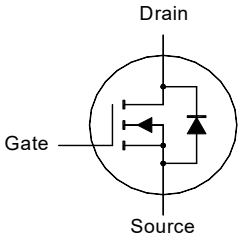
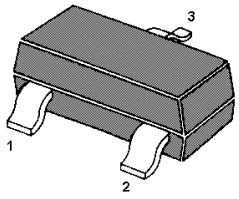
MMFTN2302B

N-Channel Enhancement Mode MOSFET

Applications

- Load Switching for Portable Devices
- DC-DC converter





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

Absolute Maximum Ratings (T_a = 25℃ unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	± 8	V
Continuous Drain Current		I_D	2.9	A
Peak Drain Current, Pulsed [1]		I_{DM}	10	A
Power Dissipation [2]	Steady State t ≤ 10 s	P_D	0.71 1.4	W
Operating Junction and Storage Temperature Range		T_j, T_{stg}	- 55 to + 150	℃

Thermal Characteristics

Parameter		Symbol	Max.	Unit
Thermal Resistance from Junction to Ambient [2]	Steady State t ≤ 10 s	$R_{\theta JA}$	176 89	℃/W

[1] Pulse Test: Pulse Width ≤ 100 μs, Duty Cycle ≤ 2%,Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C.

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

Dated: 05/02/2021 CL Rev: 01

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
Drain-Source Leakage Current at V_{DS} = 20 V	I_{DSS}	-	-	1	µA
Gate-Source Leakage Current at V_{GS} = ± 8 V	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage at V_{GS} = V_{DS}, I_D = 250 µA	$V_{GS(th)}$	0.4	-	0.85	V
Drain-Source On-State Resistance at V_{GS} = 4.5 V, I_D = 3.6 A at V_{GS} = 2.5 V, I_D = 3.1 A	$R_{DS(on)}$	- -	- -	57 75	mΩ
DYNAMIC PARAMETERS					
Forward Transconductance at V_{DS} = 5 V, I_D = 3.6 A	g_{FS}	-	9	-	S
Gate Resistance at V_{DS} = 0 V, f = 1 MHz	R_g	-	0.6	-	Ω
Input Capacitance at V_{GS} = 0 V, V_{DS} = 15 V, f = 1 MHz	C_{iss}	-	610	-	pF
Output Capacitance at V_{GS} = 0 V, V_{DS} = 15 V, f = 1 MHz	C_{oss}	-	95	-	pF
Reverse Transfer Capacitance at V_{GS} = 0 V, V_{DS} = 15 V, f = 1 MHz	C_{rss}	-	72	-	pF
Gate Charge Total at V_{DS} = 10 V, V_{GS} = 4.5 V, I_D = 3.6 A	Q_g	-	8.7	-	nC
Gate to Source Gate Charge at V_{DS} = 10 V, V_{GS} = 4.5 V, I_D = 3.6 A	Q_{gs}	-	1.6	-	nC
Gate to Drain Charge at V_{DS} = 10 V, V_{GS} = 4.5 V, I_D = 3.6 A	Q_{gd}	-	3.3	-	nC
Turn-On Delay Time at V_{DD} = 10 V, I_D = 1 A, V_{GS} = 4.5 V, R_G = 2.2 Ω	$t_{d(on)}$	-	12	-	ns
Rise Time at V_{DD} = 10 V, I_D = 1 A, V_{GS} = 4.5 V, R_G = 2.2 Ω	t_r	-	30	-	ns
Turn-Off Delay Time at V_{DD} = 10 V, I_D = 1 A, V_{GS} = 4.5 V, R_G = 2.2 Ω	$t_{d(off)}$	-	13	-	ns
Fall Time at V_{DD} = 10 V, I_D = 1 A, V_{GS} = 4.5 V, R_G = 2.2 Ω	t_f	-	2.3	-	ns
Body-Diode PARAMETERS					
Body Diode Voltage at I_S = 0.95 A	V_{SD}	-	-	1.2	V
Body Diode Reverse Recovery Time at I_S = 3.6 A, di/dt = 100 A / µs	t_{rr}	-	12	-	ns
Body Diode Reverse Recovery Charge at I_S = 3.6 A, di/dt = 100 A / µs	Q_{rr}	-	2.2	-	nc

Electrical Characteristics Curves

Fig. 1 Typical Output Characteristic

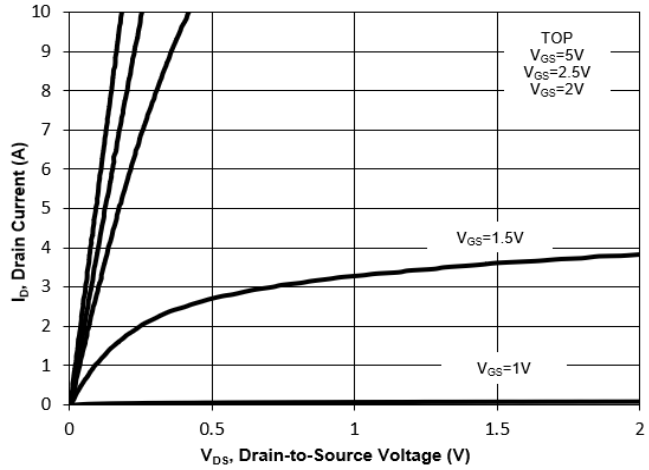


Fig. 2 Typical Transfer Characteristic

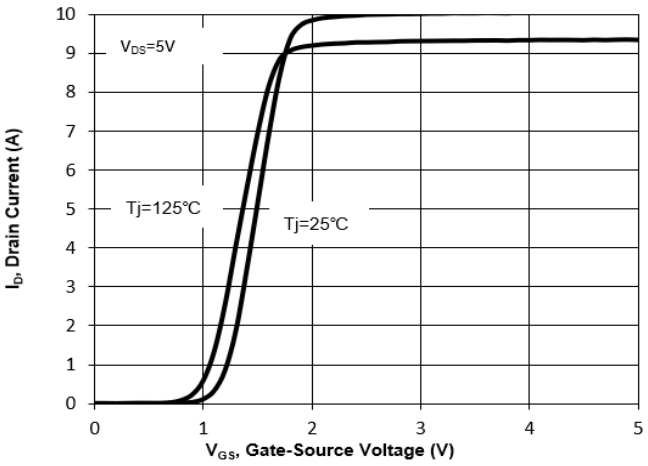


Fig. 3 on-Resistance vs Drain Current

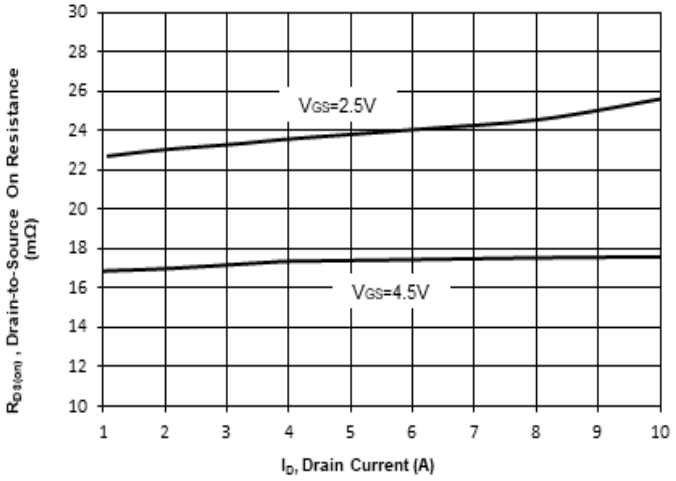


Fig. 4 on-Resistance vs. Gate Voltage

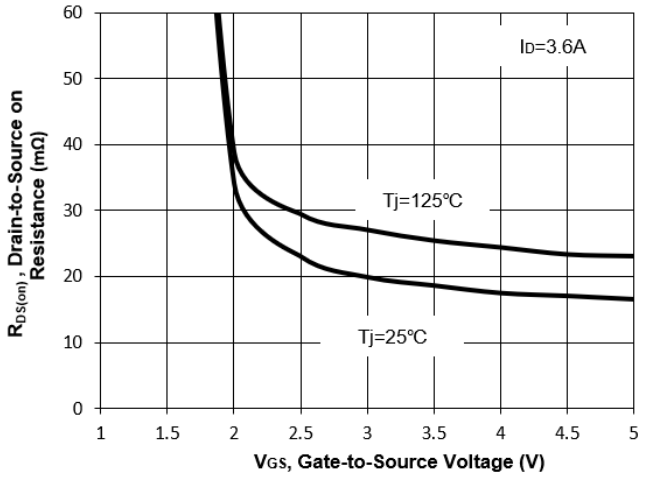


Fig. 5 on-Resistance vs.T_j

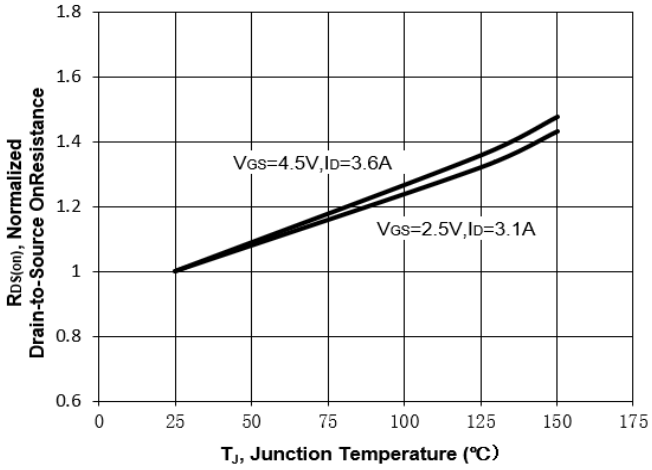
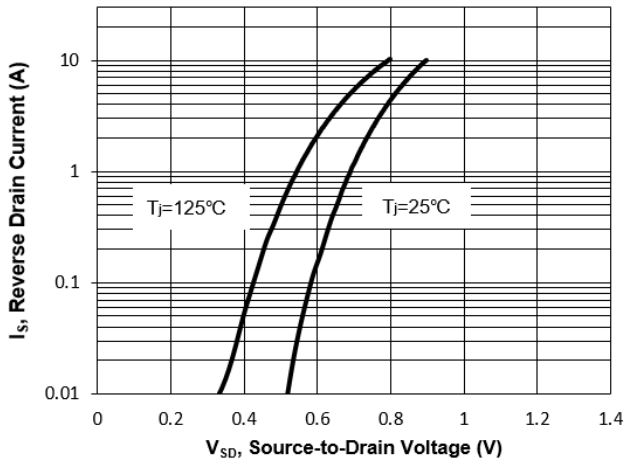


Fig. 6 Typical Forward Characteristic



Electrical Characteristics Curves

Fig. 7 Typical Junction Capacitance

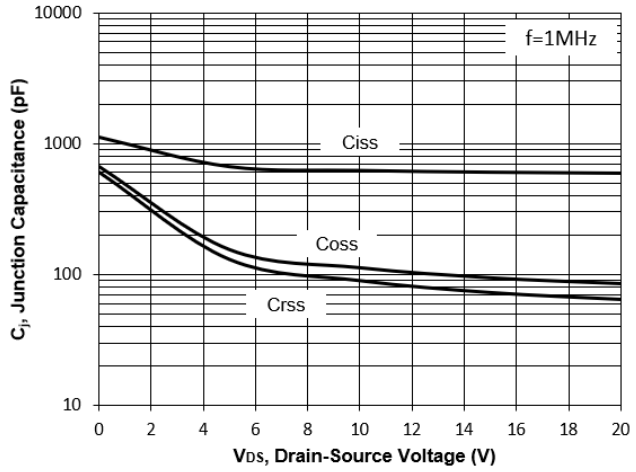


Fig. 8 Drain-Source Leakage Current vs. T_j

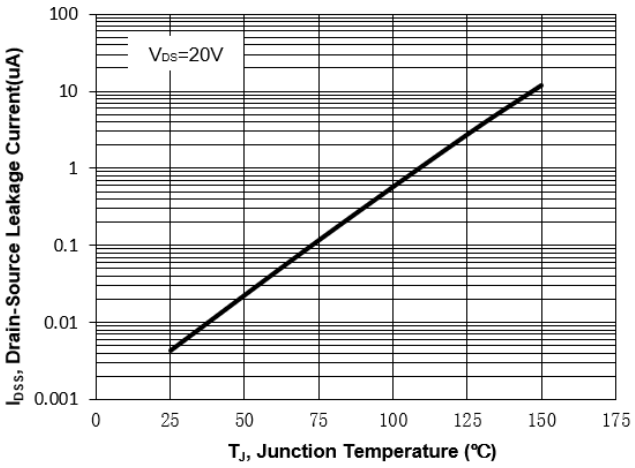


Fig. 9 $V_{(BR)DSS}$ vs. Junction Temperature

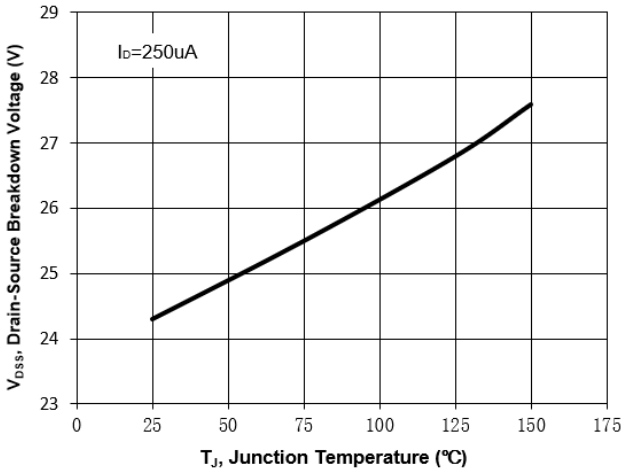


Fig. 10 Gate Threshold Variation vs. T_j

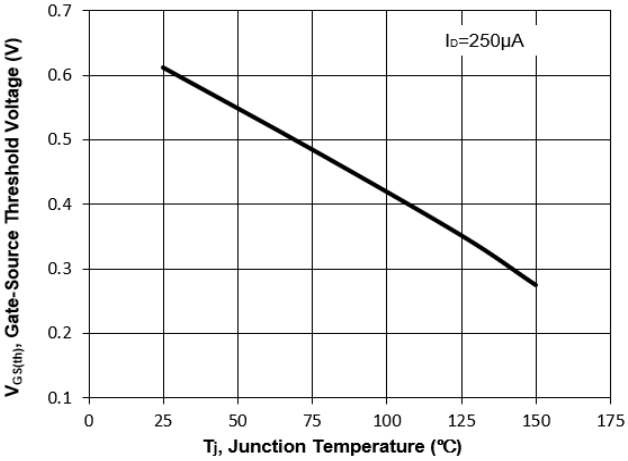


Fig. 11 Gate Charge

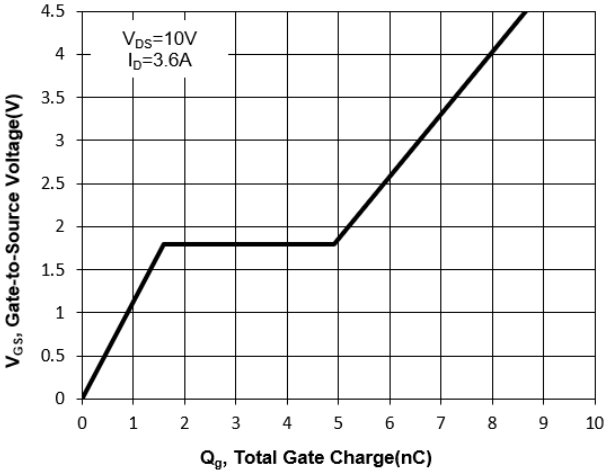
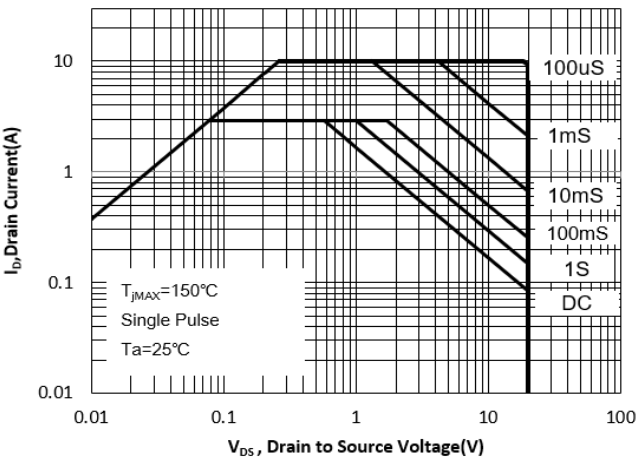


Fig. 12 Safe Operation Area



Test Circuits

Fig.1-1 Switching times test circuit

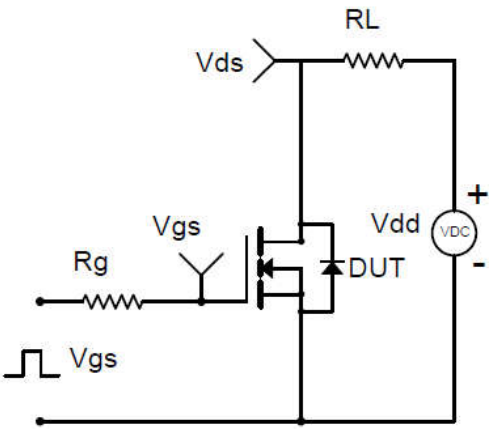


Fig.1-2 Switching Waveform

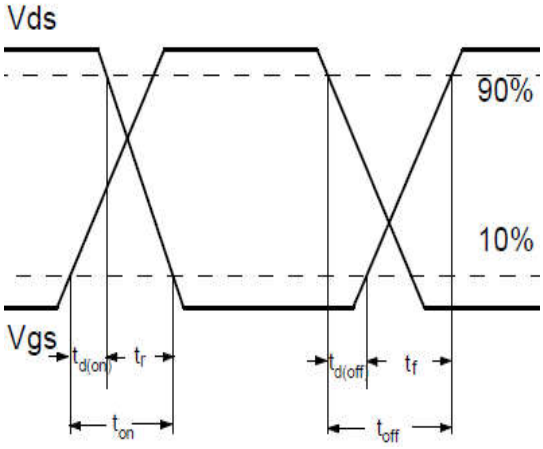


Fig.2-1 Gate charge test circuit

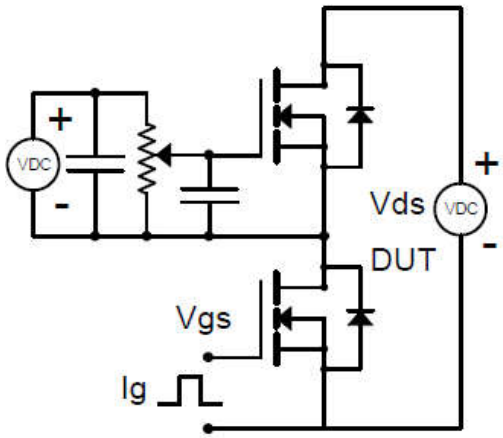
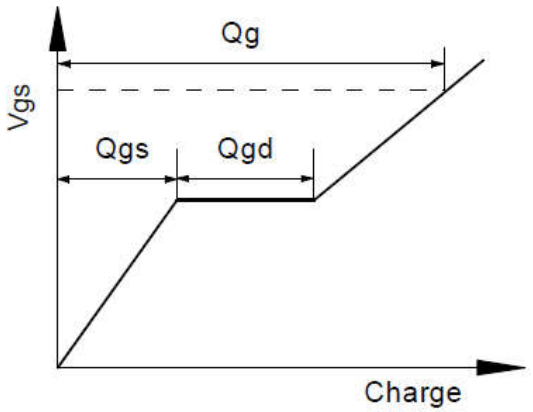
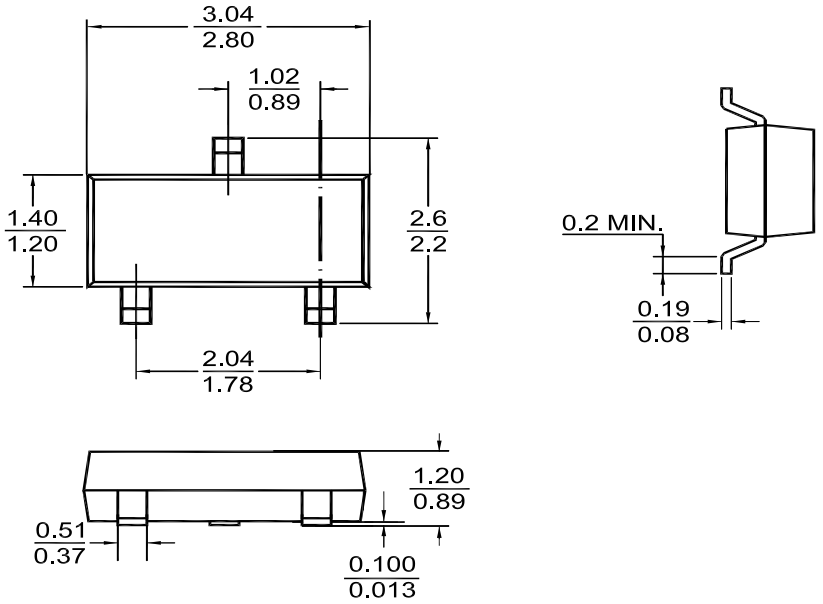


Fig.2-2 Gate charge waveform

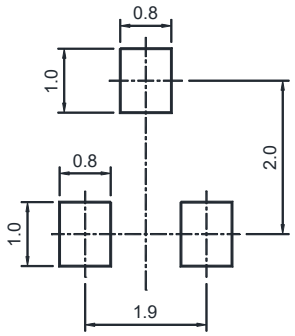


PACKAGE OUTLINE

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

" TP " = Part No.
"YM" = Date Code Marking
"Y" = Year
"M" = Month
Font type: Arial