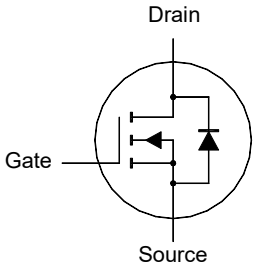
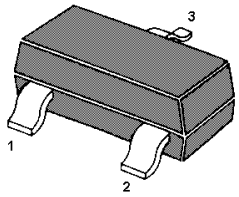
MMFTN123

N-Channel Enhancement Mode MOSFET





1. Gate 2. Source 3. Drain
TO-236 Plastic Package

Applications

- Portable appliances
- Low switch appliances

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current	I_D	170	mA
Peak Drain Current, Pulsed [1)]	I_{DM}	680	mA
Total Power Dissipation	P_{tot}	360	mW
Junction Temperature	T_j	150	℃
Storage Temperature Range	T_{stg}	-55 to +150	℃

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Ambient [2)]	$R_{\theta JA}$	347	℃/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 minimum recommended pad layout.

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	$V_{(BR)DSS}$	100	-	-	V
Drain-Source Leakage Current at V_{DS} = 100 V	I_{DSS}	-	-	1	µA
Gate-Source Leakage Current at V_{GS} = ± 20 V	I_{GSS}	-	-	± 50	nA
Gate-Source Threshold Voltage at V_{GS} = V_{DS}, I_D = 250 µA	$V_{GS(th)}$	0.8	-	2	V
Drain-Source On-State Resistance at V_{GS} = 10 V, I_D = 170 mA at V_{GS} = 4.5 V, I_D = 170 mA	$R_{DS(ON)}$	- -	- -	6 10	Ω
DYNAMIC PARAMETERS					
Gate resistance at V_{DS} = 0 V, f = 1 MHz	R_g	-	43	-	Ω
Input Capacitance at V_{DS} = 50 V, V_{GS} = 0 V, f = 1 MHz	C_{iss}	-	20	-	pF
Output Capacitance at V_{DS} = 50 V, V_{GS} = 0 V, f = 1 MHz	C_{oss}	-	11	-	pF
Reverse Transfer Capacitance at V_{DS} = 50 V, V_{GS} = 0 V, f = 1 MHz	C_{rss}	-	6	-	pF
Total Gate Charge at V_{GS} = 10 V, V_{DD} = 50 V, I_D = 1 A	Q_g	-	1.4	-	nC
Gate-Source Charge at V_{GS} = 10 V, V_{DD} = 50 V, I_D = 1 A	Q_{gs}	-	0.4	-	nC
Gate-Drain Charge at V_{GS} = 10 V, V_{DD} = 50 V, I_D = 1 A	Q_{gd}	-	0.3	-	nC
Turn-On Delay Time at V_{DD} = 51 V, I_D = 170 mA, V_{GS} = 10 V, R_G = 6 Ω	$t_{d(on)}$	-	20	-	ns
Turn-On Rise Time at V_{DD} = 51 V, I_D = 170 mA, V_{GS} = 10 V, R_G = 6 Ω	t_r	-	43	-	ns
Turn-Off Delay Time at V_{DD} = 51 V, I_D = 170 mA, V_{GS} = 10 V, R_G = 6 Ω	$t_{d(off)}$	-	18	-	ns
Turn-Off Fall Time at V_{DD} = 51 V, I_D = 170 mA, V_{GS} = 10 V, R_G = 6 Ω	t_f	-	8	-	ns
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at I_S = 0.17 A, V_{GS} = 0 V	V_{SD}	-	-	1.2	V

Electrical Characteristics Curves

Fig. 1 Typical Output Characteristic

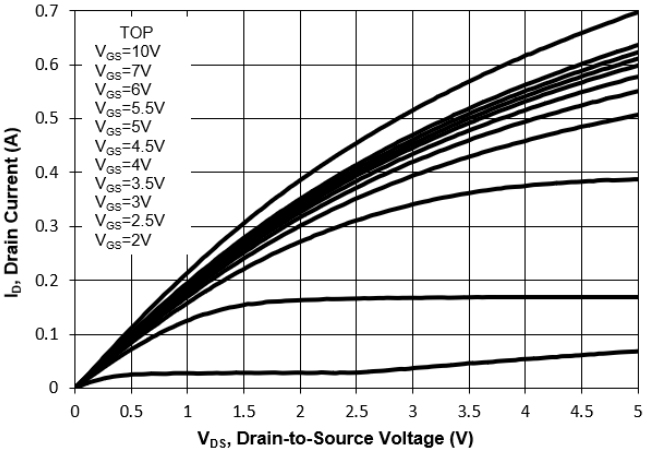


Fig. 2 Typical Transfer Characteristic

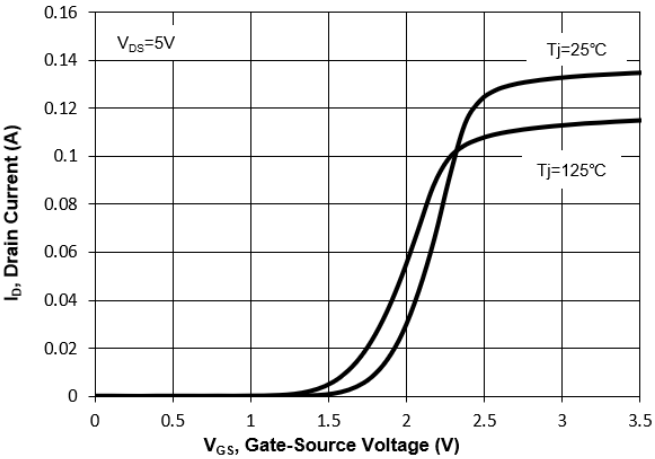


Fig. 3 on-Resistance vs Drain Current

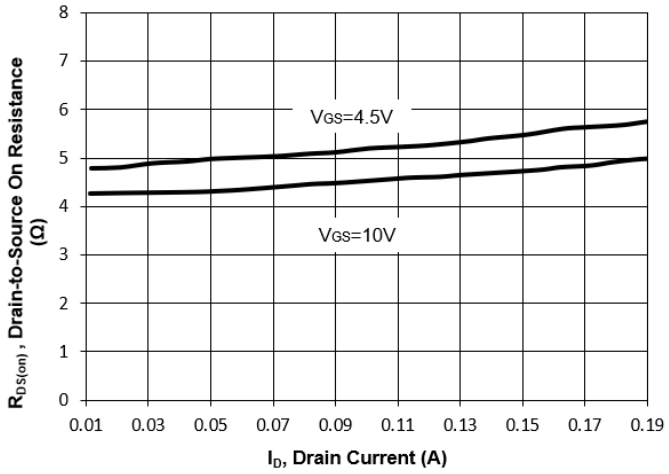


Fig. 4 on-Resistance vs. Gate Voltage

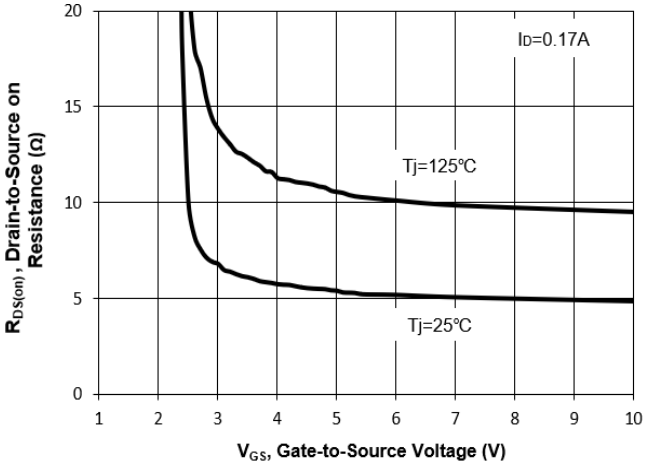


Fig. 5 on-Resistance vs.T_j

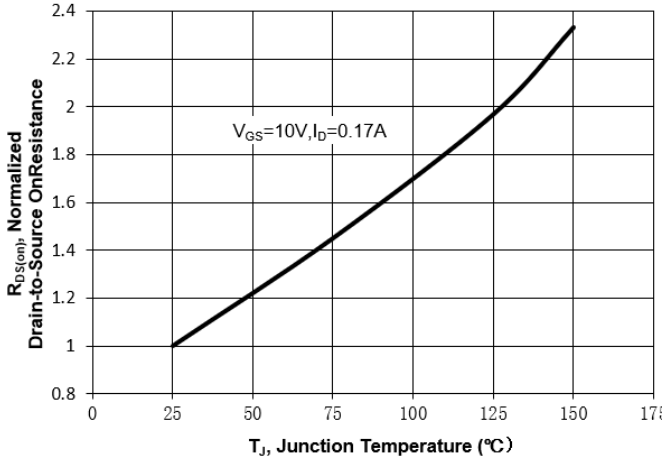
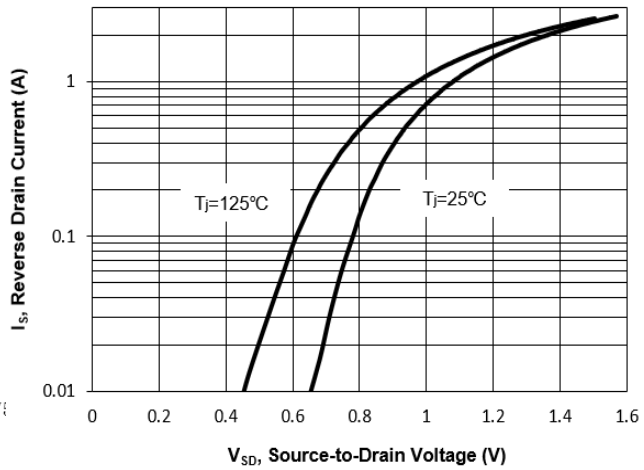


Fig. 6 Typical Forward Characteristic



Electrical Characteristics Curves

Fig. 7 Typical Junction Capacitance

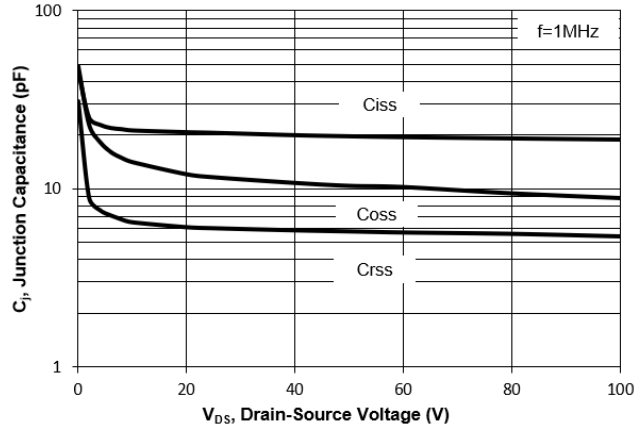


Fig. 8 Drain-Source Leakage Current vs. T_j

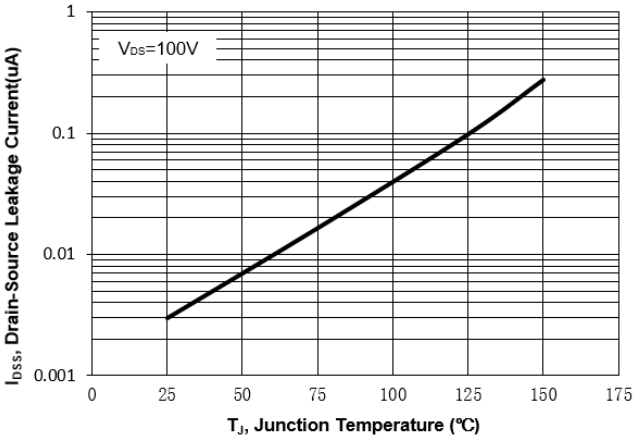


Fig. 9 $V_{(BR)DSS}$ vs. Junction Temperature

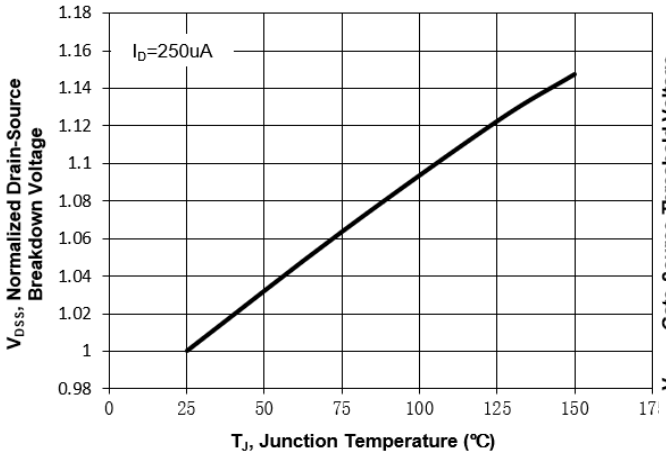


Fig. 10 Gate Threshold Variation vs. T_j

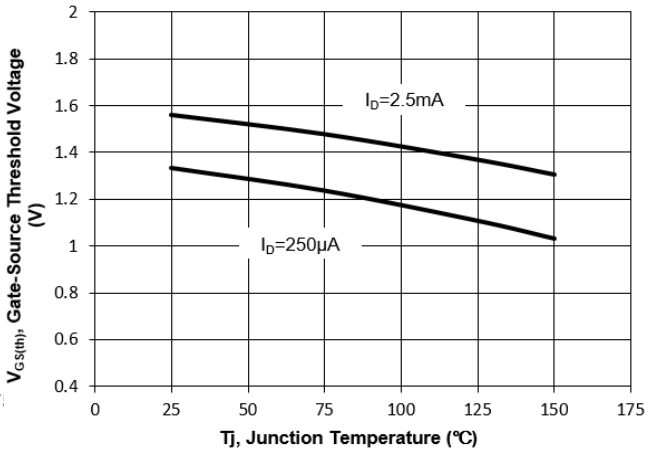
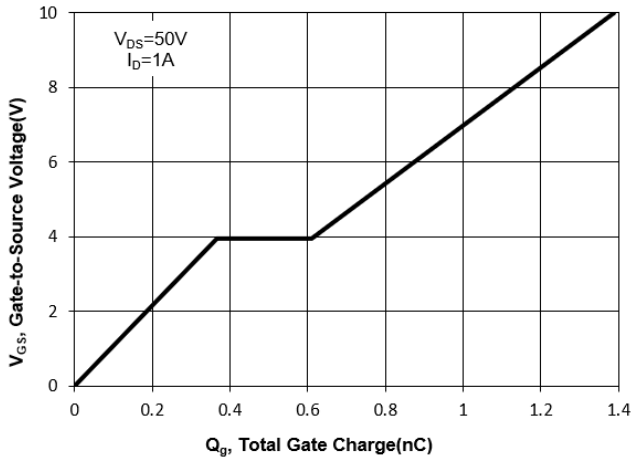


Fig. 11 Gate Charge



Test Circuits

Fig.1-1 Switching times test circuit

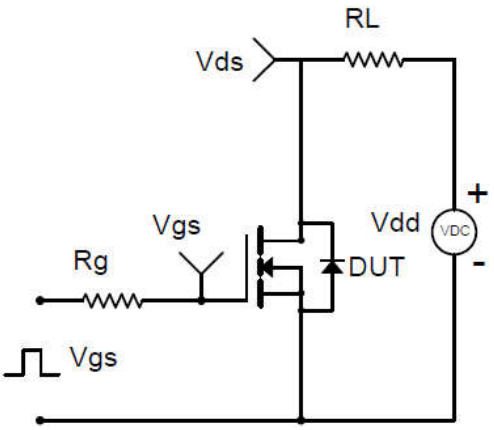


Fig.1-2 Switching Waveform

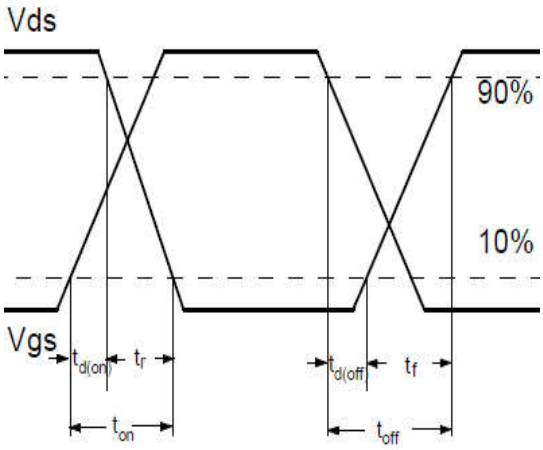


Fig.2-1 Gate charge test circuit

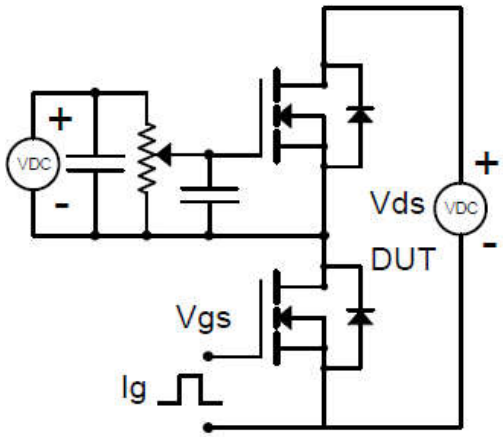
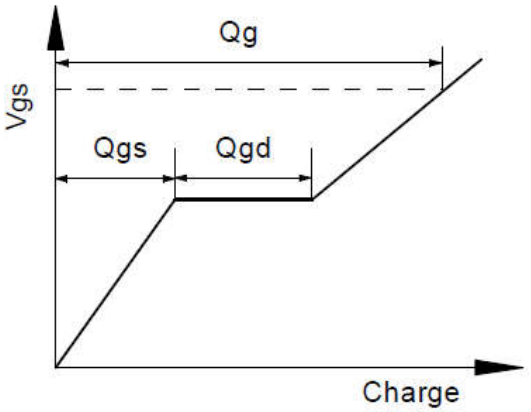
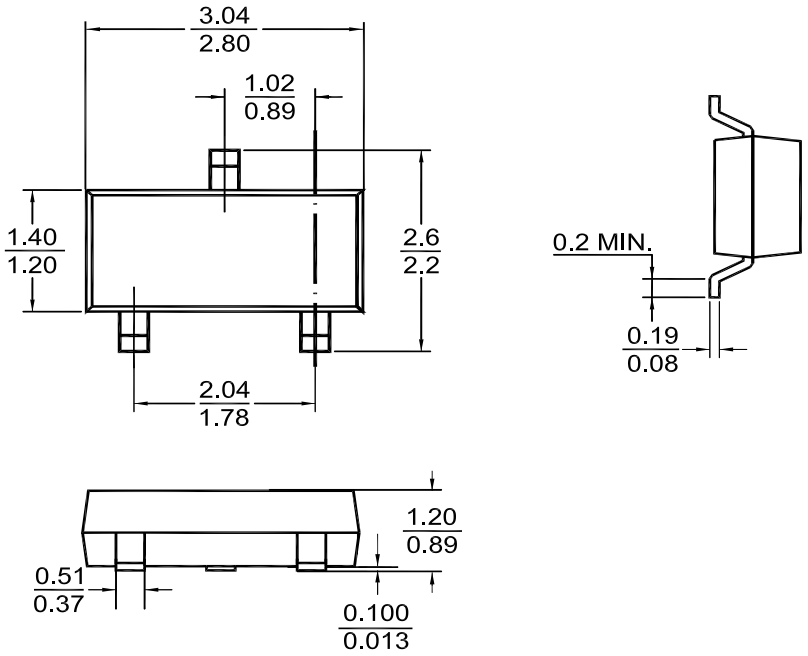


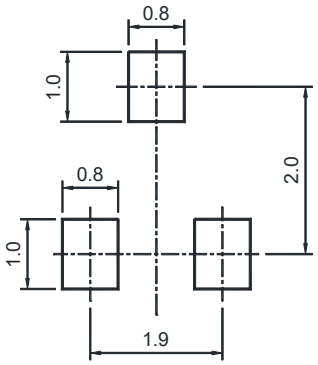
Fig.2-2 Gate charge waveform



Package Outline (Dimensions in mm) TO-236



Recommended Soldering Footprint



Packing information

Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
TO-236	8	4 ± 0.1	0.157 ± 0.004	178	7	3,000

Marking information

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