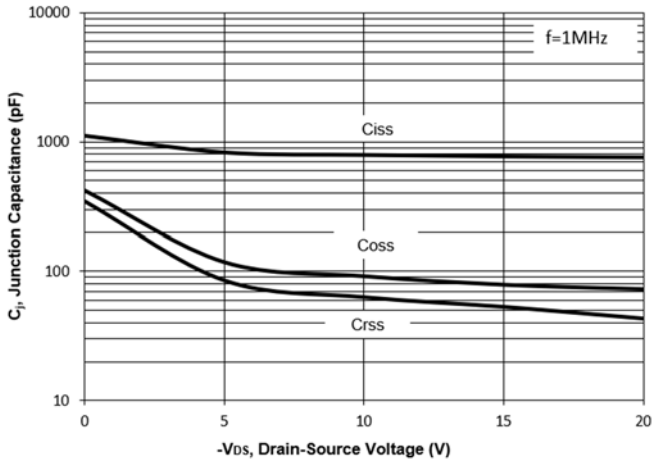


Fig. 8 Drain-Source Leakage Current vs. T_j

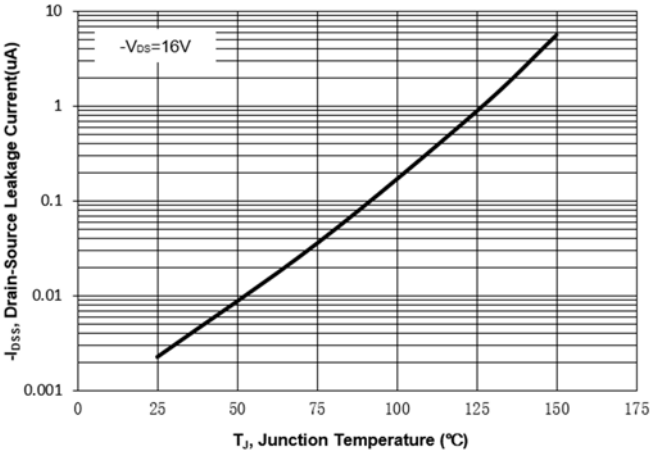


Fig. 9 $V_{(BR)DSS}$ vs. Junction Temperature

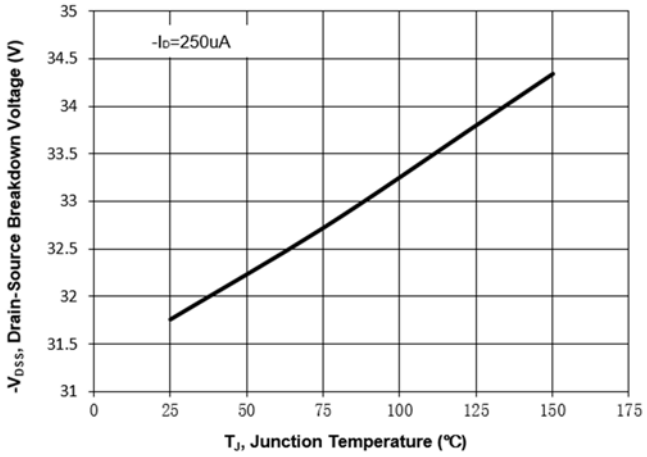


Fig. 10 Gate Threshold Variation vs. T_j

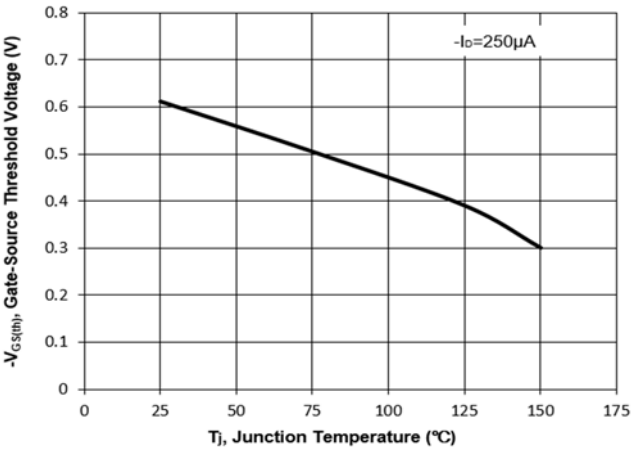
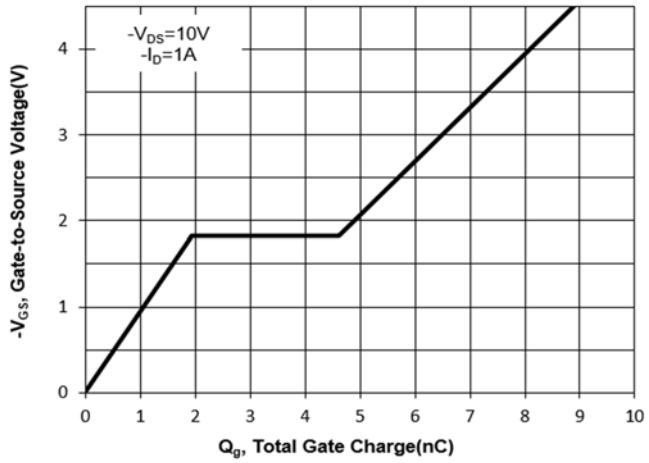


Fig. 11 Gate Charge



Test Circuits

Fig.1-1 Switching times test circuit

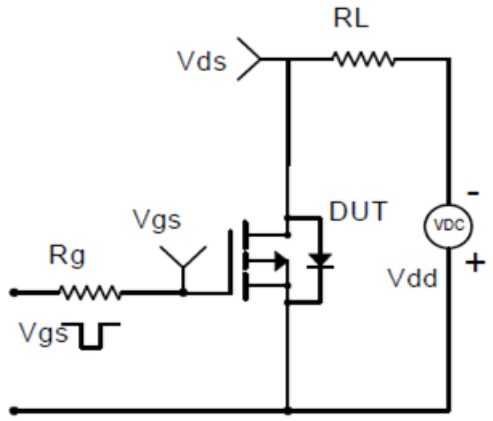


Fig.1-2 Switching Waveform

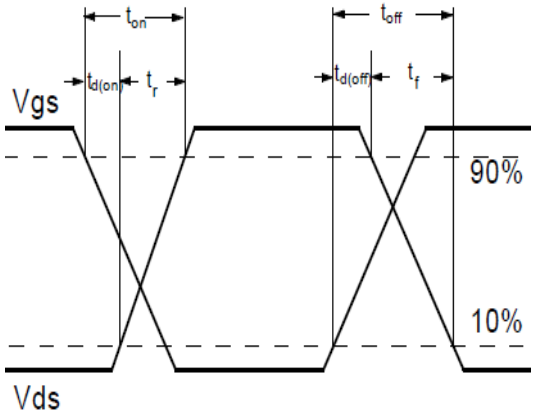


Fig.2-1 Gate charge test circuit

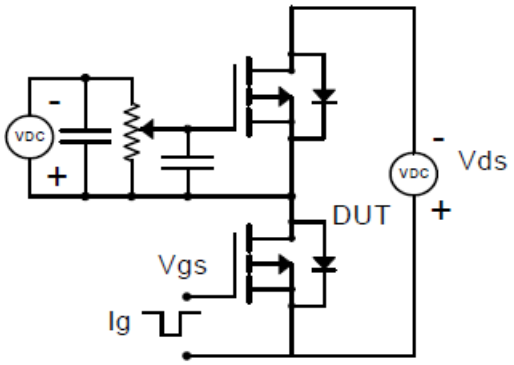
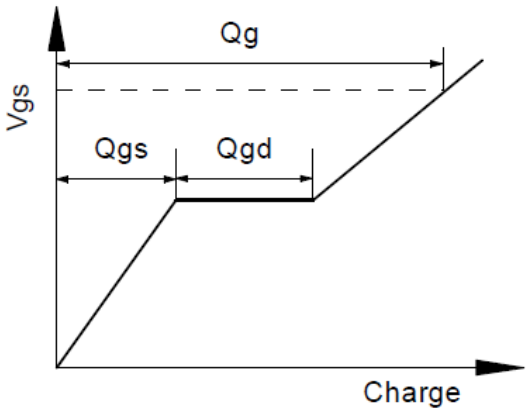
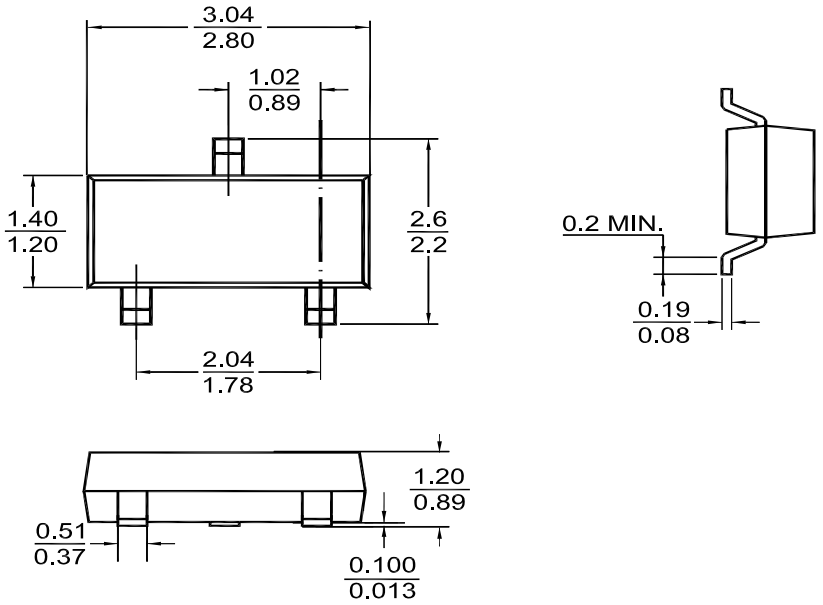


Fig.2-2 Gate charge waveform

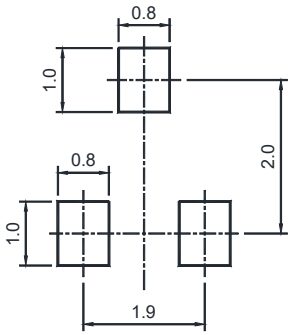


PACKAGE OUTLINE

Plastic surface mounted package (Dimensions in mm) **SOT-23**



Recommended Soldering Footprint



Packing information

Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
SOT-23	8	4 ± 0.1	0.157 ± 0.004	178	7	3,000

Marking information

" WM " = Part No.

"YM" = Date Code Marking

"Y" = Year

"M" = Month

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