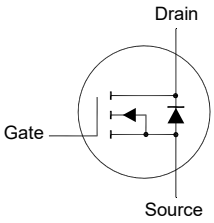
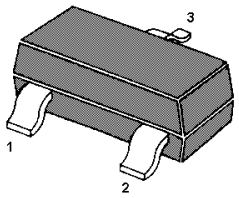
MMFTN2310

N-Channel Enhancement Mode MOSFET

Features

- Extremely low threshold voltage
- Advanced trench cell design





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

Applications

- Portable appliances
- High speed switch
- Low power DC to DC converter

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	60	V
Drain-Gate Voltage	V_{GS}	± 20	V
Drain Current - Continuous	I_D	3	A
Peak Drain Current , Pulsed [1]	I_{DM}	10	A
Total Power Dissipation	P_{tot}	1.38 [2] 0.46 [3]	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]	$R_{\theta JA}$	90	℃/W
Thermal Resistance from Junction to Ambient [3]	$R_{\theta JA}$	270	℃/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

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

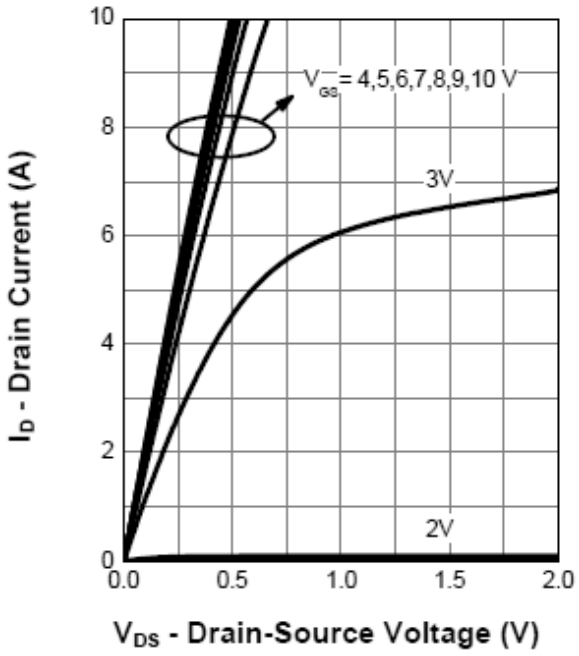
Dated: 27/01/2021 Rev: 02

Characteristics at T_a = 25℃ unless otherwise specified

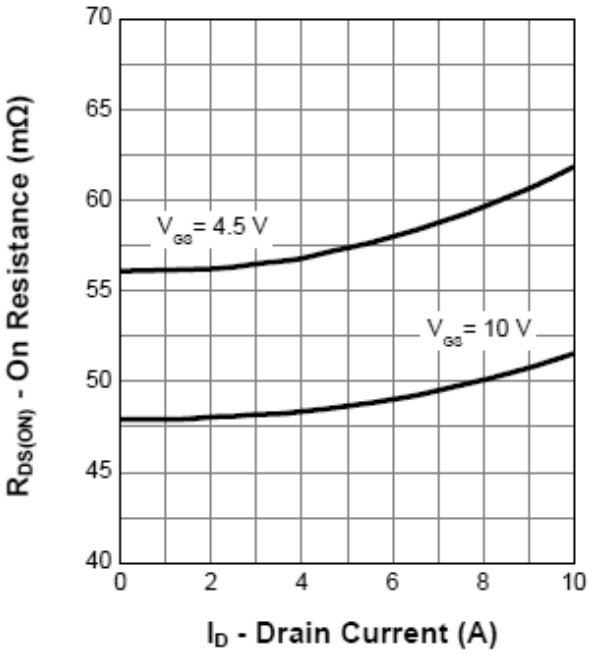
Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at I_D = 250 µA	$V_{(BR)DSS}$	60	-	-	V
Drain-Source Leakage Current at V_{DS} = 60 V	I_{DSS}	-	-	10	µA
Gate-Source Leakage Current at V_{GS} = ± 20 V	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage at V_{GS} = V_{DS}, I_D = 250 µA	$V_{GS(th)}$	1	-	2.5	V
Drain-Source On-State Resistance at V_{GS} = 10 V, I_D = 3 A at V_{GS} = 4.5 V, I_D = 3 A at V_{GS} = 4 V, I_D = 1 A	$R_{DS(on)}$	- - -	- - -	90 110 100	mΩ
DYNAMIC PARAMETERS					
Forward Transconductance at V_{DS} = 5 V, I_D = 3 A	g_{FS}	-	6	-	S
Input Capacitance at V_{DS} = 30 V, V_{GS} = 0 V, f = 1 MHz	C_{iss}	-	628	-	pF
Output Capacitance at V_{DS} = 30 V, V_{GS} = 0 V, f = 1 MHz	C_{oss}	-	29	-	pF
Reverse Transfer Capacitance at V_{DS} = 30 V, V_{GS} = 0 V, f = 1 MHz	C_{rss}	-	28	-	pF
Total Gate Charge at V_{GS} = 10 V, V_{DS} = 30 V, I_D = 3 A at V_{GS} = 4.5 V, V_{DS} = 30 V, I_D = 3 A	Q_g	- -	12 5.9	- -	nC
Gate-Source Charge at V_{GS} = 10 V, V_{DS} = 30 V, I_D = 3 A	Q_{gs}	-	2.8	-	nC
Gate-Drain Charge at V_{GS} = 10 V, V_{DS} = 30 V, I_D = 3 A	Q_{gd}	-	1.6	-	nC
Turn-On Delay Time at V_{DS} = 30 V, I_D = 3 A, V_{GS} = 10 V, R_G = 4.5 Ω	$t_{d(on)}$	-	10	-	ns
Turn-On Rise Time at V_{DS} = 30 V, I_D = 3 A, V_{GS} = 10 V, R_G = 4.5 Ω	t_r	-	23	-	ns
Turn-Off Delay Time at V_{DS} = 30 V, I_D = 3 A, V_{GS} = 10 V, R_G = 4.5 Ω	$t_{d(off)}$	-	34	-	ns
Turn-Off Fall Time at V_{DS} = 30 V, I_D = 3 A, V_{GS} = 10 V, R_G = 4.5 Ω	t_f	-	4.6	-	ns
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at V_{GS} = 0 V, I_S = 3 A	V_{SD}	-	-	1.3	V
Reverse Recovery Time at I_S = 3 A, dI/dt = 100 A/µs	t_{rr}	-	34	-	ns
Reverse Recovery Charge at I_S = 3 A, dI/dt = 100 A/µs	Q_{rr}	-	4.6	-	nC

Electrical Characteristics Curves

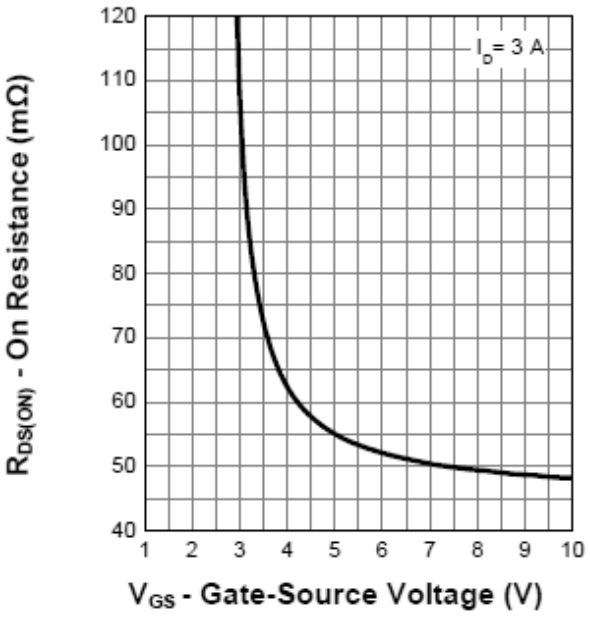
Output Characteristics



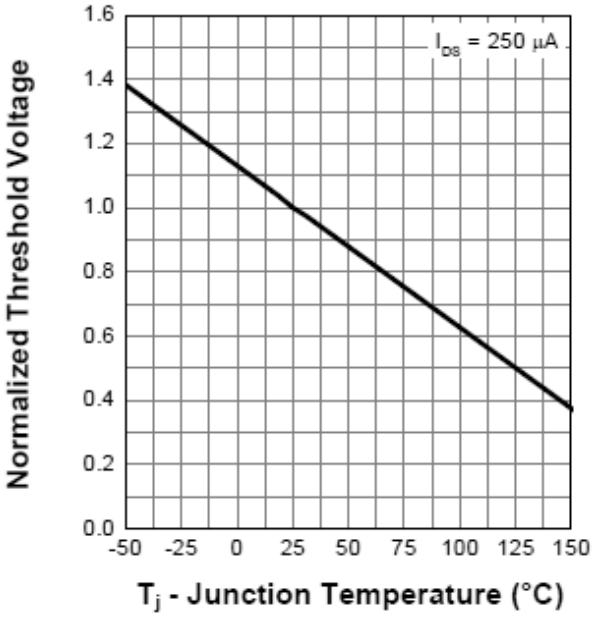
On Resistance



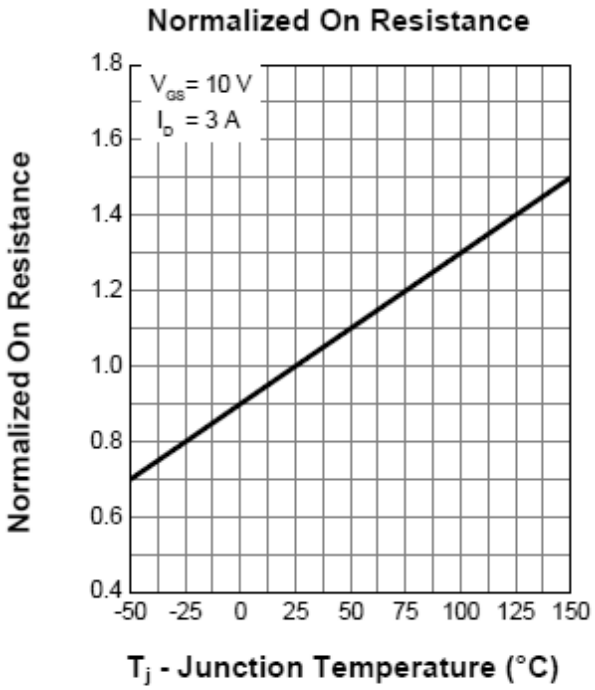
Transfer Characteristics

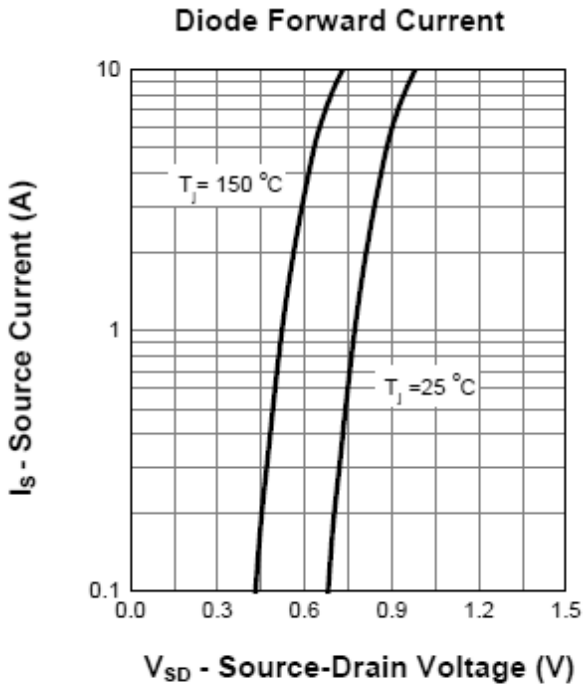


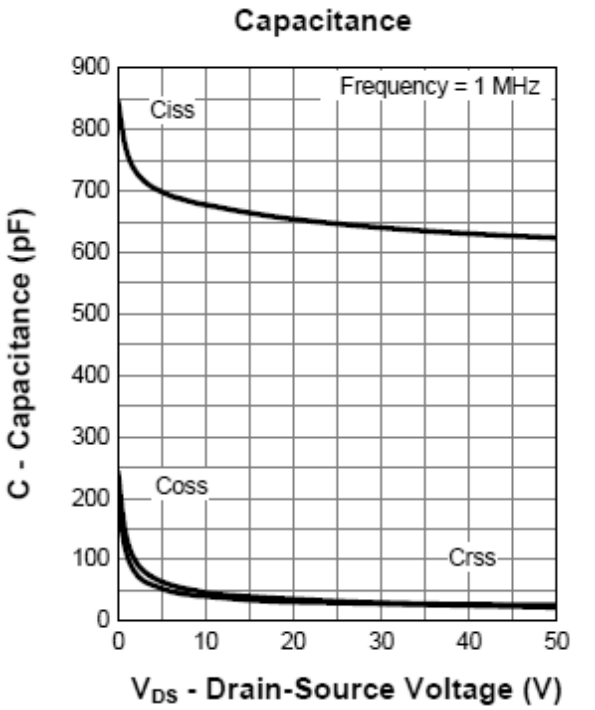
Normalized Threshold Voltage

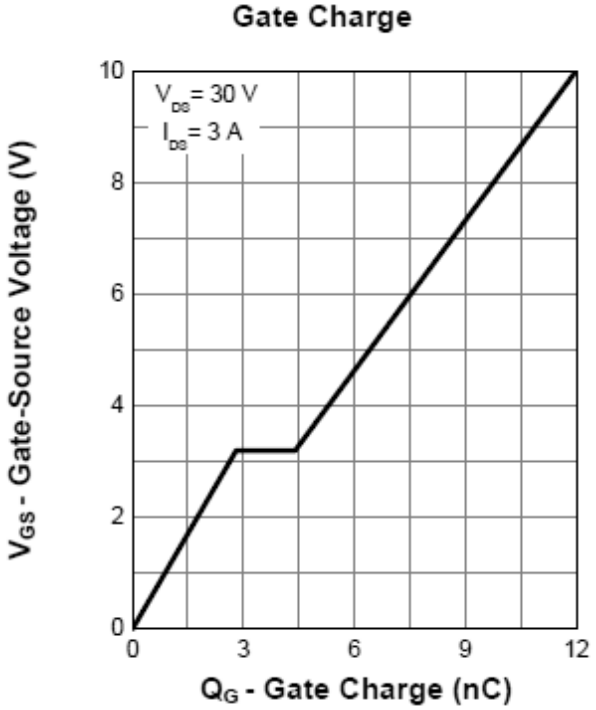


Electrical Characteristics Curves









Test Circuits

Fig.1-1 Switching times test circuit

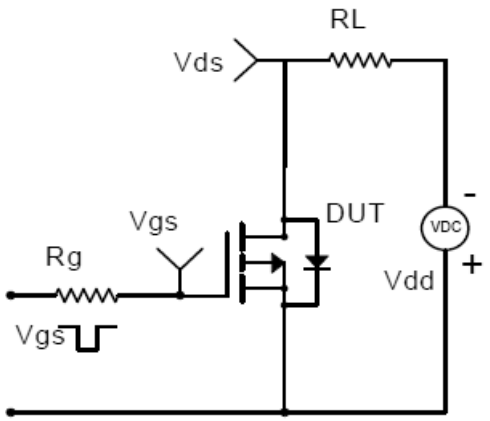


Fig.1-2 Switching Waveform

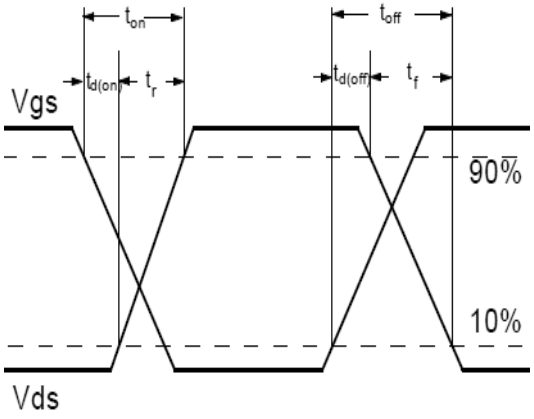


Fig.2-1 Gate charge test circuit

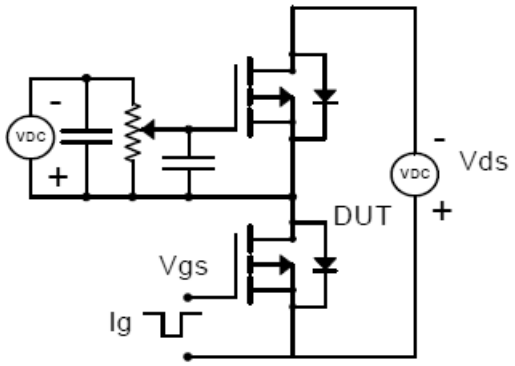
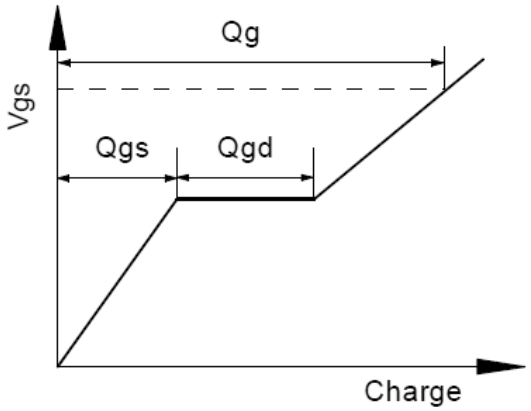
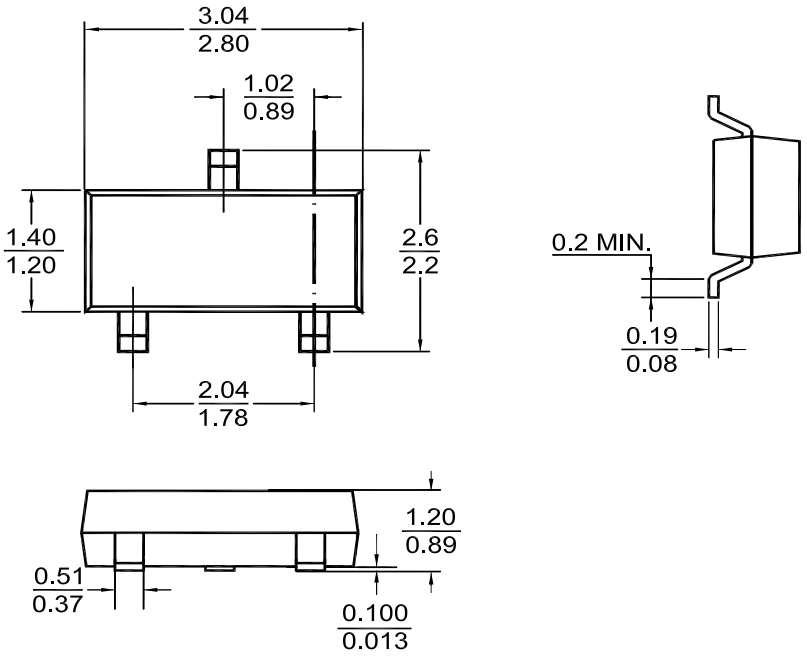


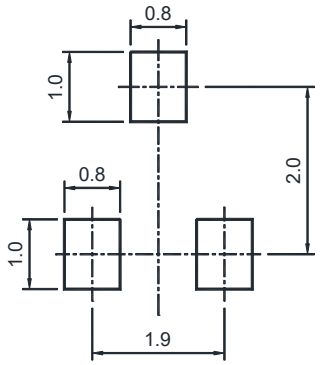
Fig.2-2 Gate charge waveform



Package Outline (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

" M2 " = Part No.
" YM " = Date Code Marking
" Y " = Year
" M " = Month
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