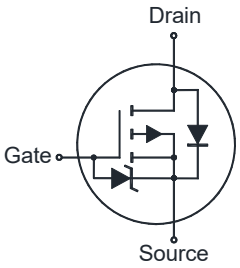
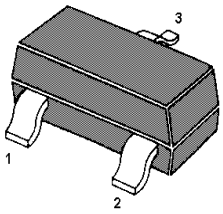
MMFTP302K

P-Channel Enhancement Mode MOSFET





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

Features

- ESD protected
- Advanced trench cell design
- High speed switch

Applications

- Portable appliances
- Load switch appliances

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$-V_{DS}$	25	V
Gate-Source Voltage	$-V_{GS}$	8	V
Drain Current	$-I_D$	0.5	A
Peak Drain Current, Pulsed [1]	$-I_{DM}$	1	A
Power Dissipation [2]	P_D	0.35	W
Operating Junction and Storage Temperature Range	T_j, T_{stg}	- 55 to + 150	℃

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance-Junction to Ambient [2]	$R_{\theta JA}$	357	℃/W

[1] 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 minimum recommended pad layout.

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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	$-V_{(BR)DSS}$	25	-	-	V
Zero Gate Voltage Drain Current at $-V_{DS}$ = 20 V	$-I_{DSS}$	-	-	1	µA
Gate-Source Leakage At $-V_{GS}$ = 8 V	$-I_{GSS}$	-	-	10	µA
Gate-Source Threshold Voltage at V_{DS} = V_{GS}, $-I_D$ = 250 µA	$-V_{GS(th)}$	0.8	-	2	V
Drain-Source On-State Resistance at $-V_{GS}$ = 10 V, $-I_D$ = 0.5 A at $-V_{GS}$ = 4.5 V, $-I_D$ = 0.2 A at $-V_{GS}$ = 2.7 V, $-I_D$ = 0.1 A	$R_{DS(on)}$	- - -	- - -	3.6 5.4 11	Ω
DYNAMIC PARAMETERS					
Forward Transconductance at $-V_{DS}$ = 5 V, $-I_D$ = 200 mA	g_{FS}	-	0.4	-	S
Input Capacitance at $-V_{DS}$ = 30 V, V_{GS} = 0 V, f = 1 MHz	C_{iss}	-	42	-	pF
Output Capacitance at $-V_{DS}$ = 30 V, V_{GS} = 0 V, f = 1 MHz	C_{oss}	-	3.6	-	pF
Reverse Transfer Capacitance at $-V_{DS}$ = 30 V, V_{GS} = 0 V, f = 1 MHz	C_{rss}	-	1.4	-	pF
Total Gate Charge at $-V_{DS}$ = 30 V, $-V_{GS}$ = 10 V, $-I_D$ = 400 mA	Q_g	-	1.7	-	nC
Gate-Source Charge at $-V_{DS}$ = 30 V, $-V_{GS}$ = 10 V, $-I_D$ = 400 mA	Q_{gs}	-	0.5	-	nC
Gate-Drain Charge at $-V_{DS}$ = 30 V, $-V_{GS}$ = 10 V, $-I_D$ = 400 mA	Q_{gd}	-	0.2	-	nC
Turn-On Rise Time at $-V_{GS}$ = 10 V, $-V_{DS}$ = 30 V, $-I_D$ = 400 mA, R_G = 3.9 Ω	$t_{d(on)}$	-	6.8	-	ns
Turn-On Rise Time at $-V_{GS}$ = 10 V, $-V_{DS}$ = 30 V, $-I_D$ = 400 mA, R_G = 3.9 Ω	t_r	-	7.5	-	ns
Turn-Off Delay Time at $-V_{GS}$ = 10 V, $-V_{DS}$ = 30 V, $-I_D$ = 400 mA, R_G = 3.9 Ω	$t_{d(off)}$	-	36	-	ns
Turn-Off Fall Time at $-V_{GS}$ = 10 V, $-V_{DS}$ = 30 V, $-I_D$ = 400 mA, R_G = 3.9 Ω	t_f	-	22	-	ns
Body-Diode PARAMETERS					
Body Diode Voltage at $-I_S$ = 0.5 A	$-V_{SD}$	-	-	1.3	V
Body-Diode Continuous Current	$-I_S$	-	-	500	mA
Body Diode Reverse Recovery Time at I_S = 400 mA, di/dt = 100 A / µs	t_{rr}	-	20	-	nS
Body Diode Reverse Recovery Charge at I_S = 400 mA, di/dt = 100 A / µs	Q_{rr}	-	13	-	nC

Electrical Characteristics Curves

Fig. 1 Typical Output Characteristic

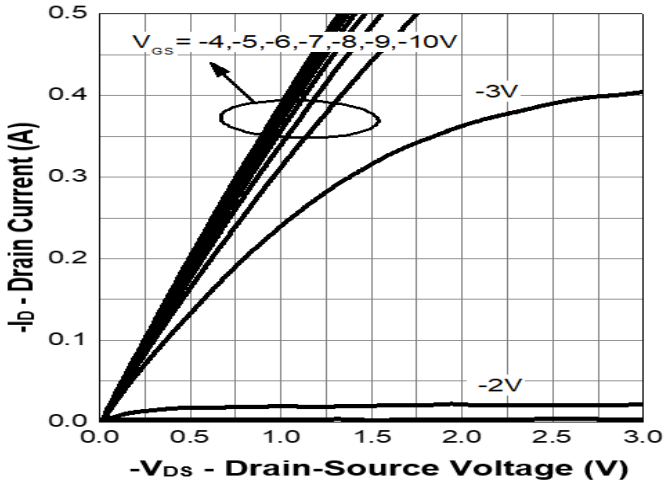


Fig. 2 Gate Threshold Variation vs. T_j

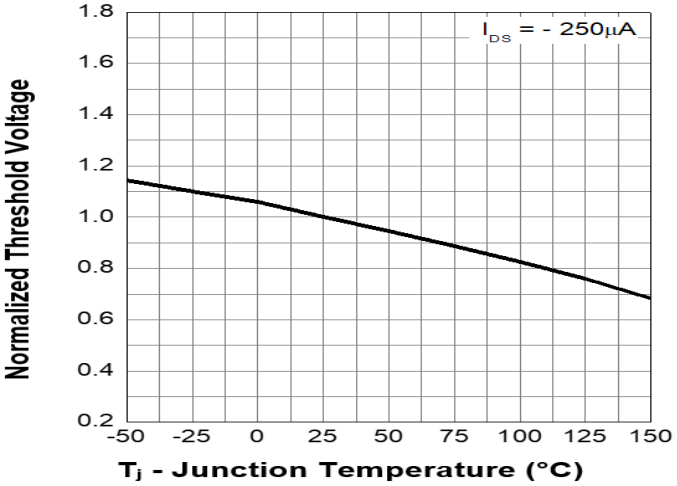


Fig. 3 On-Resistance vs. Gate Voltage

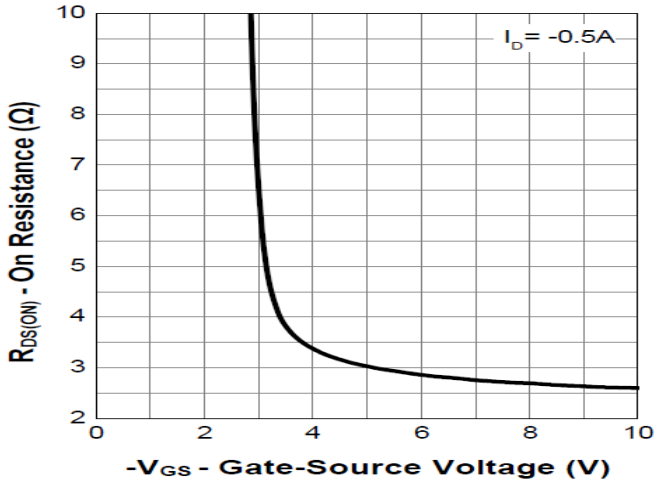


Fig. 4 On-Resistance vs.T_j

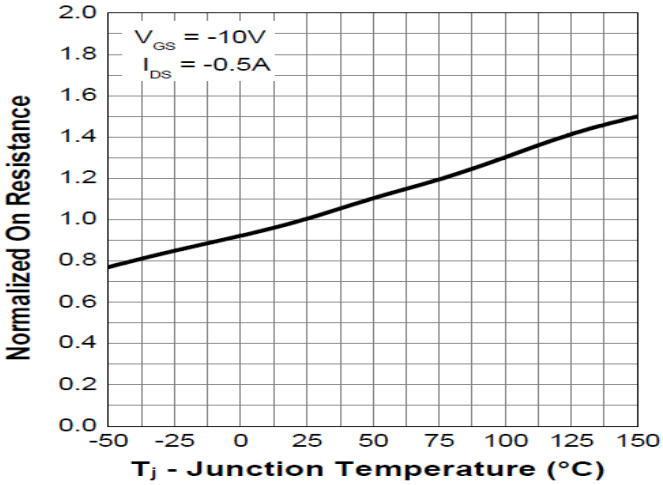


Fig. 5 On-Resistance vs. Drain Current

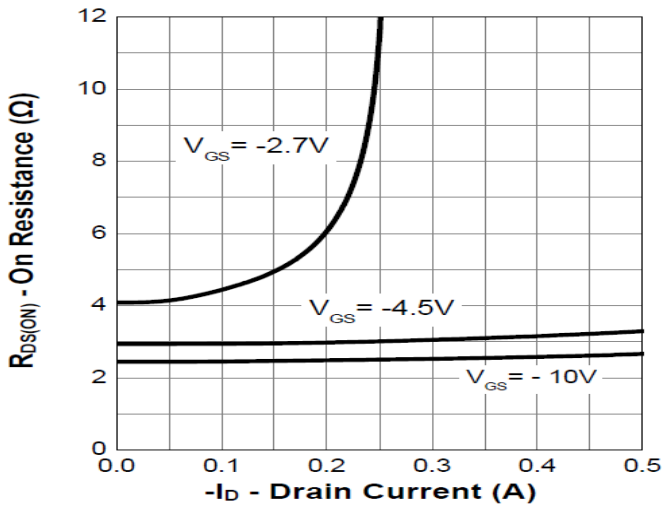
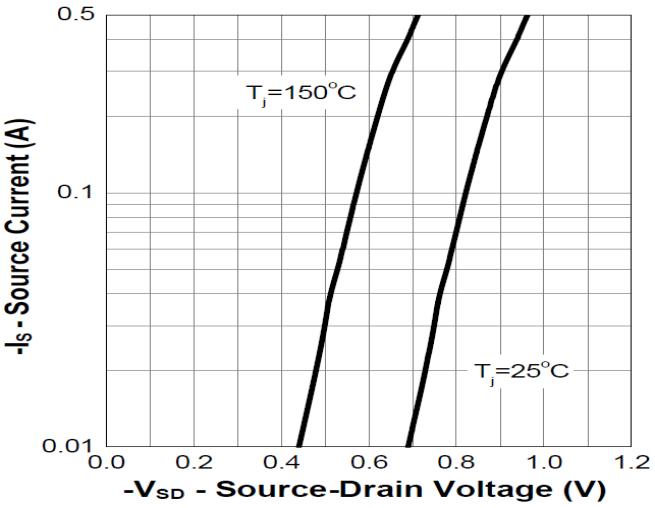


Fig. 6 Typical Forward Characteristic



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Electrical Characteristics Curves

Fig. 7 Typical Junction Capacitance

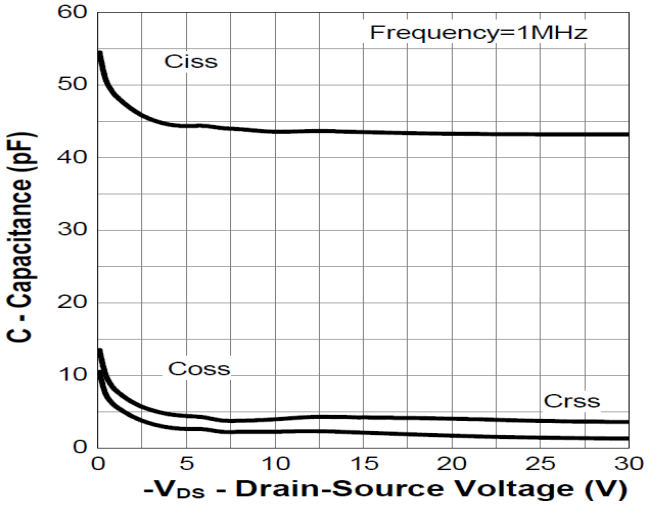
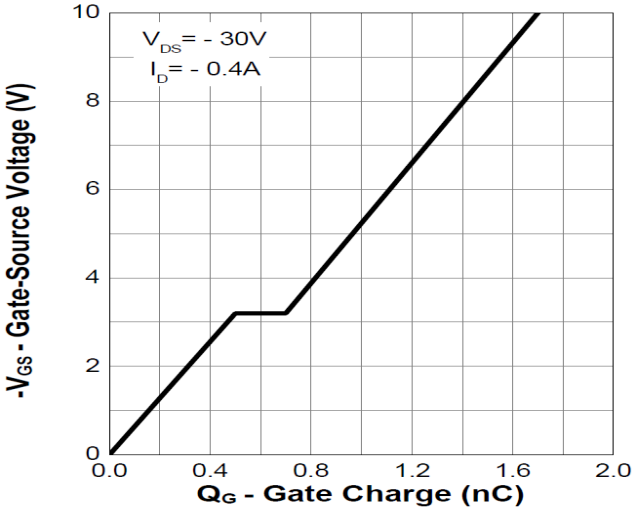


Fig. 8 Gate Charge



Test Circuits

Fig.1-1 Switching times test circuit

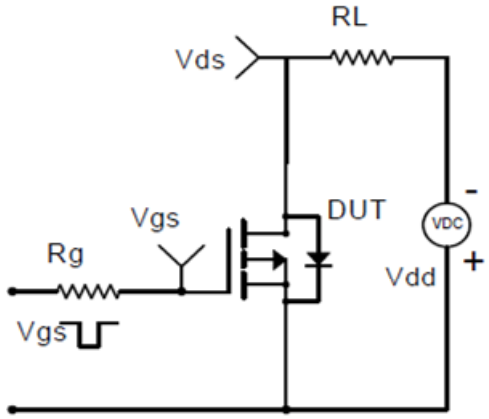


Fig.1-2 Switching Waveform

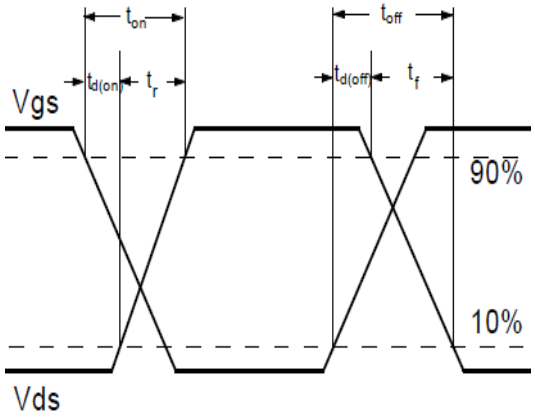


Fig.2-1 Gate charge test circuit

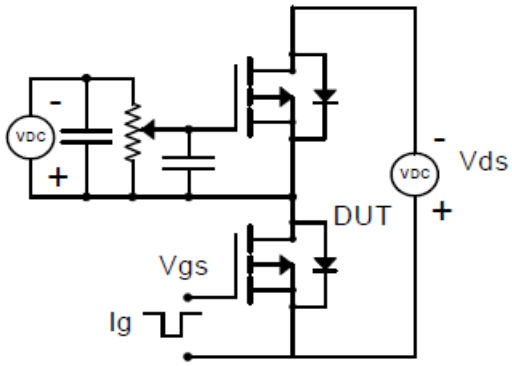
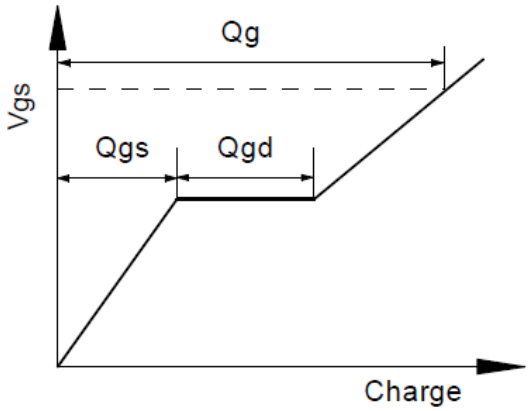
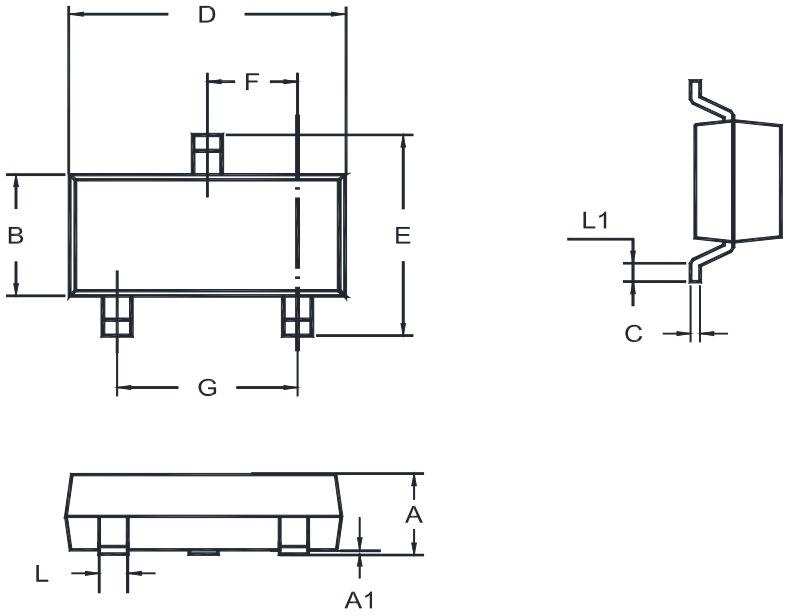


Fig.2-2 Gate charge waveform

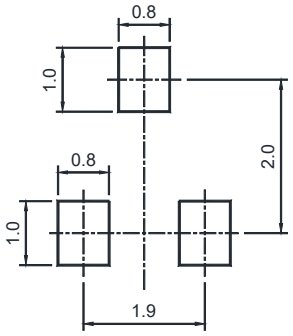


Package Outline (Dimensions in mm) SOT-23



Unit	A	A1	B	C	D	E	F	G	L	L1
mm	1.20 0.89	0.100 0.013	1.40 1.20	0.19 0.08	3.04 2.80	2.6 2.2	1.02 0.89	2.04 1.78	0.51 0.37	0.2 MIN

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

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