MMFTP84K-AH

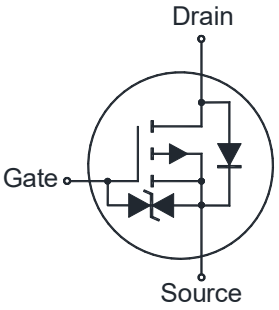
P-Channel Enhancement Mode MOSFET

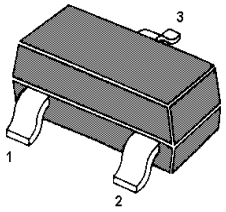
Features

- AEC-Q101 Qualified
- ESD protection
- Halogen and Antimony Free(HAF), RoHS compliant

Typical ESD Protection HBM Class 1C

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





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

Applications

- Portable appliances

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
Continuous Drain Current	$-I_D$	180	mA
Peak Drain Current, Pulsed [1]	$-I_{DM}$	700	mA
Power Dissipation [2]	P_D	225	mW
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	556 [2] 265 [3]	℃/W
Operating Junction Temperature Range	T_j	- 55 to + 150	℃
Storage Temperature Range	T_{stg}	- 55 to + 150	℃

[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, with minimum recommended pad layout.

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

Dated: 28/11/2020 IMC7 Rev: 01

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	$-V_{(BR)DSS}$	60	-	-	V
Zero Gate Voltage Drain Current at $-V_{DS}$ = 25 V at $-V_{DS}$ = 60 V	$-I_{DSS}$	- -	- -	0.1 1	µA
Gate-Source Leakage at V_{GS} = ± 20 V	I_{GSS}	-	-	± 10	µA
Gate-Source Threshold Voltage at V_{DS} = V_{GS}, $-I_D$ = 250 µA	$-V_{GS(th)}$	0.9	-	2	V
Drain-Source On-State Resistance at $-V_{GS}$ = 5 V, $-I_D$ = 0.1 A	$R_{DS(on)}$	-	2.6	10	Ω
DYNAMIC PARAMETERS					
Forward Transconductance at $-V_{DS}$ = 25 V, $-I_D$ = 0.1 A, f = 1KHz	gfs	50	-	-	mS
Input Capacitance at V_{GS} = 0 V, $-V_{DS}$ = 30 V, f = 1 MHz	C_{iss}	-	38	-	pF
Output Capacitance at V_{GS} = 0 V, $-V_{DS}$ = 30 V, f = 1 MHz	C_{oss}	-	9	-	pF
Reverse Transfer Capacitance at V_{GS} = 0 V, $-V_{DS}$ = 30 V, f = 1 MHz	C_{rss}	-	6	-	pF
Total Gate Charge at $-V_{DS}$ = 25 V, $-V_{GS}$ = 4.5 V, $-I_D$ = 0.1 A	Q_g	-	1.1	-	nC
Gate Source Charge at $-V_{DS}$ = 25 V, $-V_{GS}$ = 4.5 V, $-I_D$ = 0.1 A	Q_{gs}	-	0.3	-	nC
Gate Drain Charge at $-V_{DS}$ = 25 V, $-V_{GS}$ = 4.5 V, $-I_D$ = 0.1 A	Q_{gd}	-	0.2	-	nC
Turn-On Rise Time at $-V_{DS}$ = 25 V, $-V_{GS}$ = 10 V, $-I_D$ = 0.1 A, R_g = 6.8 Ω	$t_{d(on)}$	-	14	-	ns
Turn-On Rise Time at $-V_{DS}$ = 25 V, $-V_{GS}$ = 10 V, $-I_D$ = 0.1 A, R_g = 6.8 Ω	t_r	-	4	-	ns
Turn-Off Delay Time at $-V_{DS}$ = 25 V, $-V_{GS}$ = 10 V, $-I_D$ = 0.1 A, R_g = 6.8 Ω	$t_{d(off)}$	-	15	-	ns
Turn-Off Fall Time at $-V_{DS}$ = 25 V, $-V_{GS}$ = 10 V, $-I_D$ = 0.1 A, R_g = 6.8 Ω	t_f	-	77	-	ns
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at $-I_S$ = 0.5 A	$-V_{SD}$	-	-	1.2	V
Body Diode Reverse Recovery Time at $-I_S$ = 0.1 A, di/dt = 100 A / µs	t_{rr}	-	60	-	ns
Body Diode Reverse Recovery Charge at $-I_S$ = 0.1 A, di/dt = 100 A / µs	Q_{rr}	-	58	-	nC

Electrical Characteristics Curves

Fig. 1 Typical Output Characteristic

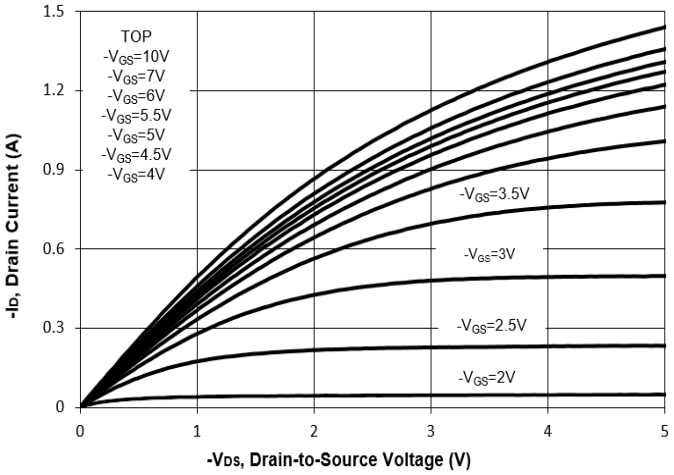


Fig. 2 Typical Transfer Characteristic

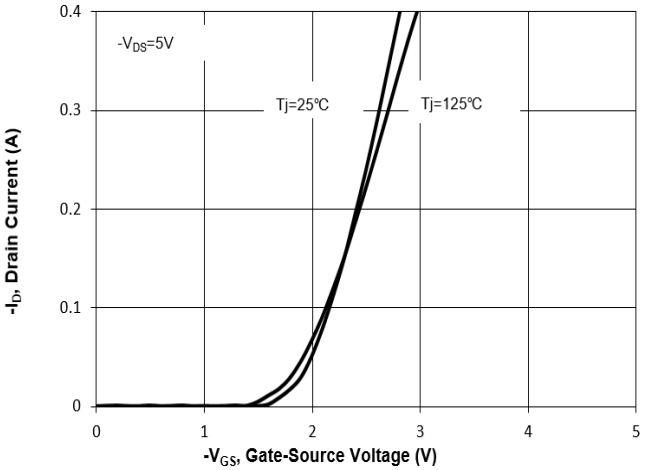


Fig. 3 on-Resistance vs. Gate Voltage

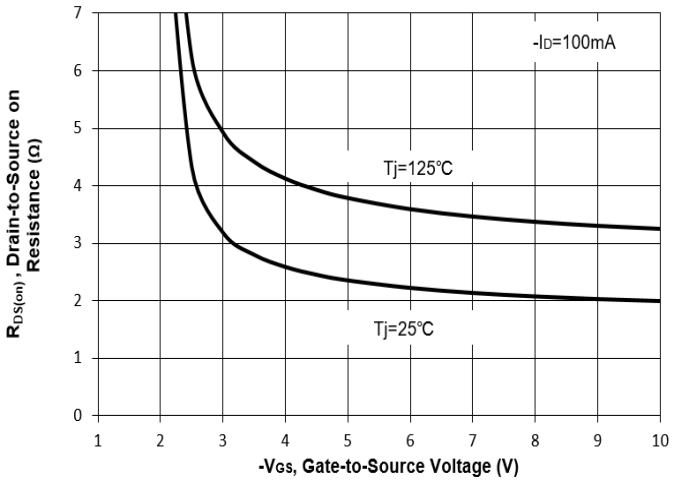


Fig. 4 on-Resistance vs.T_j

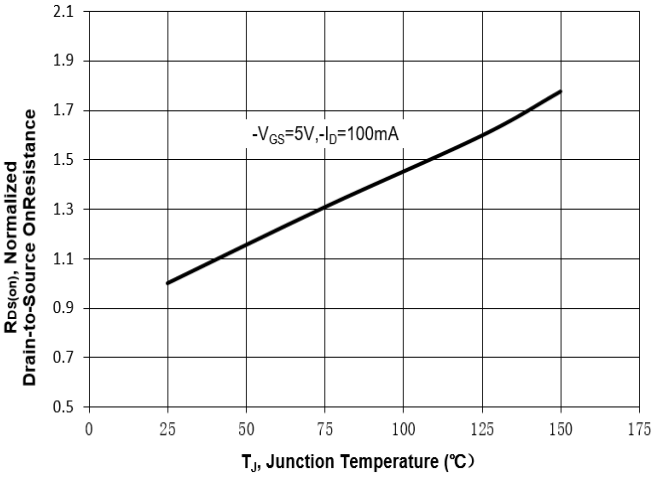


Fig. 5 On-Resistance vs. Drain Current

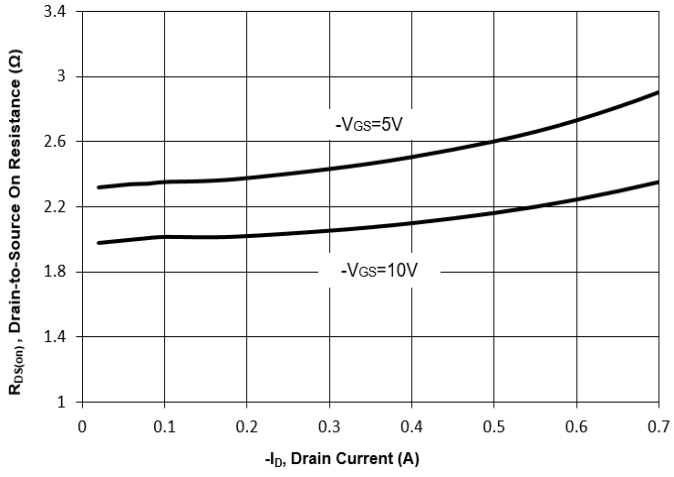
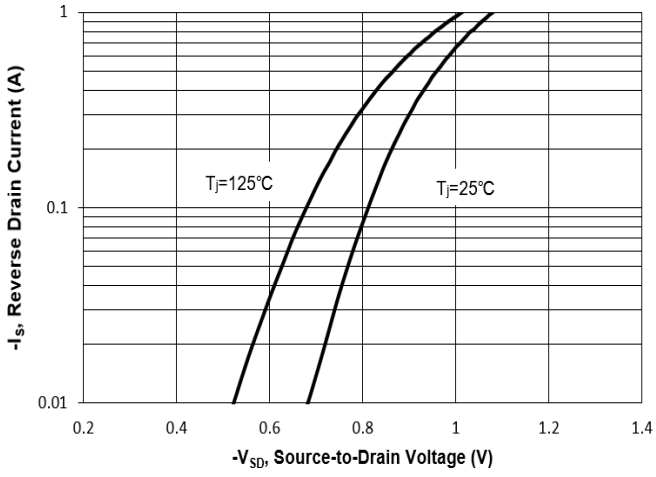


Fig. 6 Typical Forward Characteristic



Electrical Characteristics Curves

Fig. 7 $V_{(BR)DSS}$ vs. Junction Temperature

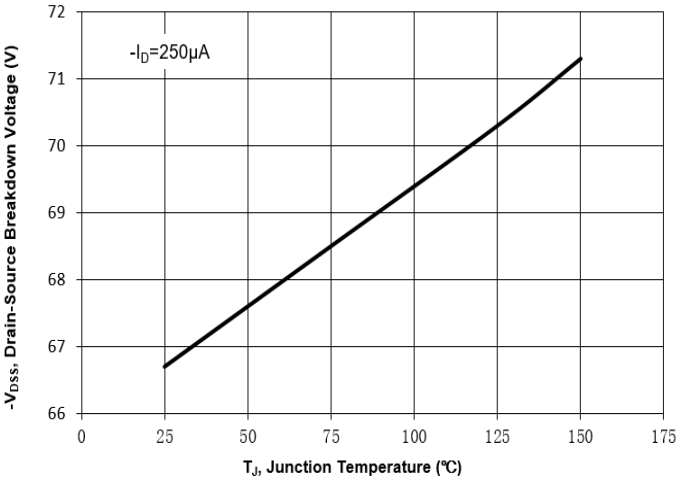


Fig. 8 Gate Threshold Variation vs. T_j

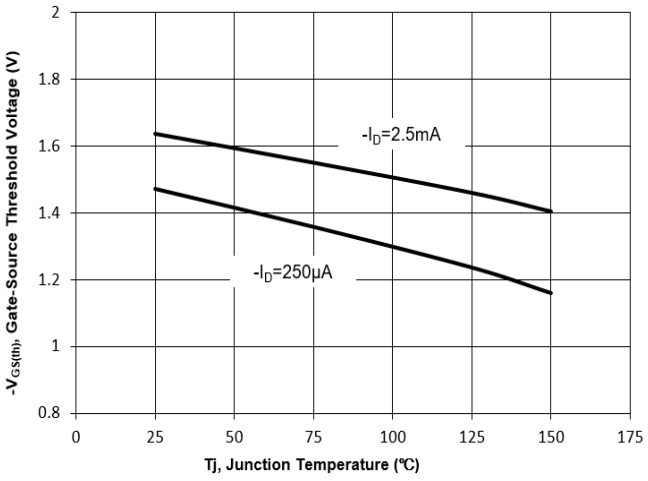


Fig. 9 Typical Junction Capacitance

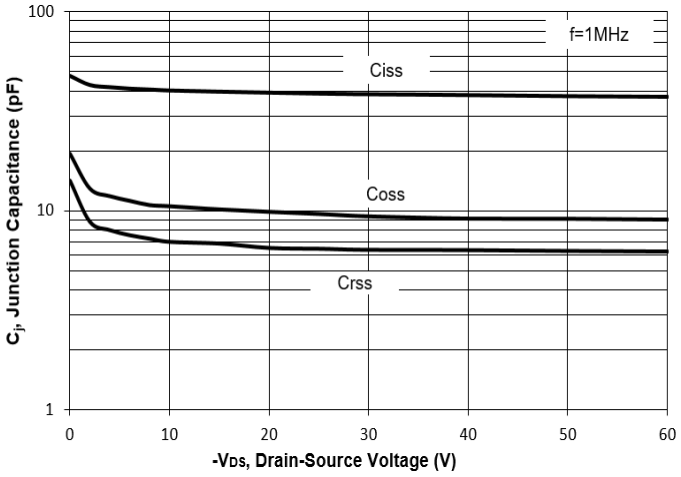


Fig. 10 Gate Charge

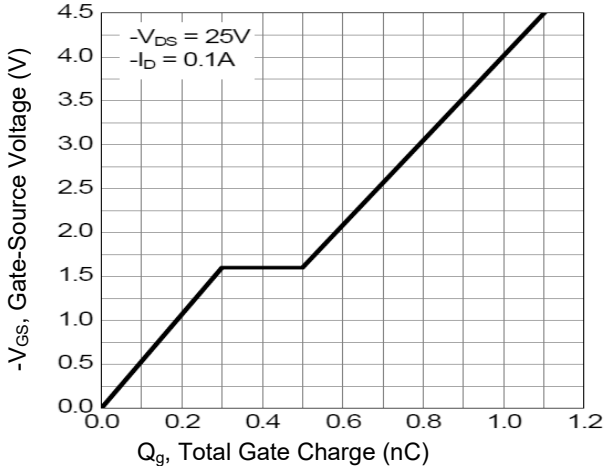
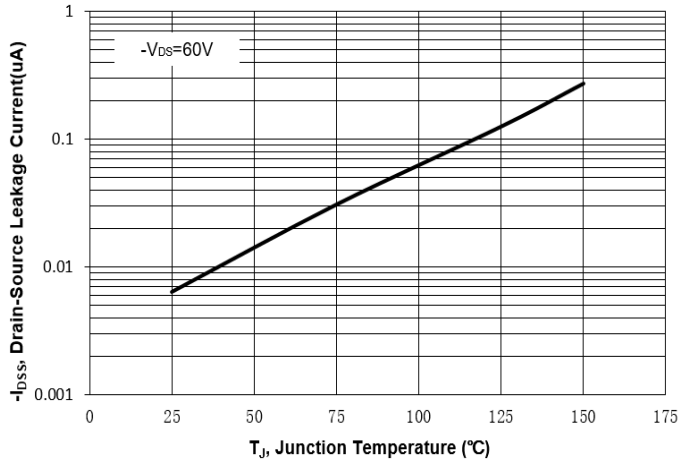


Fig. 11 Drain-Source Leakage Current vs. T_j



Test Circuits

Fig.1-1 Switching times test circuit

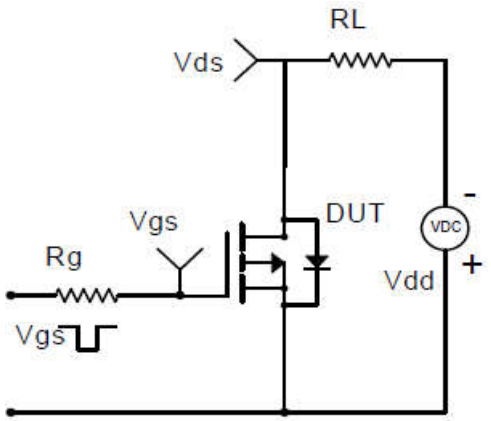


Fig.1-2 Switching Waveform

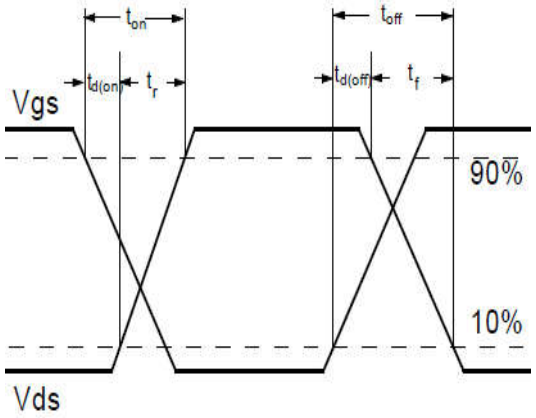


Fig.2-1 Gate charge test circuit

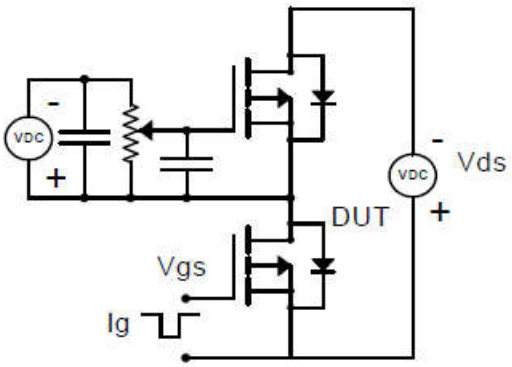
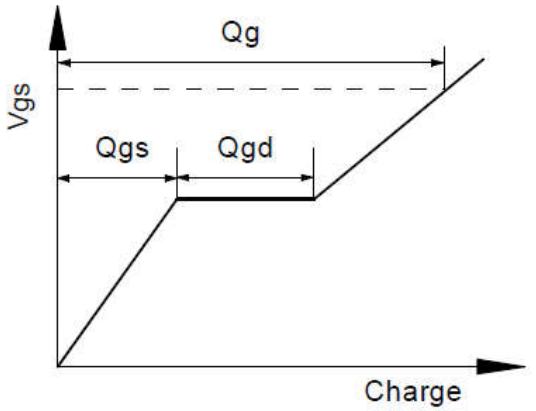
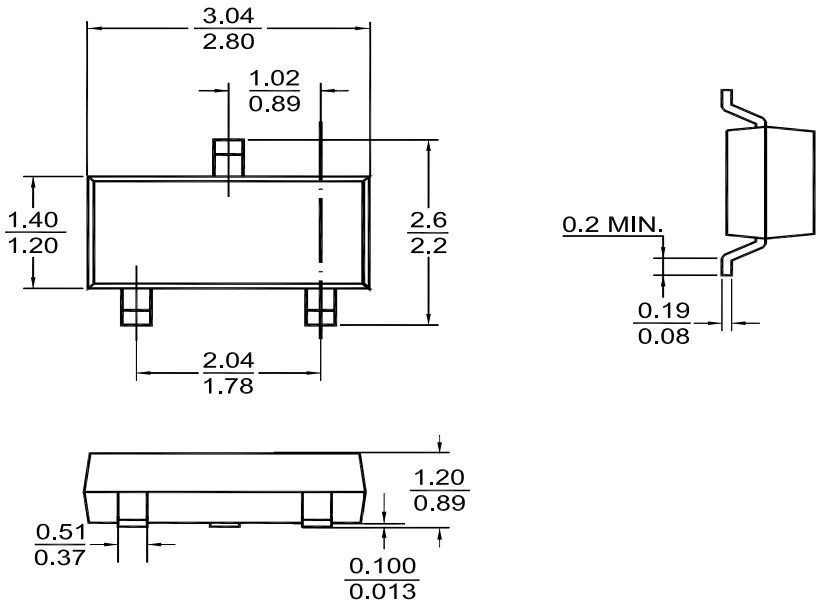


Fig.2-2 Gate charge waveform

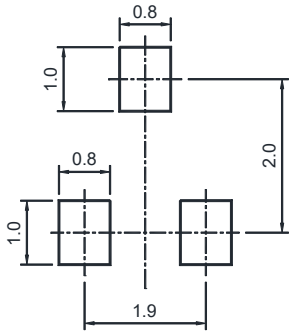


PACKAGE OUTLINE

Plastic surface mounted package (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

" VY " = Part No.
" • " = HAF (Halogen and Antimony Free)
"YM" = Date Code Marking
"Y" = Year
"M" = Month
Font type: Arial