

MMBT7002W

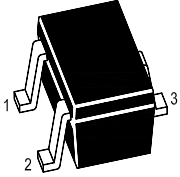
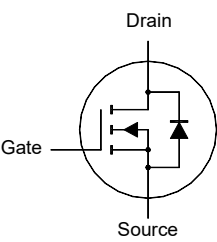
N-Channel Enhancement Mode MOSFET

Features

- Surface-mounted package
- Advanced trench cell design

Applications

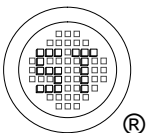
- Portable appliances
- Battery management
- High speed switch
- Low power DC to DC Converter



1. Gate 2. Source 3. Drain
SOT-323 Plastic Package

Absolute Maximum Ratings ($T_a = 25^{\circ}\text{C}$)

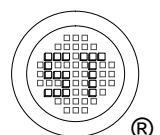
Parameter	Symbol	Value	Unit
Drain Source Voltage	V_{DSS}	60	V
Drain Gate Voltage ($R_{\text{GS}} \leq 1 \text{ M}\Omega$)	V_{DGR}	60	V
Gate Source Voltage	V_{GSS}	± 20	V
Continuous Pulsed		± 40	
Drain Current - Continuous	I_{D}	115	mA
Peak Drain Current, Pulsed	I_{DM}	800	mA
Total Power Dissipation	P_{tot}	200	mW
Junction Temperature	T_{j}	150	$^{\circ}\text{C}$
Storage Temperature Range	T_{Stg}	- 55 to + 150	$^{\circ}\text{C}$



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Characteristics at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain Source Breakdown Voltage at $I_D = 10\ \mu\text{A}$	BV_{DSS}	60	-	-	V
Zero Gate Voltage Drain Current at $V_{DS} = 60\ \text{V}$	I_{DSS}	-	-	1	μA
Gate Source Leakage Current at $V_{GS} = \pm 20\ \text{V}$	I_{GSS}	-	-	± 100	nA
Gate Source Threshold Voltage at $V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$	$V_{GS(th)}$	1	-	2.5	V
Static Drain Source On Resistance at $V_{GS} = 5\ \text{V}$, $I_D = 50\ \text{mA}$ at $V_{GS} = 10\ \text{V}$, $I_D = 500\ \text{mA}$	$R_{DS(ON)}$	- -	- -	7.5 7.5	Ω
Drain Source On Voltage at $V_{GS} = 5\ \text{V}$, $I_D = 50\ \text{mA}$ at $V_{GS} = 10\ \text{V}$, $I_D = 500\ \text{mA}$	$V_{DS(ON)}$	- -	- -	0.375 3.75	V
DYNAMIC PARAMETERS					
Forward Transconductance at $V_{DS} = 10\ \text{V}$, $I_D = 200\ \text{mA}$	g_{FS}	80	-	-	mS
Input Capacitance at $V_{DS} = 25\ \text{V}$, $f = 1\ \text{MHz}$	C_{iss}	-	22.5	50	pF
Output Capacitance at $V_{DS} = 25\ \text{V}$, $f = 1\ \text{MHz}$	C_{oss}	-	9	25	pF
Reverse Transfer Capacitance at $V_{DS} = 25\ \text{V}$, $f = 1\ \text{MHz}$	C_{rss}	-	7.5	10	pF
Total Gate Charge at $V_{DS} = 30\ \text{V}$, $I_D = 0.2\ \text{A}$, $V_{GS} = 10\ \text{V}$	Q_g	-	1.08	-	nC
Gate Source Charge at $V_{DS} = 30\ \text{V}$, $I_D = 0.2\ \text{A}$, $V_{GS} = 10\ \text{V}$	Q_{gs}	-	0.28	-	nC
Gate Drain Charge at $V_{DS} = 30\ \text{V}$, $I_D = 0.2\ \text{A}$, $V_{GS} = 10\ \text{V}$	Q_{gd}	-	0.09	-	nC
Turn On Time at $V_{DD} = 30\ \text{V}$, $R_L = 150\ \Omega$, $I_D = 0.2\ \text{A}$, $V_{GS} = 10\ \text{V}$, $R_{GEN} = 25\ \Omega$	$t_{d(on)}$	-	2.7	-	ns
Turn-On Rise Time at $V_{DD} = 30\ \text{V}$, $R_L = 150\ \Omega$, $I_D = 0.2\ \text{A}$, $V_{GS} = 10\ \text{V}$, $R_{GEN} = 25\ \Omega$	t_r	-	17	-	ns
Turn Off Time at $V_{DD} = 30\ \text{V}$, $R_L = 150\ \Omega$, $I_D = 0.2\ \text{A}$, $V_{GS} = 10\ \text{V}$, $R_{GEN} = 25\ \Omega$	$t_{d(off)}$	-	8.5	-	ns
Turn-Off Fall Time at $V_{DD} = 30\ \text{V}$, $R_L = 150\ \Omega$, $I_D = 0.2\ \text{A}$, $V_{GS} = 10\ \text{V}$, $R_{GEN} = 25\ \Omega$	t_f	-	28	-	ns
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at $V_{GS} = 0\ \text{V}$, $I_S = 0.5\ \text{A}$	V_{SD}	-	-	1.2	V



Electrical Characteristics Curves

Fig. 1 Output Characteristic

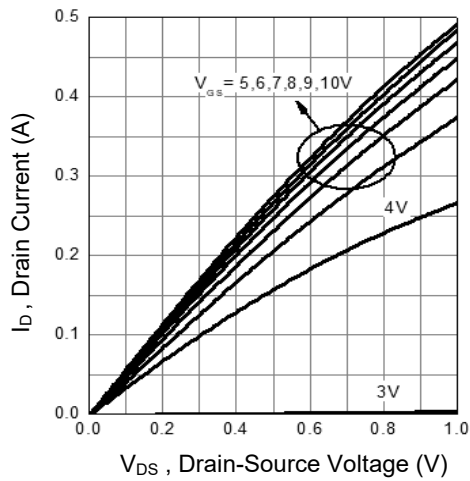


Fig. 2 Transfer Characteristics

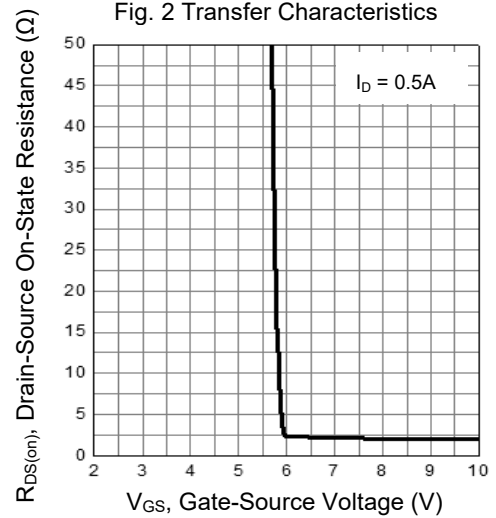


Fig. 3 on-Resistance vs. Drain Current

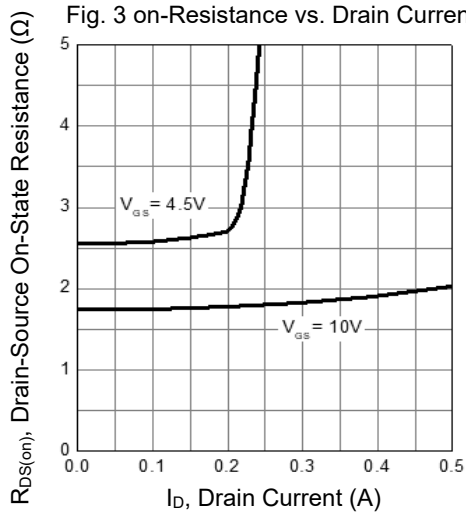


Fig. 4 Body Diode Forward Characteristic

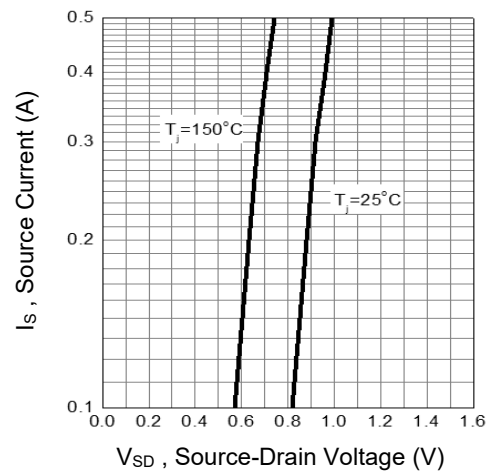


Fig. 5 R_DS(on) vs. T_J

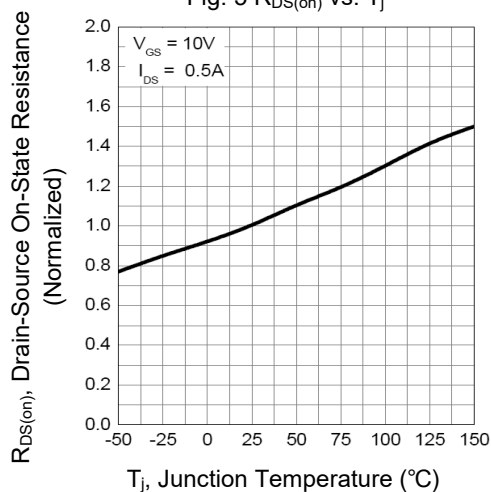
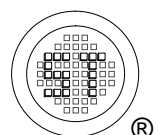
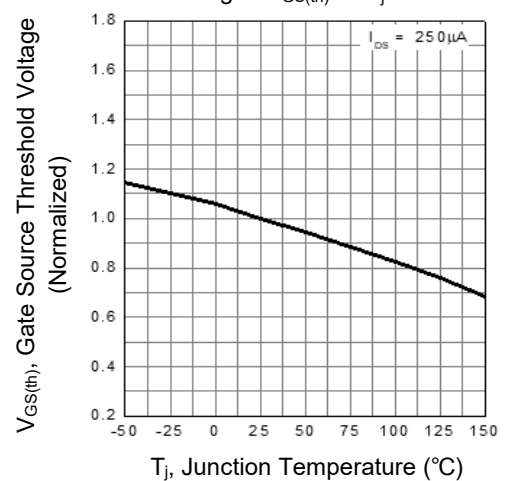
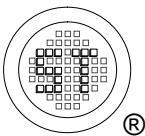
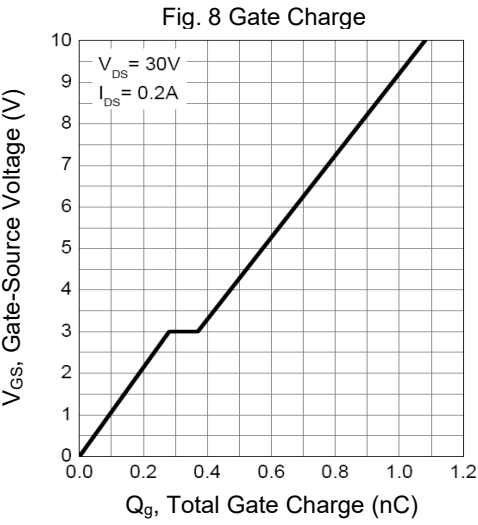
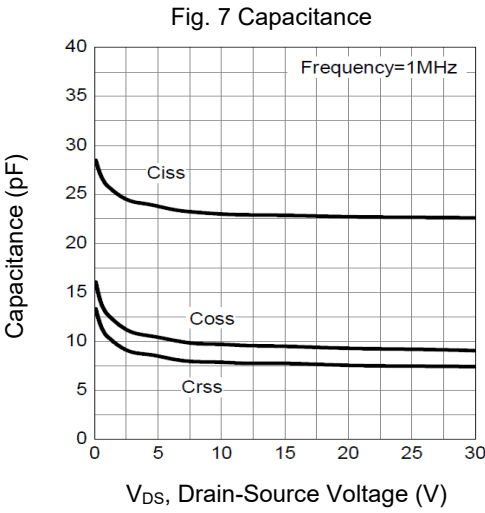


Fig. 6 V_GS(th) vs T_J



Electrical characteristic curve



Test Circuits

Fig.1-1 Switching times test circuit

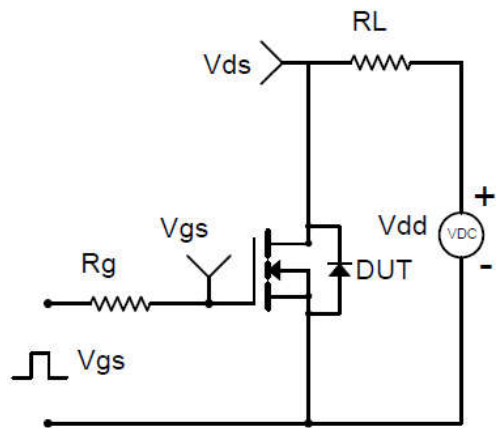


Fig.1-2 Switching Waveform

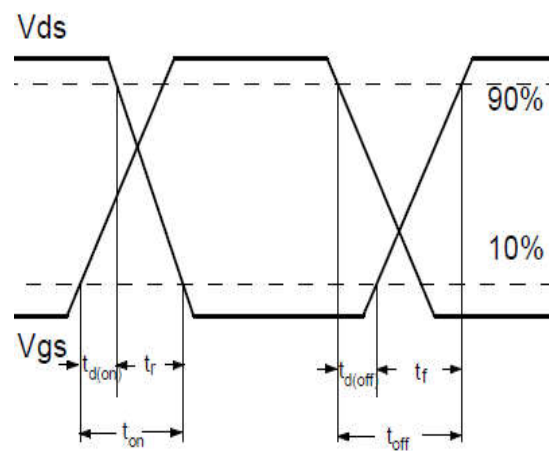


Fig.2-1 Gate charge test circuit

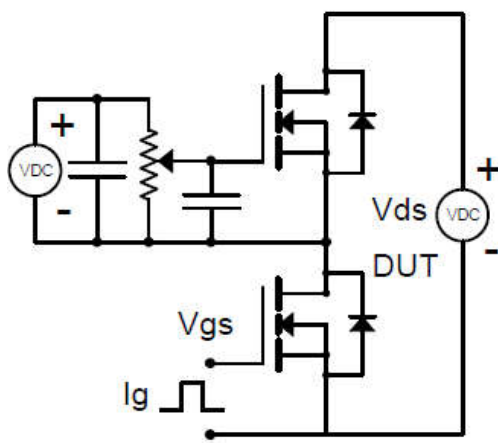
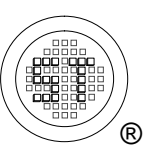
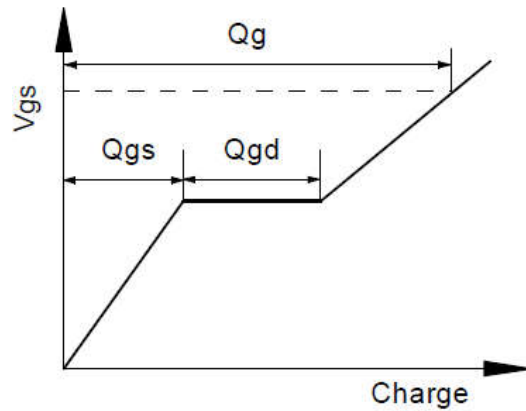
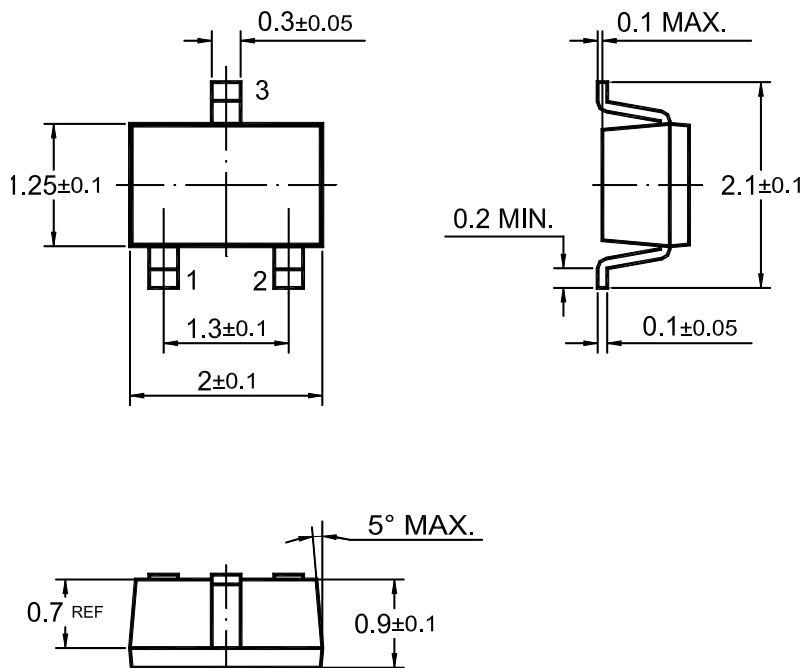


Fig.2-2 Gate charge waveform

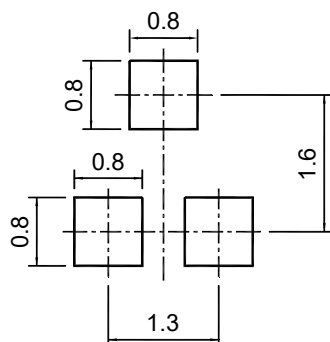


PACKAGE OUTLINE(Dimensions in mm)

SOT-323



Recommended Soldering Footprint



Packing information

Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
SOT-323	8	4 ± 0.1	0.157 ± 0.004	178	7	3,000

Marking information

" S72 " = Part No.
 " YM " = Date Code Marking
 " Y " = Year
 " M " = Month
 Font type: Arial

