MTM78E2B

Dual N-channel MOS FET

For lithium-ion secondary battery protection circuit

■ Overview

MTM78E2B is the MOS FET which is suitable for lithium ion secondary battery protection circuit and features low on-resistance by the leading-edge fine process and package techonology. Package is WSMini8-F1 which is suitable for battery packs for mobile application.

■ Features

- Small surface mount package: WSMini8-F1-B (2.1 mm × 2.0 mm × 0.7 mm)
- Low on-resistance: R_{on} = 21.5 mΩ (typ.) (I_D = 2 A, V_{GS} = 4 V)
- Drain common 2 elements
- 2.5V drive
- Halogen free package

■ Absolute Maximum Ratings T_a = 25°C

Parameter	Symbol	Rating	Unit
Drain-source surrender voltage	V_{DSS}	20	V
Gate-source surrender voltage	V_{GSS}	±12	V
Drain current	I_D	4.0	A
Peak drain current *1	I_{DP}	40	A
Power dissipation	P_D1 *2	700	mW
	P_D2 *3	150	
Channel temperature	T_{ch}	150	°C
Storage temperature	T_{stg}	–55 to +150	°C

Note) *1: t = 10 s, Duty cycle < 1%

*2: Ceramic substrate (70 mm × 70 mm × 1.0 mm), dual operating.

*3: Stand-alone (without the board)

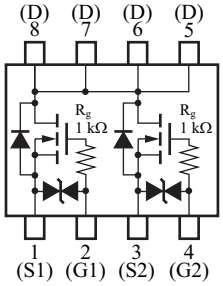
■ Package

- Code
  WSMini8-F1-B
- Pin Name

1: Source 1	5: Drain
2: Gate 1	6: Drain
3: Source 2	7: Drain
4: Gate 2	8: Drain

■ Marking Symbol: 5A

■ Internal Connection



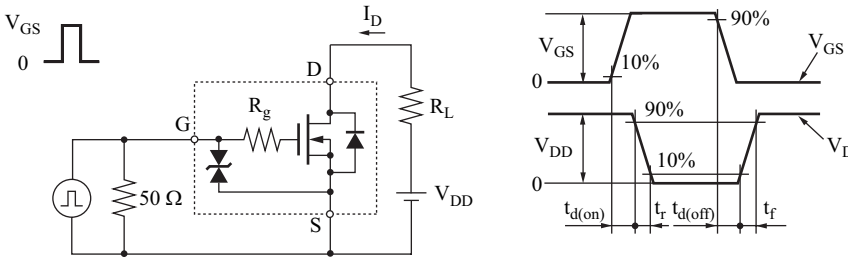
■ Electrical Characteristics T_a = 25°C±3°C

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-source surrender voltage	V_{DSS}	I_D = 1.0 mA, V_{GS} = 0	20			V
Drain-source cutoff current	I_{DSS}	V_{DS} = 20 V, V_{GS} = 0			1.0	μA
Gate-source cutoff current	I_{GSS}	V_{GS} = ±12 V, V_{DS} = 0			±10	μA
Gate threshold voltage	V_{TH}	I_D = 1.0 mA, V_{DS} = 10 V	0.40	0.85	1.3	V
Drain-source ON resistance 1	$R_{DS(on)}1$	I_D = 2.0 A, V_{GS} = 4.0 V		21.5	25.0	mΩ
Drain-source ON resistance 2	$R_{DS(on)}2$	I_D = 1.5 A, V_{GS} = 3.0 V		26.0	30.0	mΩ
Drain-source ON resistance 3	$R_{DS(on)}3$	I_D = 1.0 A, V_{GS} = 2.5 V		30.0	36.0	mΩ
Forward transfer conductance	$\|Y_{fs}\|$	I_D = 1.0 A, V_{DS} = 10 V	1.0			S
Short-circuit input capacitance (Common source)	C_{iss}	V_{DS} = 10 V, V_{GS} = 0, f = 1 MHz		1 100		pF
Short-circuit output capacitance (Common source)	C_{oss}			75		pF
Reverse transfer capacitance (Common source)	C_{rss}			70		pF
Turn-on delay time *	$t_{d(on)}$	V_{DD} = 10 V, V_{GS} = 4.0 V, I_D = 1.0 A, R_L = 10 Ω		0.20		μs
Rise time *	t_r			0.50		μs
Turn-off delay time *	$t_{d(off)}$			2.0		μs
Fall time *	t_f			1.5		μs

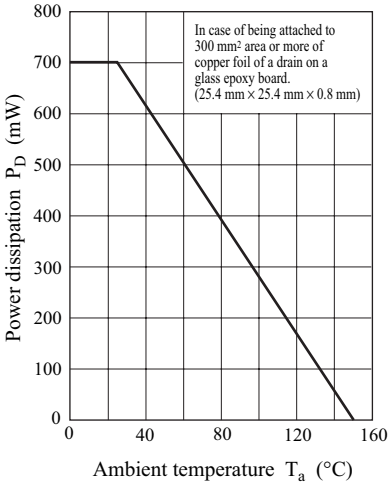
Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

2. *1: t = 10 μs, Duty cycle < 1%

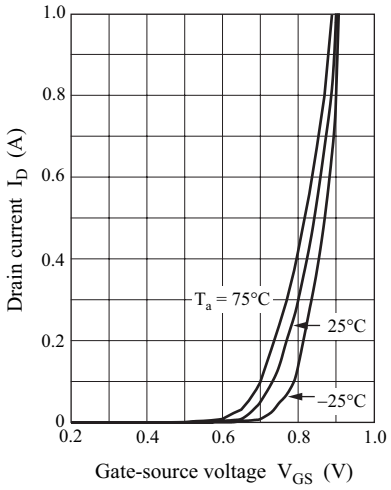
*2: Measurement circuit



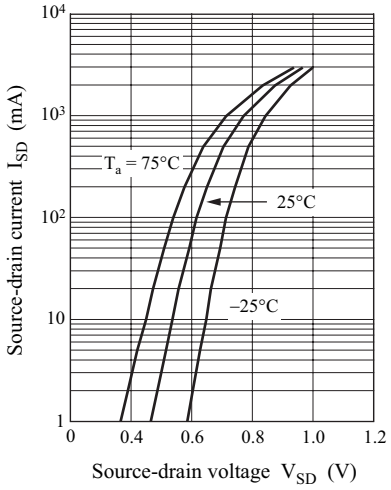
P_D — T_a



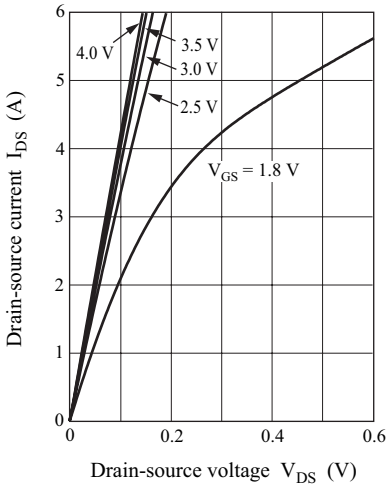
I_D — V_{GS}



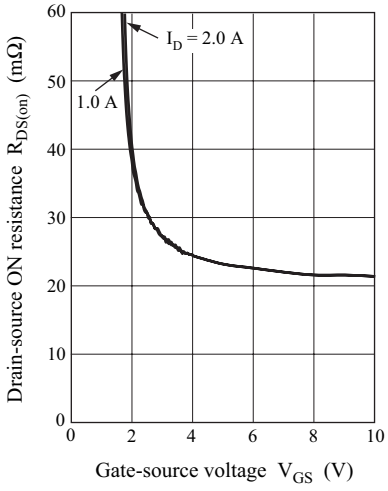
I_{SD} — V_{SD}



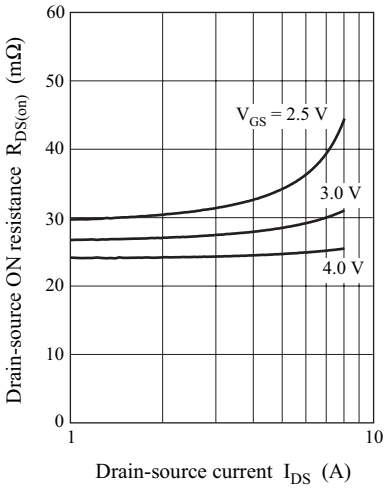
I_{DS} — V_{DS}



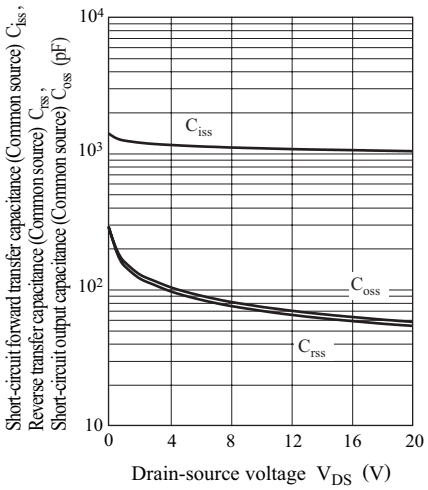
$R_{DS(on)}$ — V_{GS}



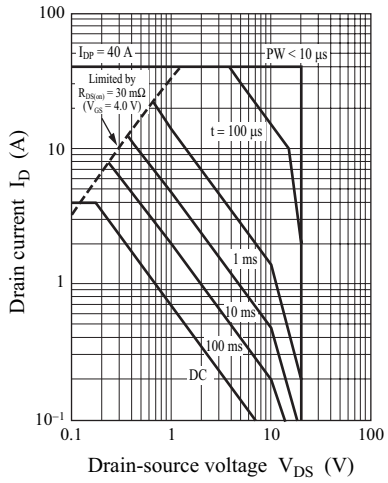
$R_{DS(on)}$ — I_{DS}



C_{iss} , C_{rss} , C_{oss} — V_D



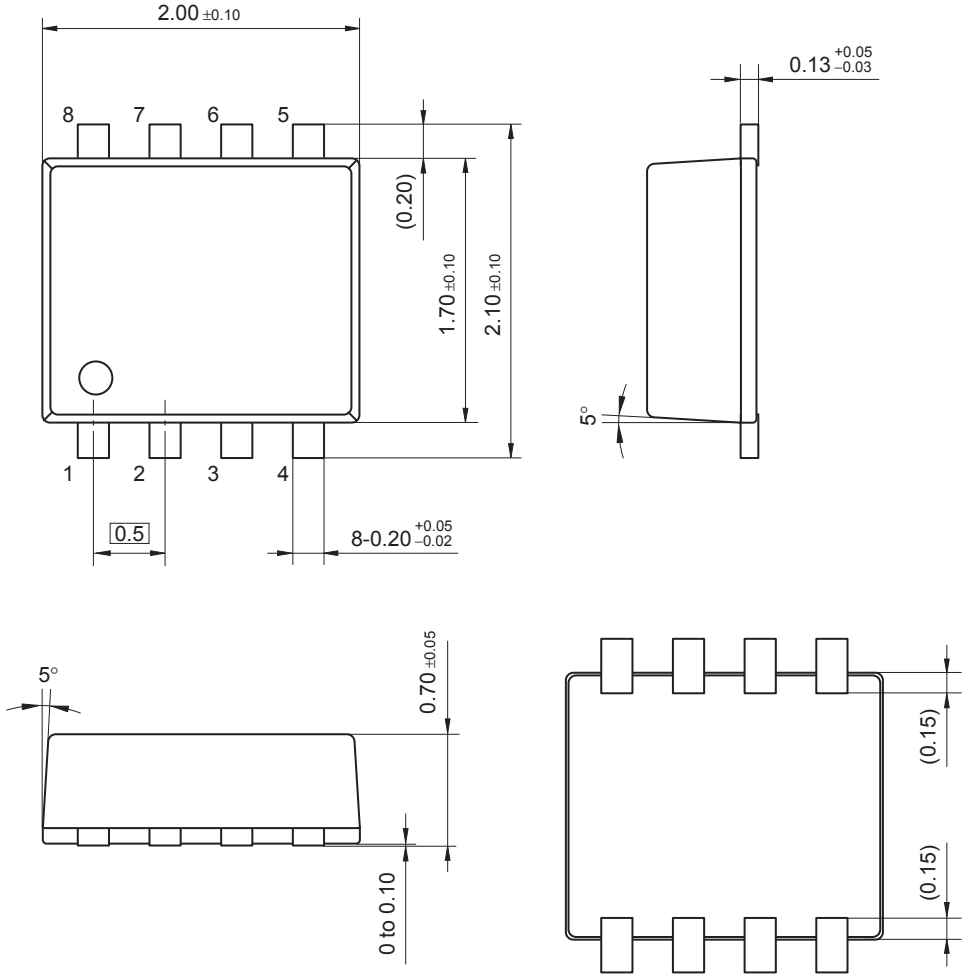
Safe operation area



T_a = 25°C
In case of being attached to 300 mm² area or more of copper foil of a drain on a glass epoxy board. (25.4 mm × 25.4 mm × 0.8 mm)

WSMini8-F1-B

Unit: mm



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