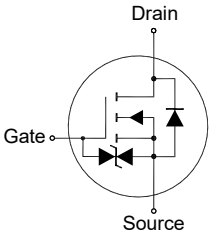
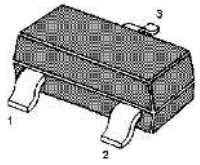
N-Channel Enhancement Mode MOSFET





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

Features

- AEC-Q101 Qualified
- Low on resistance $R_{DS(ON)}$
- Low gate threshold voltage
- Low input capacitance
- Halogen and Antimony Free(HAF), RoHS compliant
- Typical ESD Protection HBM Class 2

Classification	Voltage Range(V)
0A	< 125
0B	125 to < 250
1A	250 to < 500
1B	500 to < 1000
1C	1000 to < 2000
2	2000 to < 4000
3A	4000 to < 8000
3B	≥ 8000

Application

- Portable appliances
- Battery management

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

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current (Steady State 1sq in pad) [1]	T_a = 25℃ T_a = 85℃	I_D	380 270	mA
Drain Current (Steady State Minimum pad) [2]	T_a = 25℃ T_a = 85℃	I_D	320 230	mA
Peak Drain Current, Pulsed (t_p= 10 μs)		I_{DM}	1.5	A
Total Power Dissipation [2]		P_{tot}	350	mW
Operating and Storage Temperature Range		T_j, T_{stg}	- 55 to + 150	℃

Thermal Characteristics

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

[1] Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate in still air.

[2] Device mounted on FR-4 substrate PC board, 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 = 10 µA	BV_{DSS}	60	-	-	V
Zero Gate Voltage Drain Current at V_{DS} = 60 V	I_{DSS}	-	-	1	µA
Gate Source Leakage Current at V_{GS} = ± 20 V	I_{GSS}	-	-	± 10	µA
Gate Threshold Voltage at V_{DS} = 10 V, I_D = 250 µA	$V_{GS(th)}$	1	-	2.5	V
Static Drain Source On-Resistance at V_{GS} = 10 V, I_D = 500 mA at V_{GS} = 4.5 V, I_D = 200 mA	$R_{DS(ON)}$	- -	- -	3 4	Ω
DYNAMIC PARAMETERS					
Forward Transconductance at V_{DS} = 10 V, I_D = 200 mA	g_{FS}	80	-	-	mS
Gate Resistance at V_{GS} = 0 V, V_{DS} = 0 V, f = 1MHz	R_g	-	200	-	Ω
Input Capacitance at V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	-	22.5	50	pF
Output Capacitance at V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{oss}	-	12	25	pF
Reverse Transfer Capacitance at V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{rss}	-	0.5	10	pF
Gate charge total at V_{DS} =10 V, I_D = 0.5 A, V_{GS} = 4.5 V	Q_g	-	0.44	-	nC
Gate to Source Charge at V_{DS} =10 V, I_D = 0.5 A, V_{GS} = 4.5 V	Q_{gs}	-	0.2	-	nC
Gate to Drain Charge at V_{DS} =10 V, I_D = 0.5 A, V_{GS} = 4.5 V	Q_{gd}	-	0.1	-	nC
Turn-On Delay Time at V_{DS} = 30 V, V_{GS} = 10 V, I_D = 0.5 A, R_g = 25 Ω	$t_{d(on)}$	-	2.7	-	ns
Turn-On Rise Time at V_{DS} = 30 V, V_{GS} = 10 V, I_D = 0.5 A, R_g = 25 Ω	t_r	-	2.5	-	ns
Turn-Off Delay Time at V_{DS} = 30 V, V_{GS} = 10 V, I_D = 0.5 A, R_g = 25 Ω	$t_{d(off)}$	-	13	-	ns
Turn-Off Fall Time at V_{DS} = 30 V, V_{GS} = 10 V, I_D = 0.5 A, R_g = 25 Ω	t_f	-	8	-	ns
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at V_{GS} = 0 V, I_S = 0.5 A	V_{SD}	-	0.85	-	V
Body Diode Reverse Recovery Time at I_S = 0.5 A, di/dt = 100 A / µs	t_{rr}	-	30	-	ns
Body Diode Reverse Recovery Charge at I_S = 0.5 A, di/dt = 100 A / µs	Q_{rr}	-	29	-	nC

Electrical Characteristics Curves

Fig. 1 Typical Output Characteristics

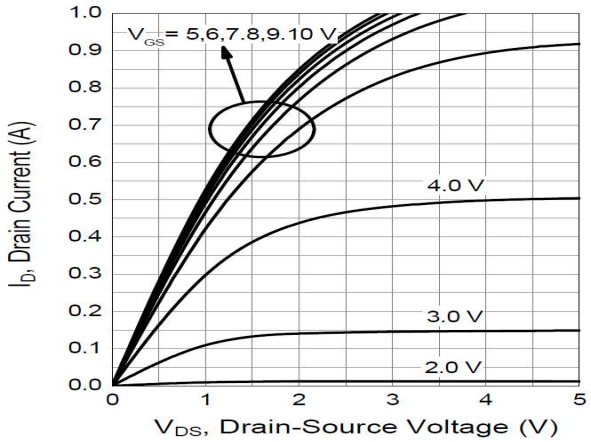


Fig. 2 Typical Transfer Characteristics

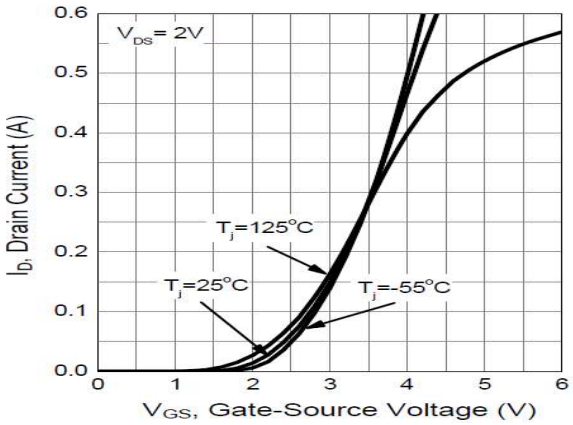


Fig. 3 $R_{DS(on)}$ vs. Gate-Source Voltage

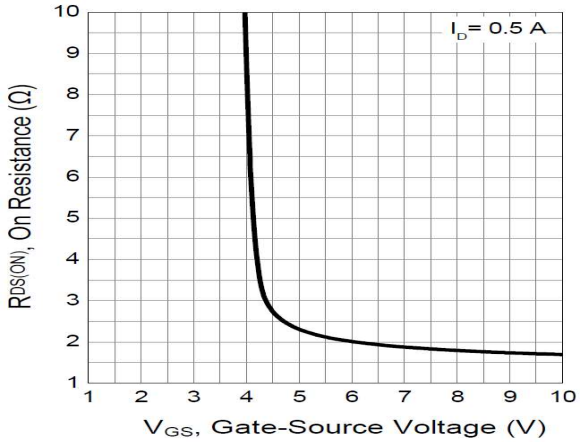


Fig. 4 on-Resistance vs.T_j

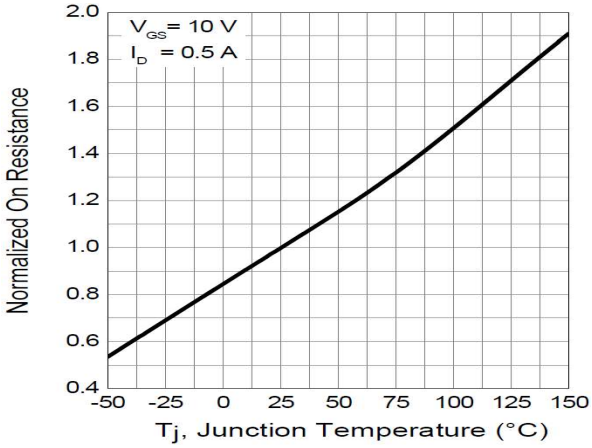


Fig. 5 on-Resistance vs. Drain Current

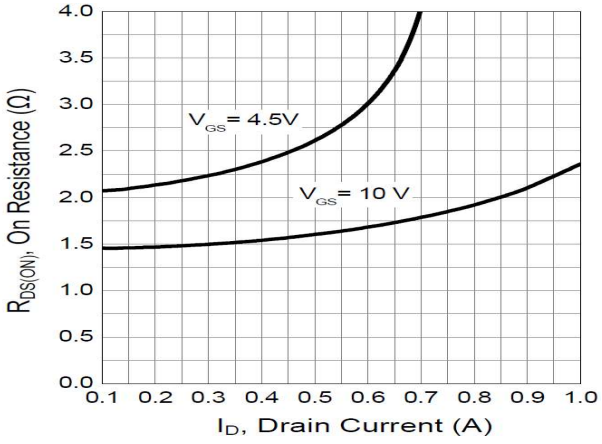
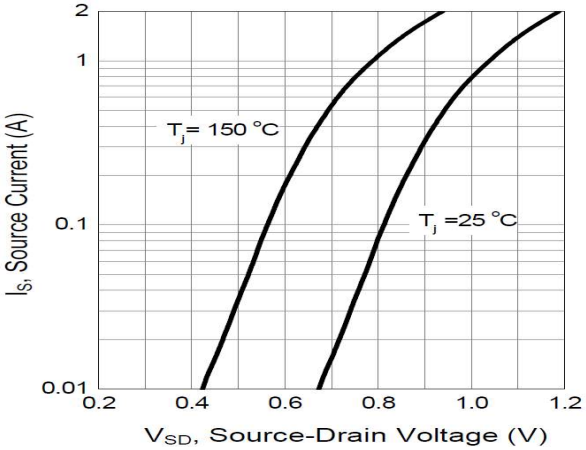


Fig. 6 Typical Forward Characteristics



Electrical Characteristics Curves

Fig. 7 Typical Junction Capacitance

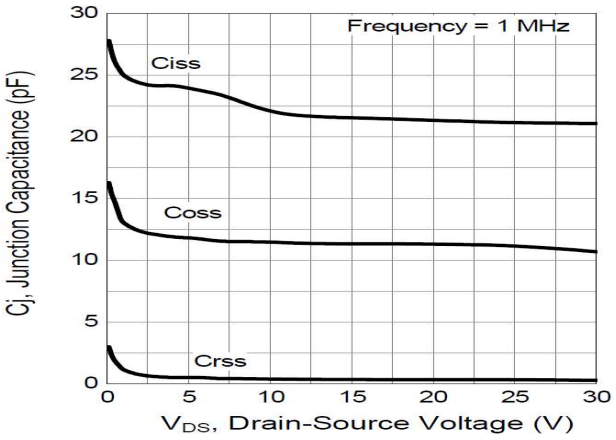


Fig. 8 Gate Threshold Variation vs. T_j

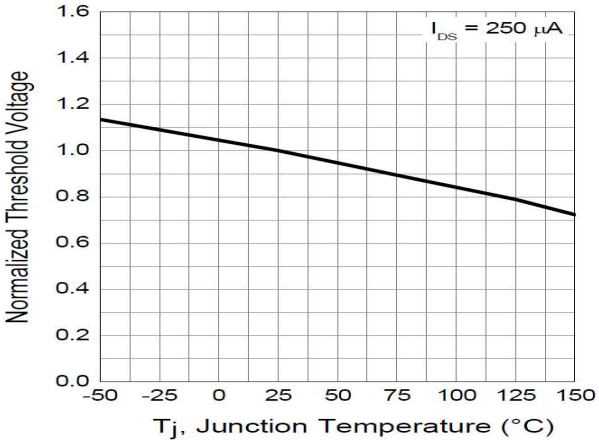
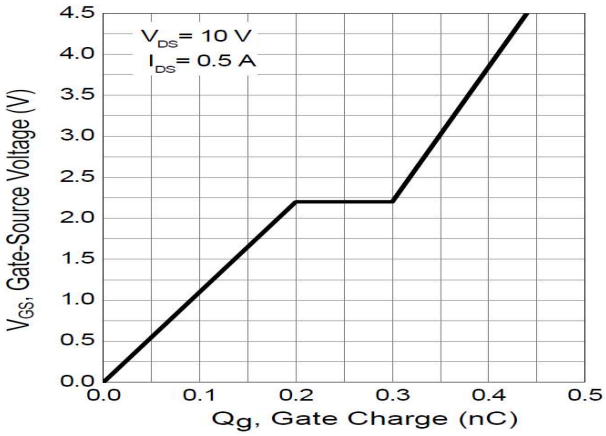


Fig. 9 Gate Charge



Test Circuits

Fig.1-1 Switching times test circuit

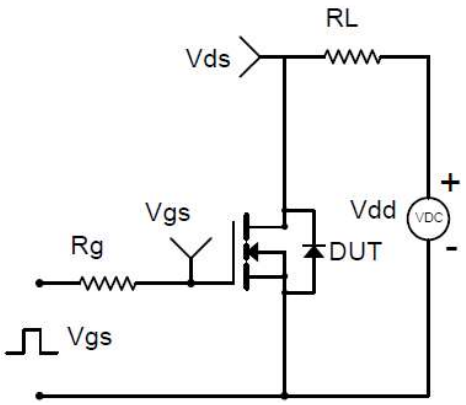


Fig.1-2 Switching Waveform

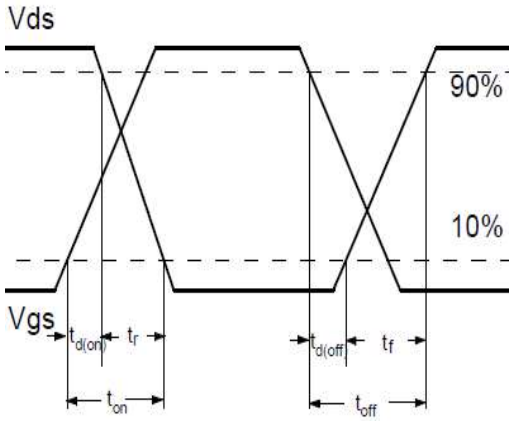


Fig.2-1 Gate charge test circuit

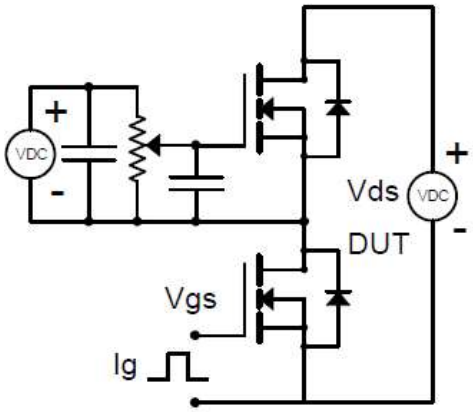
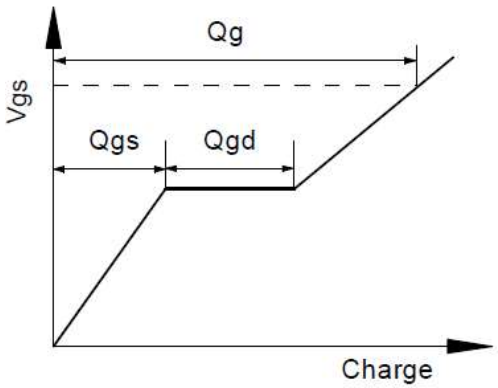
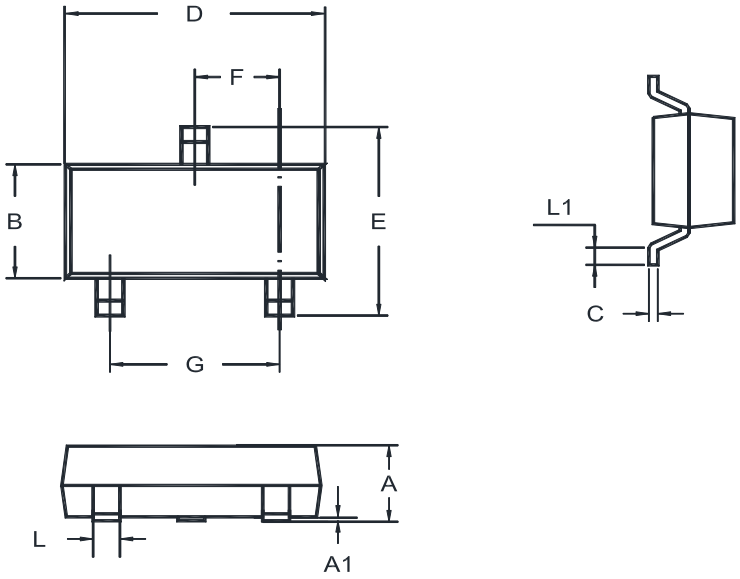


Fig.2-2 Gate charge waveform



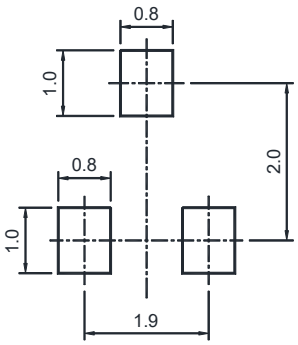
Package Outline (Dimensions in mm)

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

" K72 " = Part No.

" • " = HAF (Halogen and Antimony Free)

"YM" = Date Code Marking

"Y" = Year

"M" = Month

Font type: Arial