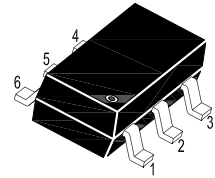
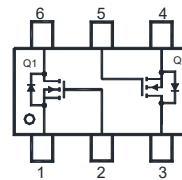


MMBT7002DW

Dual N-Channel Enhancement Mode MOSFET

Features

- High density cell design for low $R_{DS(ON)}$
- Voltage controlled small signal switching
- High saturation current capability
- High speed switching
- Halogen and Antimony Free(HAF), RoHS compliant



Q1: 1.Source 2. Gate 6. Drain
Q2: 3. Drain 4. Source 5. Gate
SOT-363 Plastic Package

MARKING:K72

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

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

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Ambient ²⁾	$R_{\theta JA}$	625	$^\circ\text{C/W}$

¹⁾ Pulse Test: Pulse Width $\leq 100 \mu\text{s}$, Duty Cycle $\leq 2\%$, Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ\text{C}$.

²⁾ Device mounted on FR-4 substrate PC board, with minimum recommended pad layout.

MMBT7002DW

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 $V_{GS} = 10\ \text{V}$, $I_D = 500\ \text{mA}$	$R_{DS(ON)}$	-	-	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

MMBT7002DW

Electrical Characteristics Curves

Fig. 1 Output Characteristic

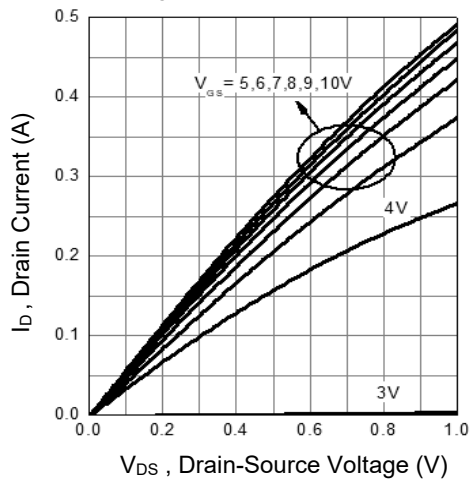


Fig. 2 Transfer Characteristics

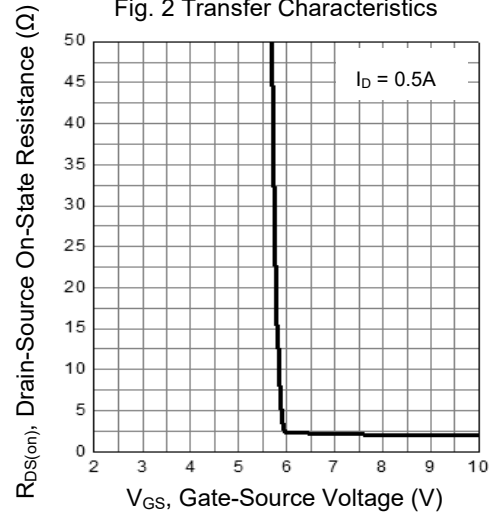


Fig. 3 on-Resistance vs. Drain Current

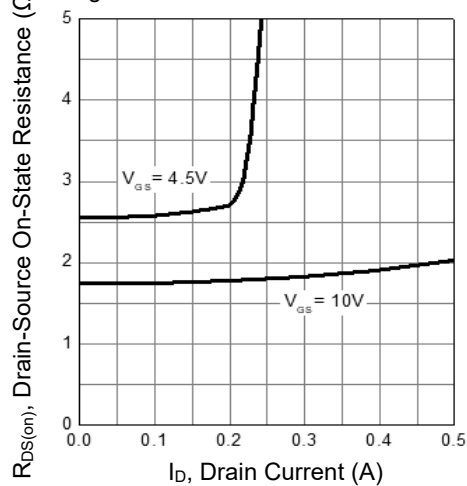


Fig. 4 Body Diode Forward Characteristic

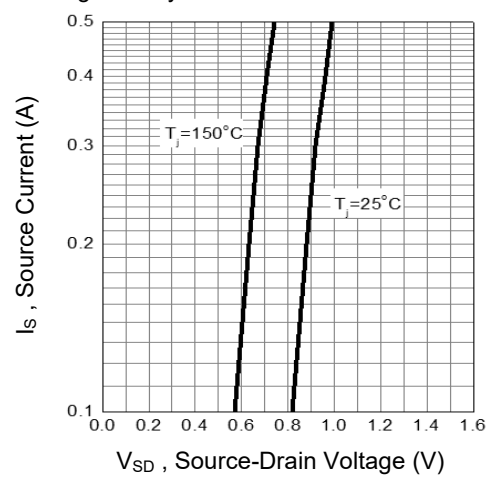


Fig. 5 $R_{DS(on)}$ vs. T_J

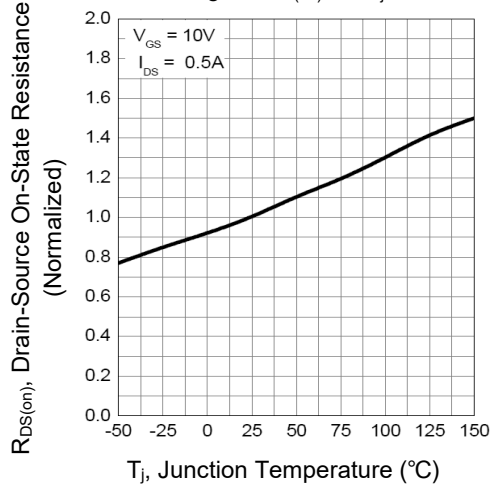
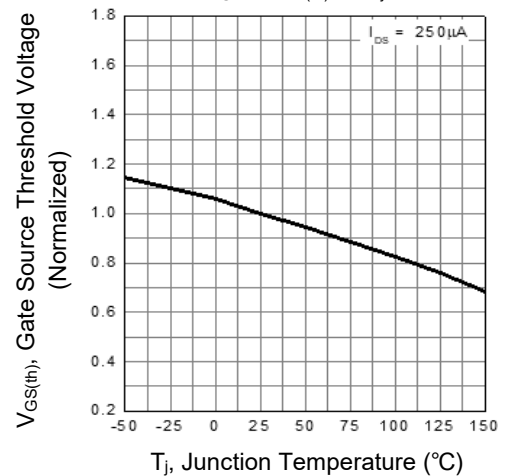


Fig. 6 $V_{GS(th)}$ vs T_J



MMBT7002DW

Electrical characteristic curve

Fig. 7 Capacitance

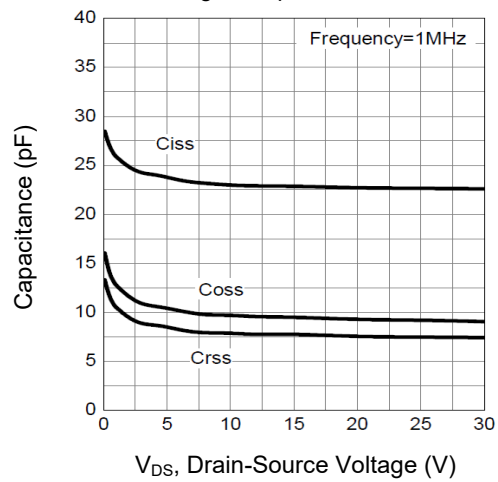
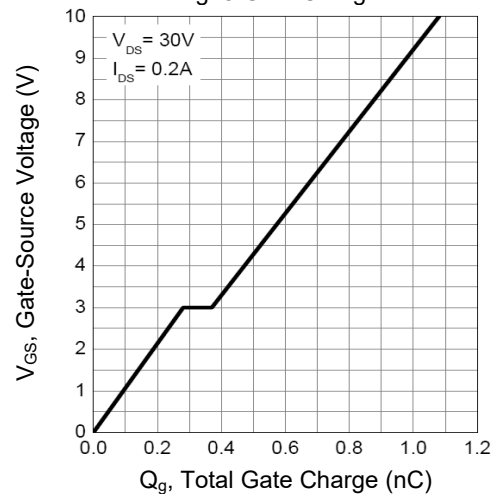


Fig. 8 Gate Charge



MMBT7002DW

Test Circuits

Fig.1-1 Switching times test circuit

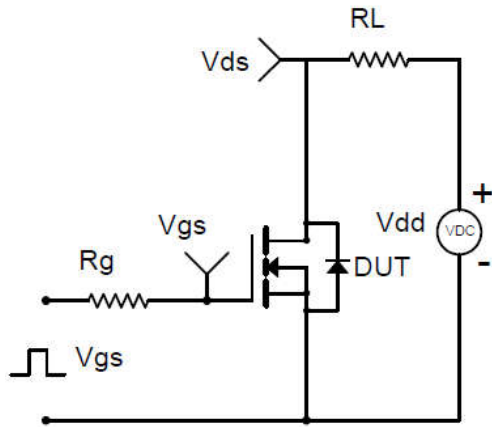


Fig.1-2 Switching Waveform

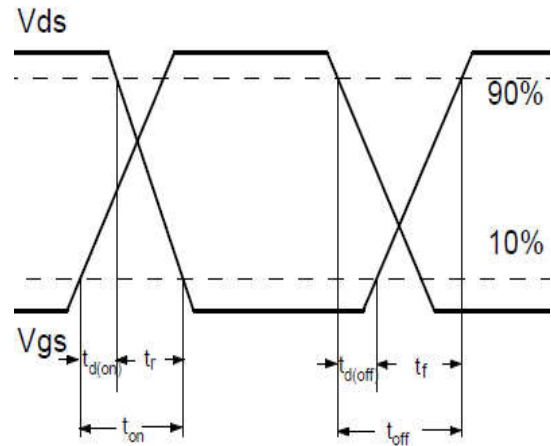


Fig.2-1 Gate charge test circuit

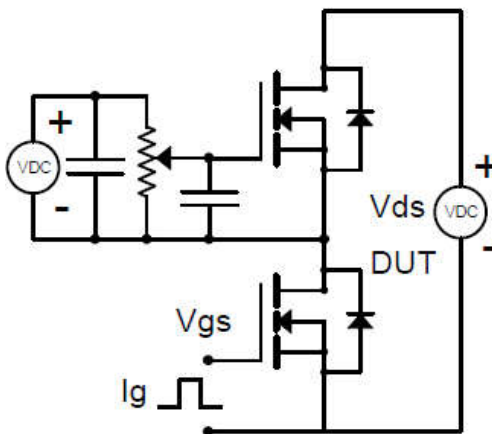
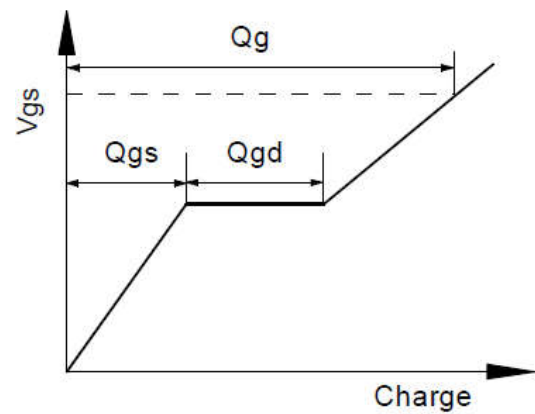
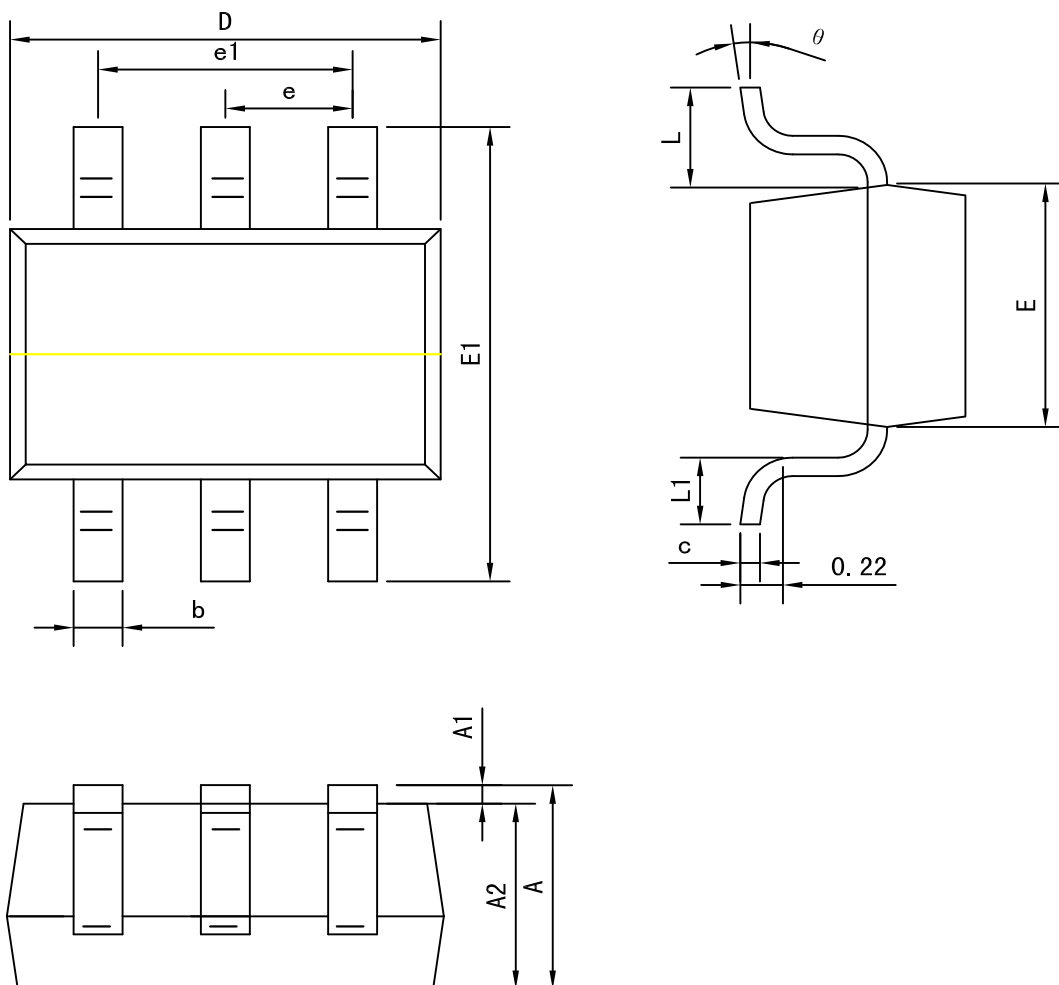


Fig.2-2 Gate charge waveform



Package outline dimensions

SOT-363



Symbol	Dimension in Millimeters	
	Min	Max
A	0.900	1.100
A1	0.000	0.100
A2	0.900	1.000
b	0.100	0.350
c	0.080	0.250
D	1.800	2.200
E	1.150	1.350
E1	2.000	2.450
e	0.650 TYP	
e1	1.200	1.400
L	0.525 REF	
L1	0.260	0.460
θ	0°	8°