

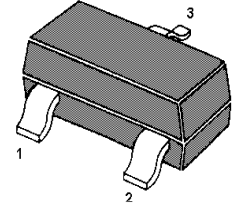
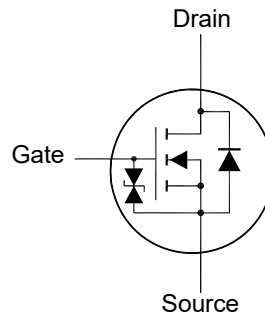
# MMFTN3070K

## N-Channel Enhancement Mode MOSFET

### Features

- Typical ESD Protection HBM Class 1B

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  
SOT-23 Plastic Package

### Applications

- Portable appliances
- Battery management

### Absolute Maximum Ratings (at $T_a = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current	$I_D$	4.2	A
Peak Drain Current, Pulsed <sup>1)</sup>	$I_{DM}$	30	A
Power Dissipation	$P_D$	0.6 <sup>2)</sup> 1.3 <sup>3)</sup>	W
Operating Junction and Storage Temperature Range	$T_j, T_{stg}$	- 55 to + 150	$^\circ\text{C}$

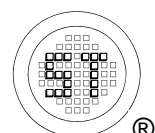
### Thermal Resistance Ratings

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	208 <sup>2)</sup> 90 <sup>3)</sup>	$^\circ\text{C}/\text{W}$

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

<sup>2)</sup> Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad.

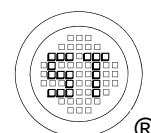
<sup>3)</sup> Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate,  $t \leq 10 \text{ s}$ .



# MMFTN3070K

## Characteristics at $T_a = 25^\circ\text{C}$ unless otherwise specified

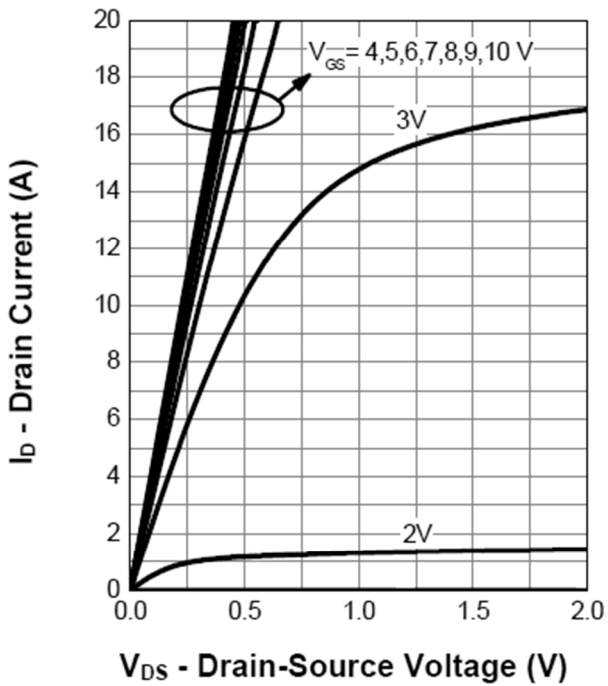
Parameter	Symbol	Min.	Typ.	Max.	Unit
<b>STATIC PARAMETERS</b>					
DrainSource Breakdown Voltage at $I_D = 250 \mu\text{A}$	$BV_{DSS}$	30	-	-	V
DrainSource Leakage Current at $V_{DS} = 24 \text{ V}$	$I_{DSS}$	-	-	1	$\mu\text{A}$
Gate Leakage Current at $V_{GS} = \pm 20 \text{ V}$	$I_{GSS}$	-	-	$\pm 10$	$\mu\text{A}$
GateSource Threshold Voltage at $V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	$V_{GS(th)}$	0.8	-	2.0	V
DrainSource OnState Resistance at $V_{GS} = 10 \text{ V}, I_D = 4.2 \text{ A}$ at $V_{GS} = 4.5 \text{ V}, I_D = 2 \text{ A}$	$R_{DS(on)}$	- -	- -	40 50	$\text{m}\Omega$
<b>DYNAMIC PARAMETERS</b>					
Forward Transconductance at $V_{DS} = 5 \text{ V}, I_D = 4.2 \text{ A}$	$g_{FS}$	-	8	-	S
Input Capacitance at $V_{DS} = 20 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$	$C_{iss}$	-	701	-	$\text{pF}$
Output Capacitance at $V_{DS} = 20 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$	$C_{oss}$	-	53	-	$\text{pF}$
Reverse Transfer Capacitance at $V_{DS} = 20 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$	$C_{rss}$	-	47	-	$\text{pF}$
Total Gate Charge at $V_{DS} = 15 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 4 \text{ A}$	$Q_g$	-	14	-	$\text{nC}$
GateSource Charge at $V_{DS} = 15 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 4 \text{ A}$	$Q_{gs}$	-	3	-	$\text{nC}$
GateDrain Charge at $V_{DS} = 15 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 4 \text{ A}$	$Q_{gd}$	-	2	-	$\text{nC}$
TurnOn Delay Time at $V_{DS} = 15 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 4 \text{ A}, R_g = 4.5 \Omega$	$t_{d(on)}$	-	4	-	$\text{nS}$
TurnOn Rise Time at $V_{DS} = 15 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 4 \text{ A}, R_g = 4.5 \Omega$	$t_r$	-	15	-	$\text{nS}$
TurnOff Delay Time at $V_{DS} = 15 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 4 \text{ A}, R_g = 4.5 \Omega$	$t_{d(off)}$	-	24	-	$\text{nS}$
TurnOff Fall Time at $V_{DS} = 15 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 4 \text{ A}, R_g = 4.5 \Omega$	$t_f$	-	16	-	$\text{nS}$
<b>Body-Diode PARAMETERS</b>					
Body Diode Voltage at $I_S = 1 \text{ A}$	$V_{SD}$	-	-	1	V
Body-Diode Continuous Current	$I_S$	-	-	4.2	A
Body Diode Reverse Recovery Time at $I_S = 4 \text{ A}, di/dt = 100 \text{ A} / \mu\text{s}$	$t_{rr}$	-	7	-	$\text{nS}$
Body Diode Reverse Recovery Charge at $I_S = 4 \text{ A}, di/dt = 100 \text{ A} / \mu\text{s}$	$Q_{rr}$	-	3.5	-	$\text{nC}$



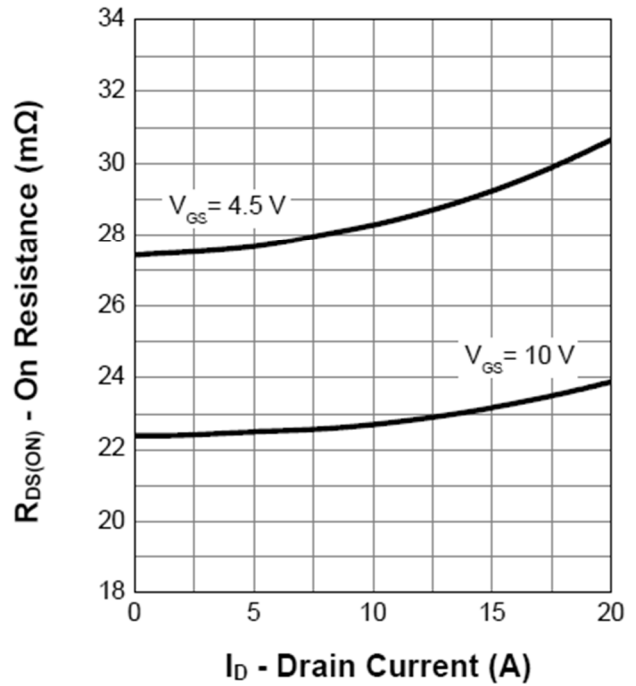
# MMFTN3070K

## Electrical characteristic curves

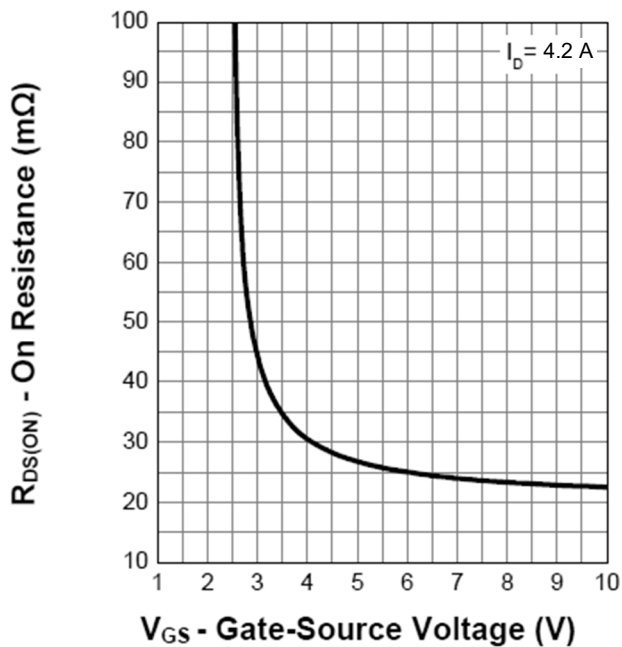
Output Characteristics



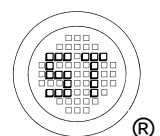
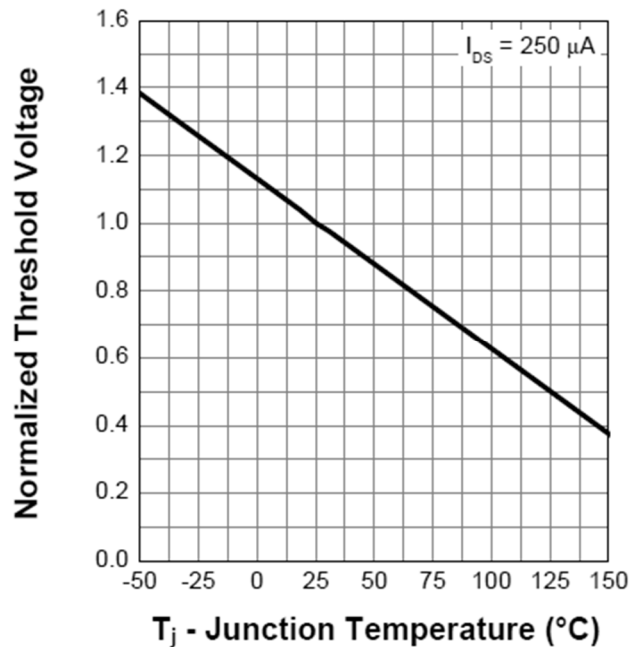
On Resistance



Transfer Characteristics

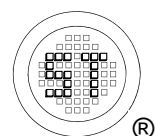
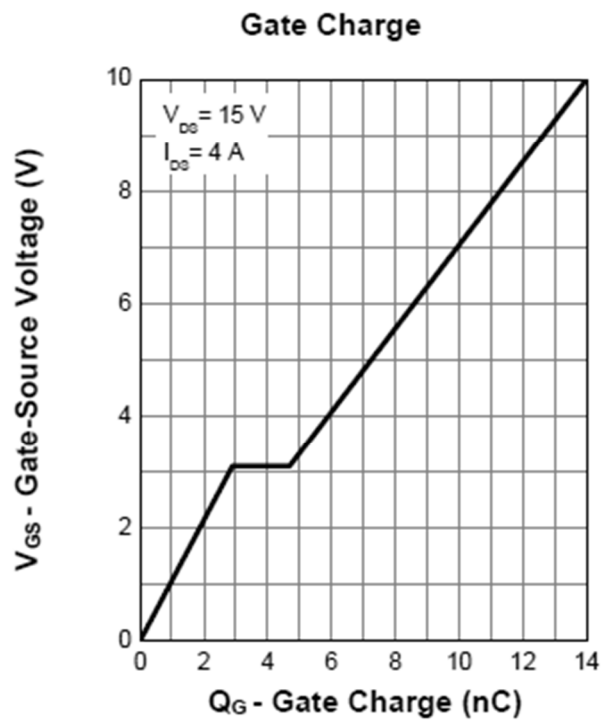
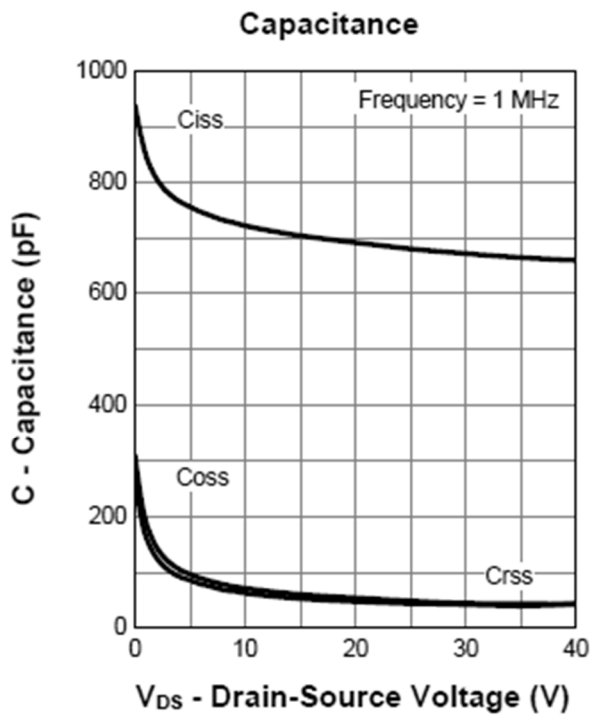
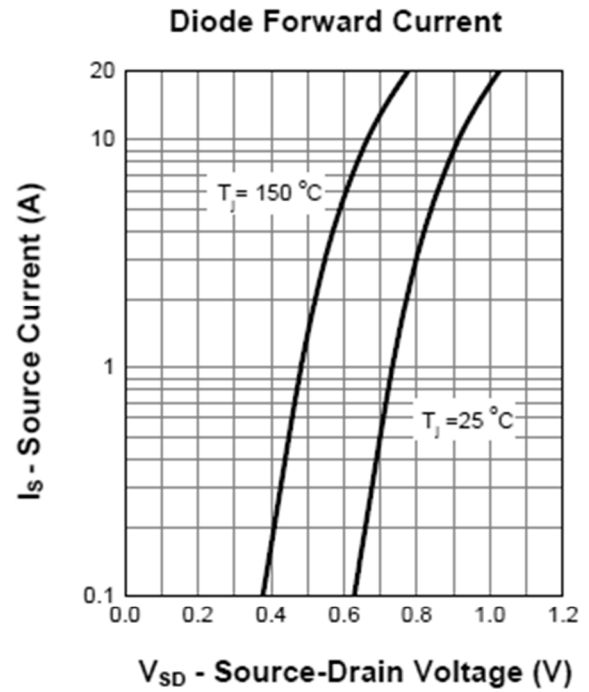
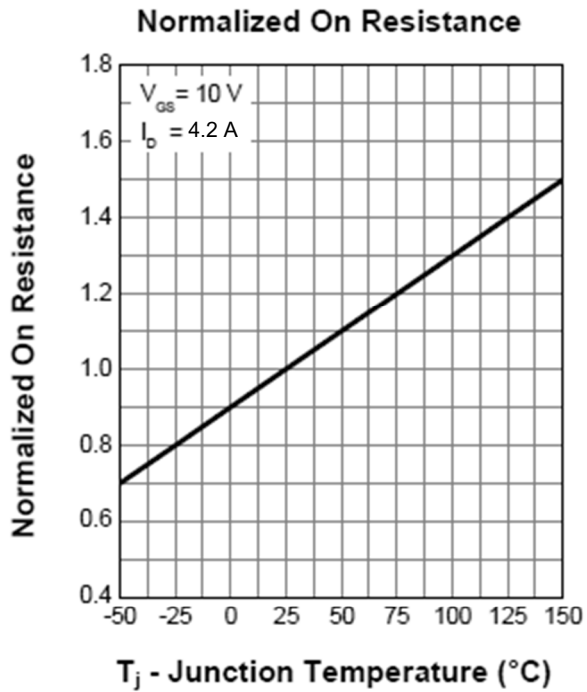


Normalized Threshold Voltage



# MMFTN3070K

## Electrical characteristic curves



## Test Circuits

Fig.1-1 Switching times test circuit

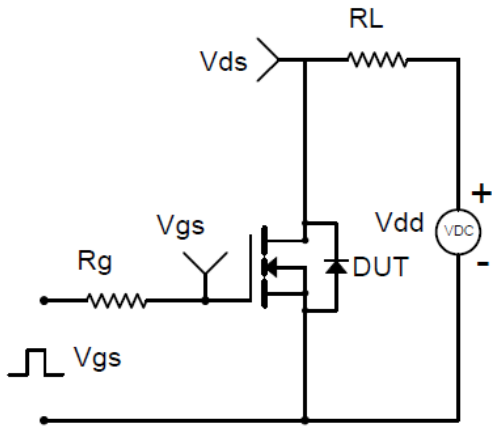


Fig.1-2 Switching Waveform

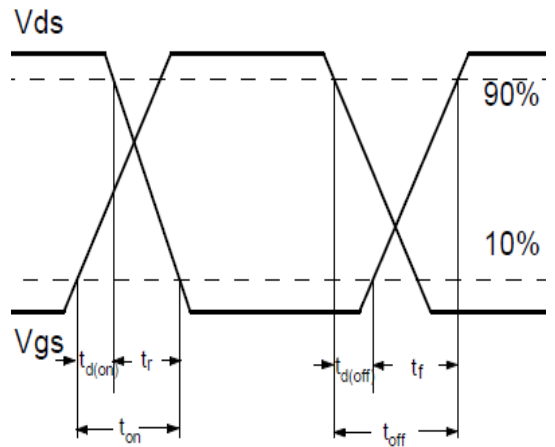


Fig.2-1 Gate charge test circuit

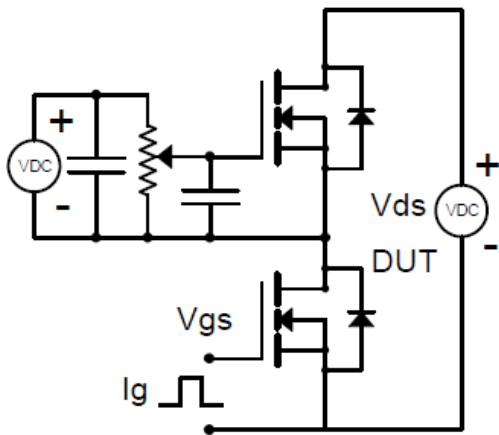
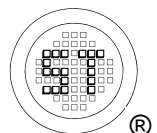
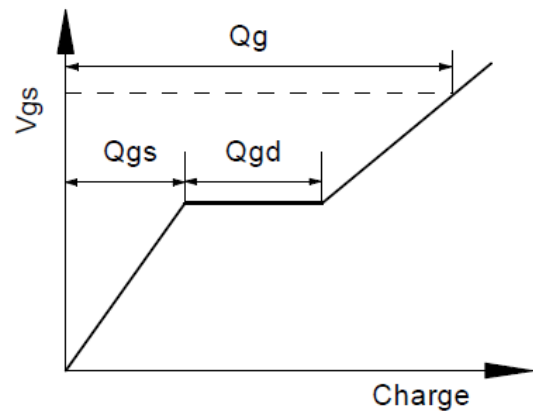


Fig.2-2 Gate charge waveform

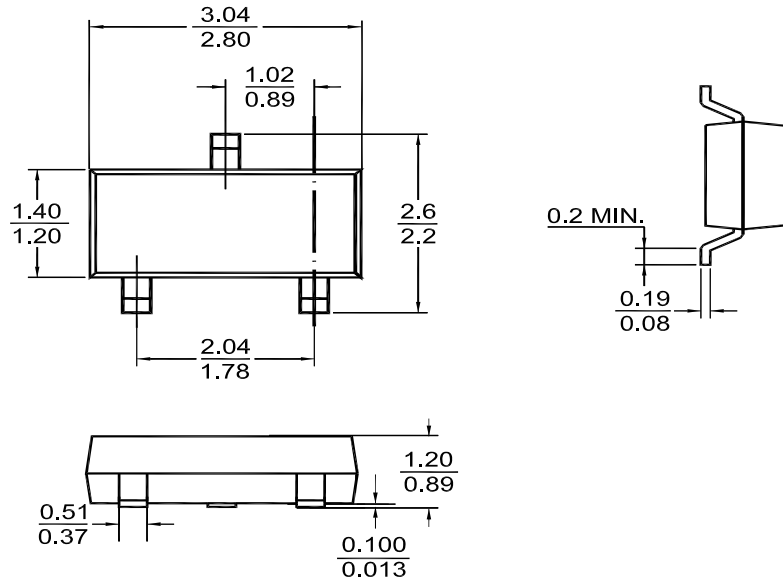


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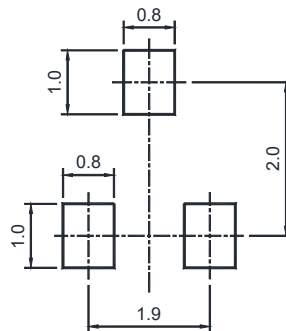
## PACKAGE OUTLINE

Plastic surface mounted package (Dimensions in mm)

SOT-23



## 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

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

