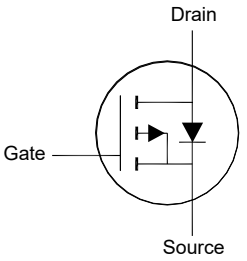
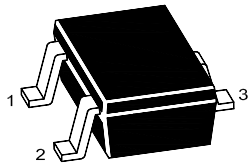
MKB03P139U-AH

P-Channel Enhancement Mode MOSFET





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

Features

- AEC-Q101 Qualified
- Extremely low threshold voltage
- Halogen and Antimony Free(HAF), RoHS compliant

Applications

- High speed switch
- Battery management
- Portable appliances

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$-V_{DS}$	30	V
Gate-Source Voltage	V_{GS}	± 12	V
Drain Current	$-I_D$	1.5	A
Peak Drain Current, Pulsed [1]	$-I_{DM}$	16	A
Power Dissipation	P_D	350 [2] 500 [3]	mW
Operating Junction and Storage Temperature Range	T_j, T_{stg}	- 55 to + 150	℃

Thermal Resistance Ratings

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	357 [2] 250 [3]	℃/W

[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, 2oz copper, with minimum recommended pad.

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

Dated: 09/03/2021 SMF8 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	$-V_{(BR)DSS}$	30	-	-	V
Drain-Source Leakage Current at $-V_{DS}$ = 24 V	$-I_{DSS}$	-	-	1	µA
Gate-Source Leakage at V_{GS} = ± 12 V	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage at V_{DS} = V_{GS}, $-I_D$ = 250 µA	$-V_{GS(th)}$	0.3	-	1.2	V
Drain-Source On-State Resistance at $-V_{GS}$ = 10 V, $-I_D$ = 1.5 A at $-V_{GS}$ = 4.5 V, $-I_D$ = 1 A	$R_{DS(on)}$	- -	- -	109 139	mΩ
DYNAMIC PARAMETERS					
Forward Transconductance at $-V_{DS}$ = 5 V, $-I_D$ = 1.5 A	g_{FS}	-	4	-	S
Gate Resistance at V_{GS} = 0 V, V_{DS} = 0 V, f = 1MHz	R_g	-	4.6	-	Ω
Input Capacitance at $-V_{DS}$ = 15 V, V_{GS} = 0 V, f = 1 MHz	C_{iss}	-	410	-	pF
Output Capacitance at $-V_{DS}$ = 15 V, V_{GS} = 0 V, f = 1 MHz	C_{oss}	-	42	-	pF
Reverse Transfer Capacitance at $-V_{DS}$ = 15 V, V_{GS} = 0 V, f = 1 MHz	C_{rss}	-	24	-	pF
Total Gate Charge at $-V_{DS}$ = 15 V, $-V_{GS}$ = 10 V, $-I_D$ = 1.5 A	Q_g	-	11	-	nC
Gate-Source Charge at $-V_{DS}$ = 15 V, $-V_{GS}$ = 10 V, $-I_D$ = 1.5 A	Q_{gs}	-	1	-	nC
Gate-Drain Charge at $-V_{DS}$ = 15 V, $-V_{GS}$ = 10 V, $-I_D$ = 1.5 A	Q_{gd}	-	1	-	nC
Turn-On Delay Time at $-V_{DD}$ = 15 V, $-V_{GS}$ = 10 V, $-I_D$ = 1.5 A, R_g = 4.7 Ω	$t_{d(on)}$	-	8	-	ns
Turn-On Rise Time at $-V_{DD}$ = 15 V, $-V_{GS}$ = 10 V, $-I_D$ = 1.5 A, R_g = 4.7 Ω	t_r	-	11	-	ns
Turn-Off Delay Time at $-V_{DD}$ = 15 V, $-V_{GS}$ = 10 V, $-I_D$ = 1.5 A, R_g = 4.7 Ω	$t_{d(off)}$	-	13	-	ns
Turn-Off Fall Time at $-V_{DD}$ = 15 V, $-V_{GS}$ = 10 V, $-I_D$ = 1.5 A, R_g = 4.7 Ω	t_f	-	3	-	ns
Body-Diode PARAMETERS					
Body Diode Voltage at $-I_S$ = 1 A	$-V_{SD}$	-	-	1.2	V
Body-Diode Continuous Current	$-I_S$	-	-	1.5	A
Body Diode Reverse Recovery Time at $-I_S$ = 1.5 A, di/dt = 100 A / µs	t_{rr}	-	8	-	nS
Body Diode Reverse Recovery Charge at $-I_S$ = 1.5 A, di/dt = 100 A / µs	Q_{rr}	-	3.6	-	nC

Electrical Characteristics Curves

Fig. 1 Typical Output Characteristic

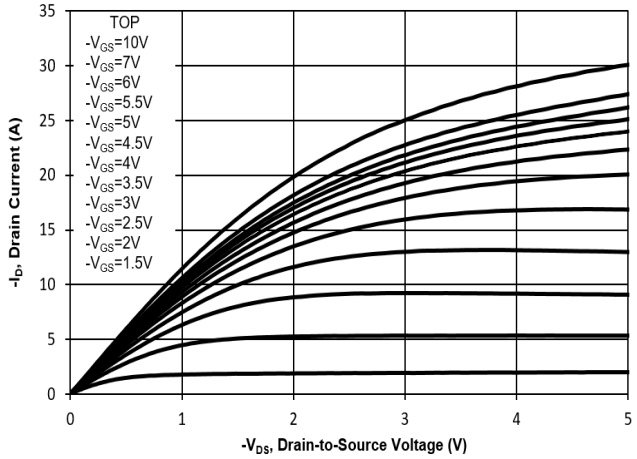


Fig. 2 Typical Transfer Characteristic

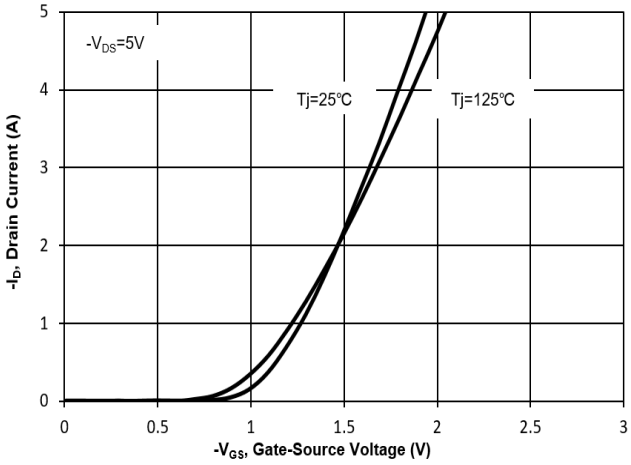


Fig. 3 on-Resistance vs. Drain Current

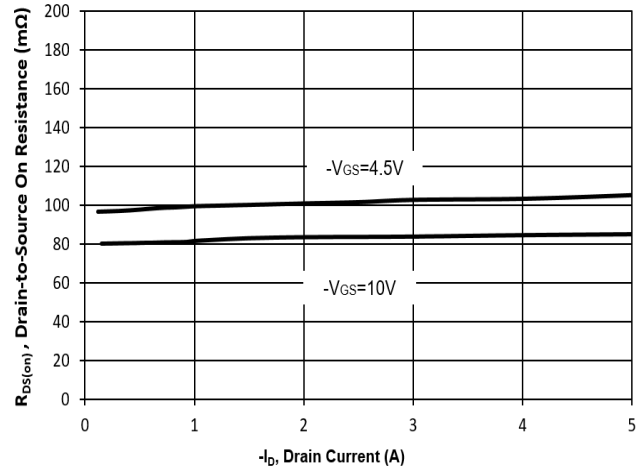


Fig. 4 on-Resistance vs. Gate Voltage

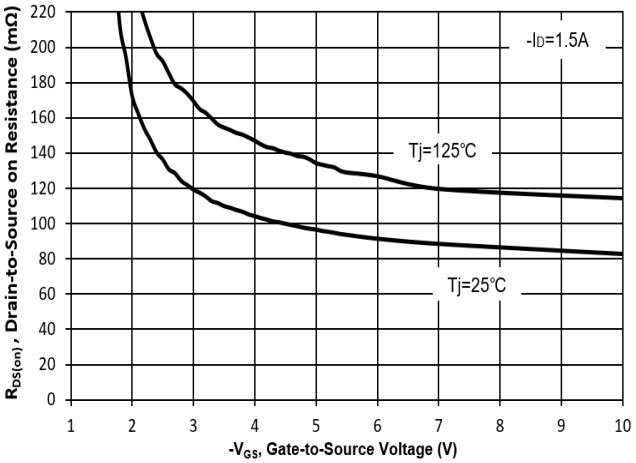


Fig. 5 on-Resistance vs.T_j

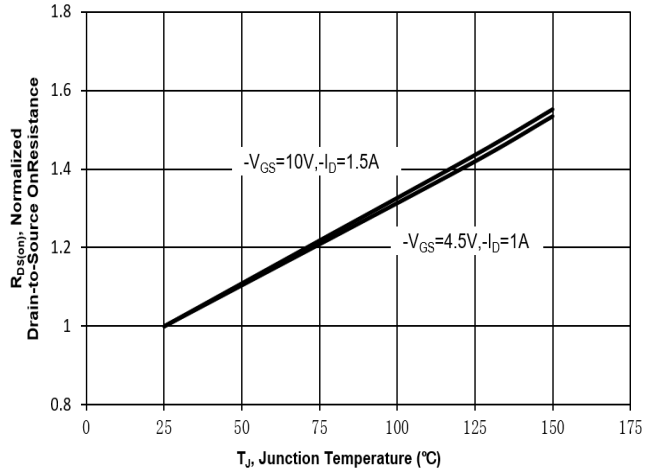
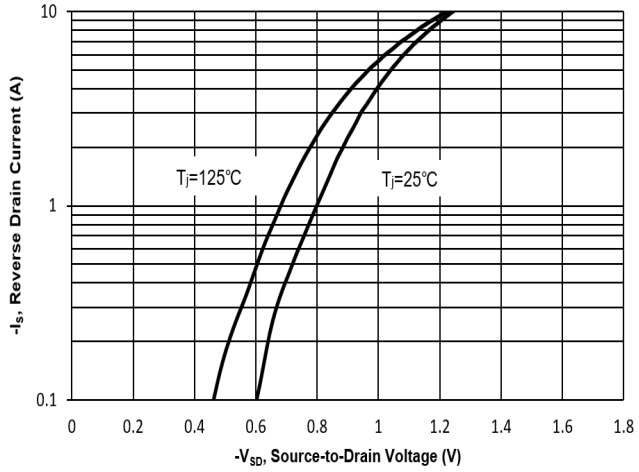


Fig. 6 Typical Body-Diode Forward Characteristic



Electrical Characteristics Curves

Fig. 7 Typical Junction Capacitance

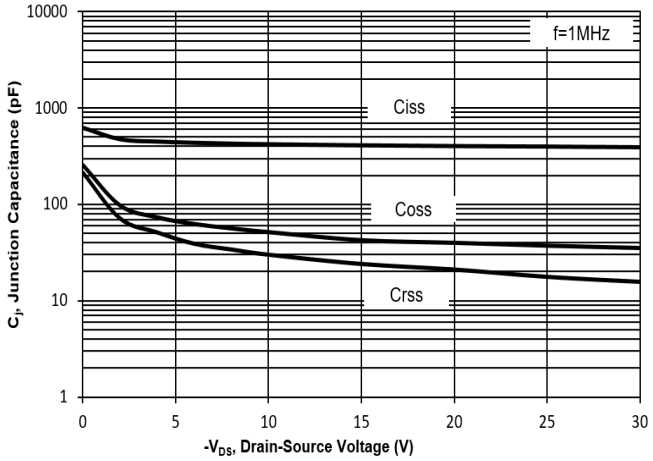


Fig. 8 Drain-Source Leakage Current vs. T_j

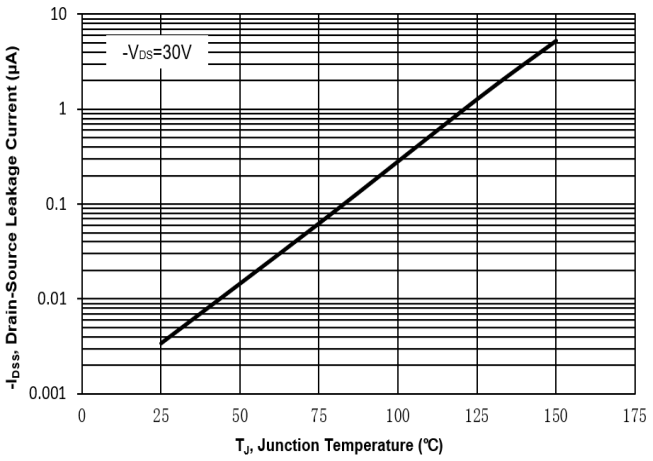


Fig. 9 $V_{(BR)DSS}$ vs. Junction Temperature

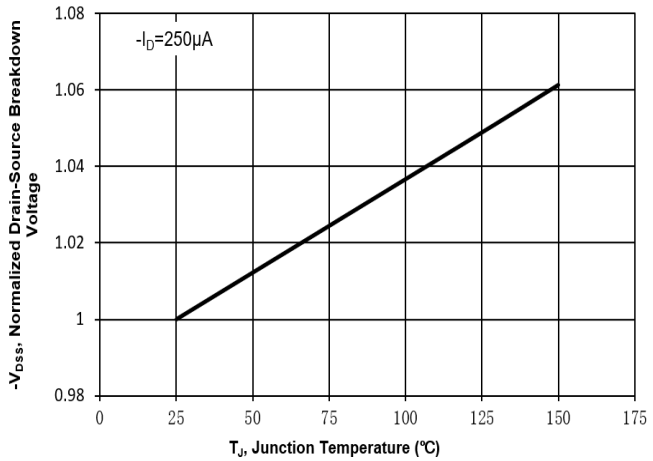


Fig. 10 Gate Threshold Variation vs. T_j

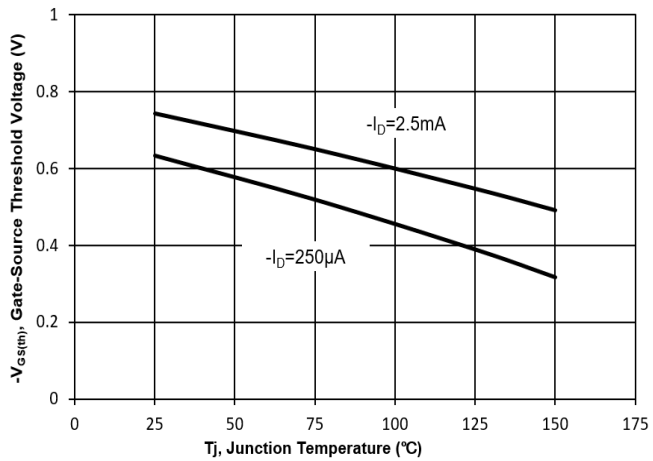
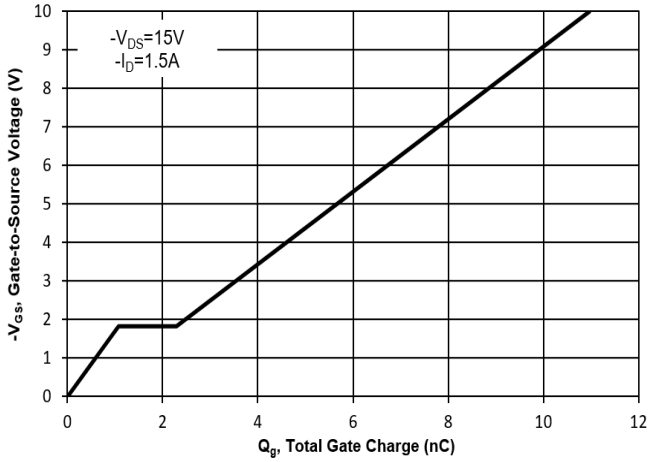


Fig. 11 Gate Charge



Test Circuits

Fig.1-1 Switching times test circuit

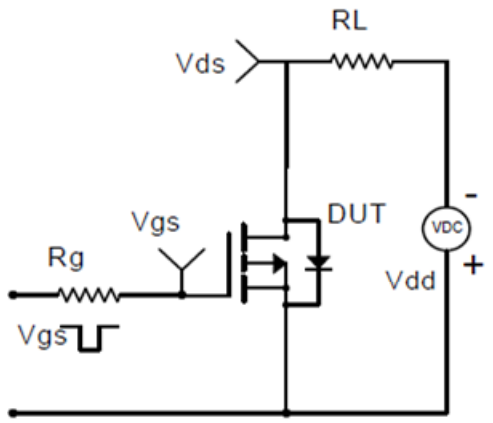


Fig.1-2 Switching Waveform

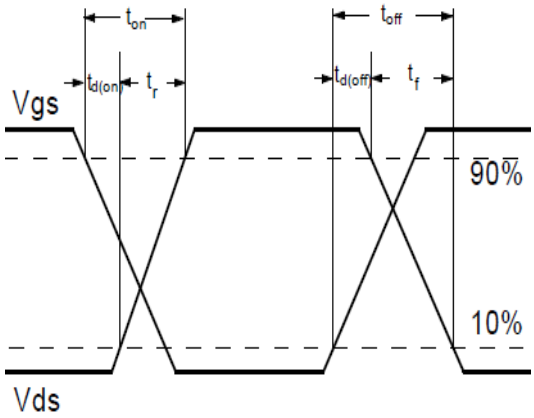


Fig.2-1 Gate charge test circuit

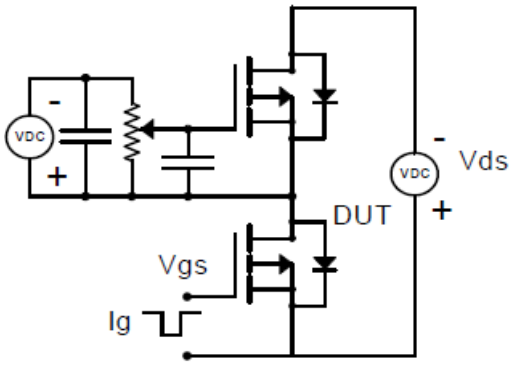
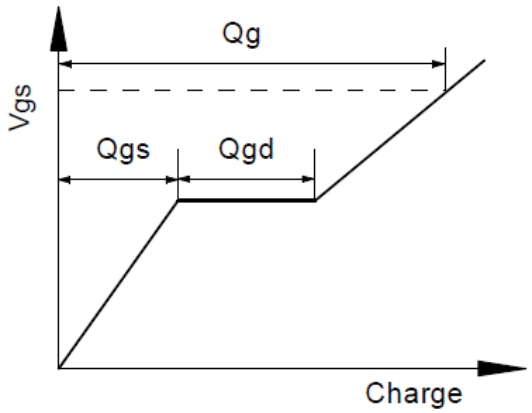
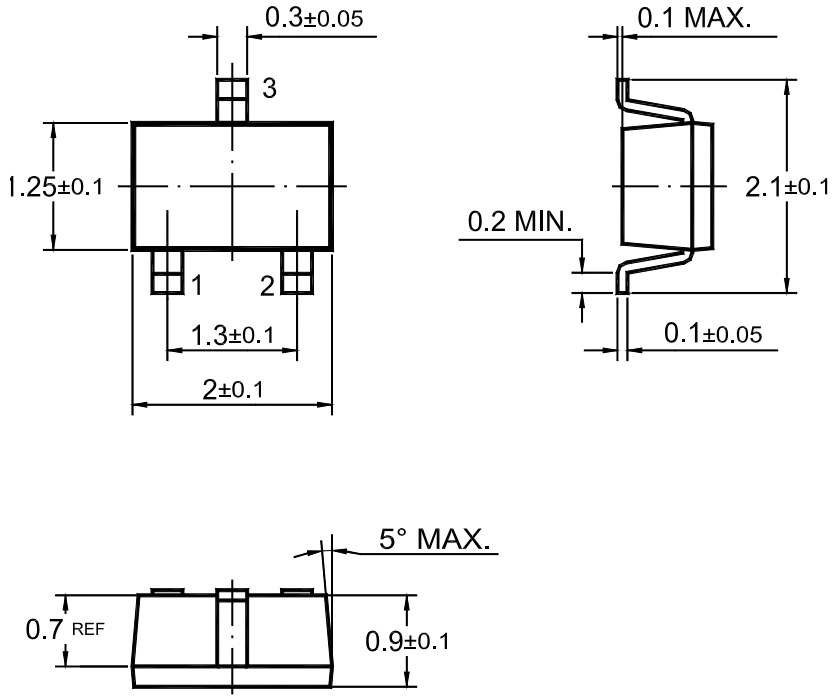


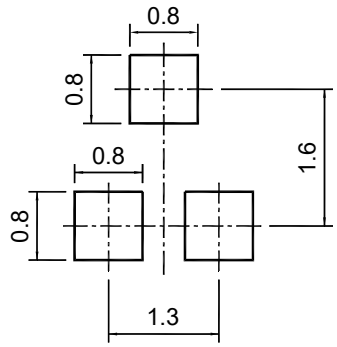
Fig.2-2 Gate charge waveform



PACKAGE OUTLINE(Dimensions in mm) SOT-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

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