MTM86627A

Silicon P-channel MOS FET (FET)
Silicon epitaxial planar type (SBD)

For DC-DC converter circuits
For switching circuits

■ Overview

MTM86627A is the composite MOS FET (P-channel MOS FET and schttoky barrier diode) that is highly suitable for DC-DC converter and other switching circuits.

■ Features

- Built-in schottky barrier diode: V_R = 20 V, $I_{F(AV)}$ = 800 mA
- Low drain-source ON resistance:
  $R_{DS(on)}$ = 80 mΩ (typ.) (I_D = –1.0 A, V_{GS} = –4.0 V)
- Low short-circuit input capacitance (common source): C_{iss} = 300 pF
- Small surface mounting halogen-free package:
  WSSMini6-F1 (1.6 mm × 1.6 mm × 0.5 mm)

■ Absolute Maximum Ratings T_a = 25°C

Parameter		Symbol	Rating	Unit
FET	Drain-source surrender voltage	V_{DSS}	–20	V
	Gate-source surrender voltage	V_{GSS}	±10	V
	Drain current	I_D	–2.0	A
	Peak drain current	I_{DP}	–8.0	A
	Channel temperature	T_{ch}	150	°C
	Storage temperature	T_{stg}	–55 to +150	°C
SBD	Reverse voltage	V_R	20	V
	Forward current (Average)	$I_{F(AV)}$	800	mA
	Non-repetitive peak forward surge current *1	I_{FSM}	3	A
	Junction temperature	T_j	125	°C
	Storage temperature	T_{stg}	–55 to +125	°C
Overall	Total power dissipation *2	P_D	540	mW

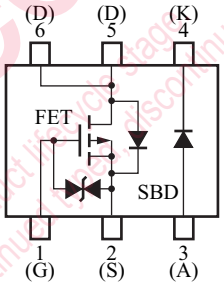
Note) *1: 50 Hz sine wave 1 cycle (Non-repetitive peak current)
*2: Measuring on ceramic substrate at 40 mm × 38 mm × 0.2 mm
Absolute maximum rating without heat sink for P_D is 150 mW

■ Package

- Code
  WSSMini6-F1
- Pin Name
  1: Gate 4: Cathode
  2: Source 5: Drain
  3: Anode 6: Drain

■ Marking Symbol: QK

■ Internal Connection



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

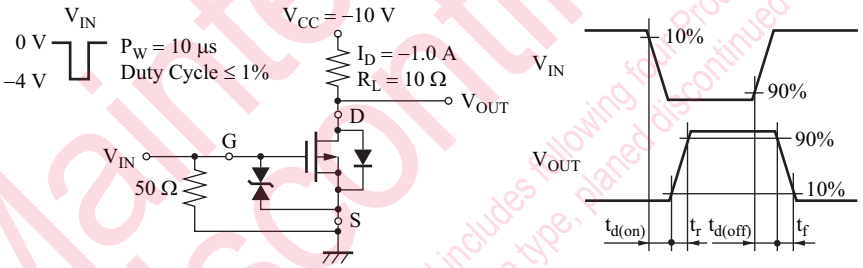
• FET

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} = ±8 V, V_{DS} = 0			±10	µA
Gate threshold voltage	V_{TH}	I_D = –1.0 mA, V_{DS} = –10 V	– 0.4	– 0.75	–1.1	V
Drain-source ON resistance 1 *1	$R_{DS(on)}1$	I_D = –1.0 A, V_{GS} = –4.0 V		80	120	mΩ
Drain-source ON resistance 2 *1	$R_{DS(on)}2$	I_D = –1.0 A, V_{GS} = –2.5 V		100	170	mΩ
Drain-source ON resistance 3 *1	$R_{DS(on)}3$	I_D = – 0.5 A, V_{GS} = –1.8 V		140	230	mΩ
Forward transfer admittance *1	$\|Y_{fs}\|$	I_D = –1.0 A, V_{DS} = –10 V, f = 1 kHz	3.0			S
Short-circuit input capacitance (Common source)	C_{iss}	V_{DS} = –10 V, V_{GS} = 0, f = 1 MHz		300		pF
Short-circuit output capacitance (Common source)	C_{oss}			30		pF
Reverse transfer capacitance (Common source)	C_{rss}			35		pF
Turn-on delay time *2	$t_{d(on)}$	V_{DD} = –10 V, V_{GS} = 0 V to –4 V, I_D = –1.0 A		6		ns
Rise time *2	t_r			8		ns
Turn-off delay time *2	$t_{d(off)}$	V_{DD} = –10 V, V_{GS} = –4 V to 0 V, I_D = –1.0 A		57		ns
Fall time *2	t_f			55		ns

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

2. *1: Pulse measurement

*2: Measurement circuit



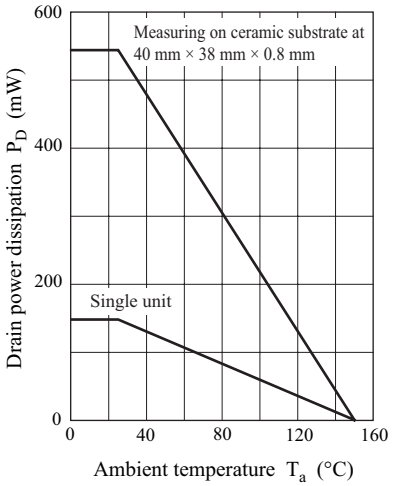
• SBD

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Forward voltage	V_F	I_F = 800 mA			0.47	V
Reverse current	I_R	V_R = 20 V			80	µA

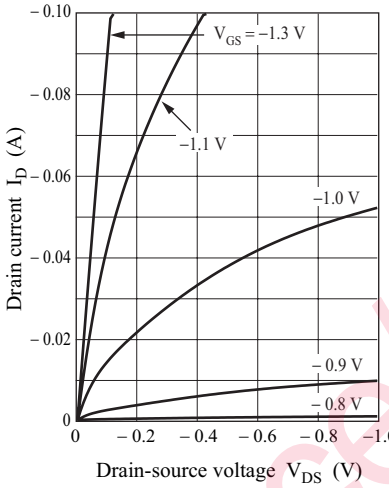
Note: Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7031 measuring methods for diodes.

Characteristics charts of FET

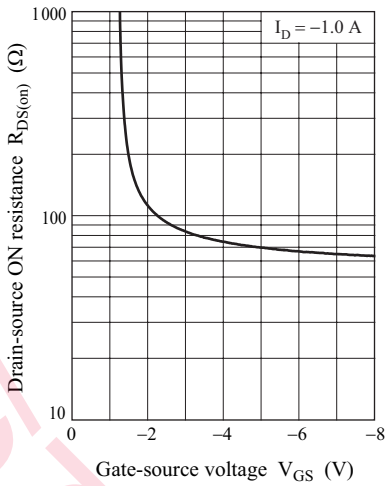
P_D — T_a



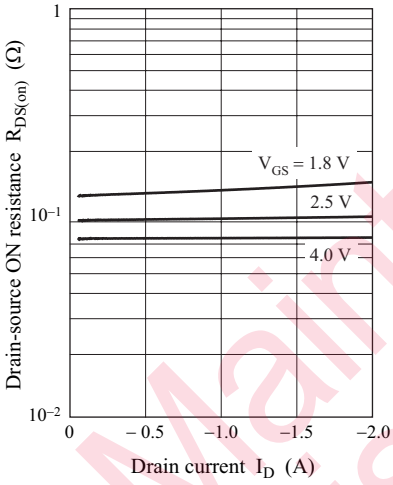
I_D — V_{DS}



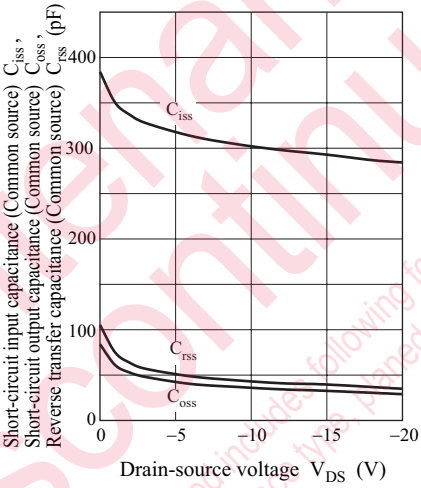
$R_{DS(on)}$ — V_{GS}



$R_{DS(on)}$ — I_D

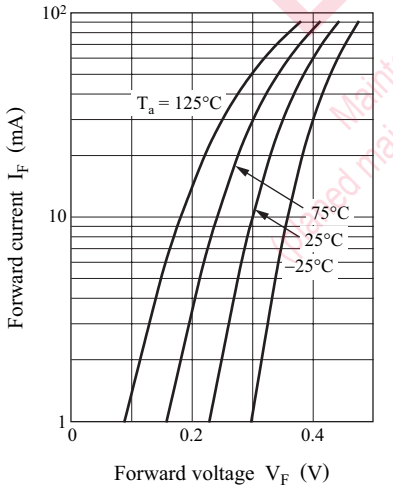


C_{iss} , C_{oss} , C_{rss} — V_{DS}

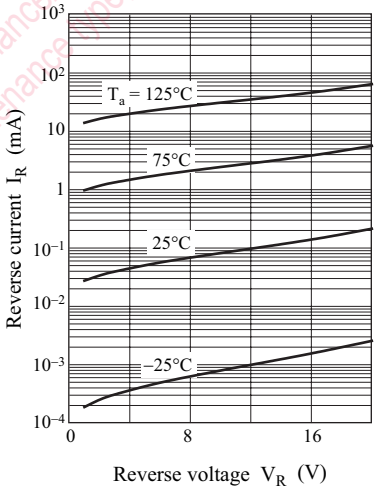


Characteristics charts of SBD

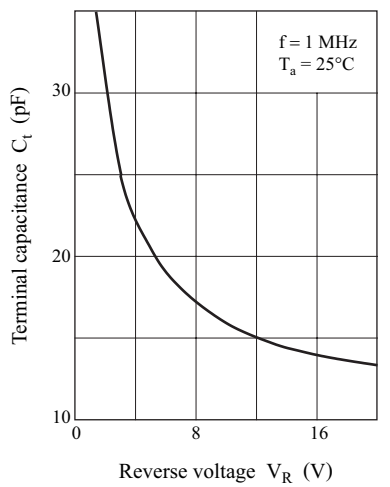
I_F — V_F



I_R — V_R

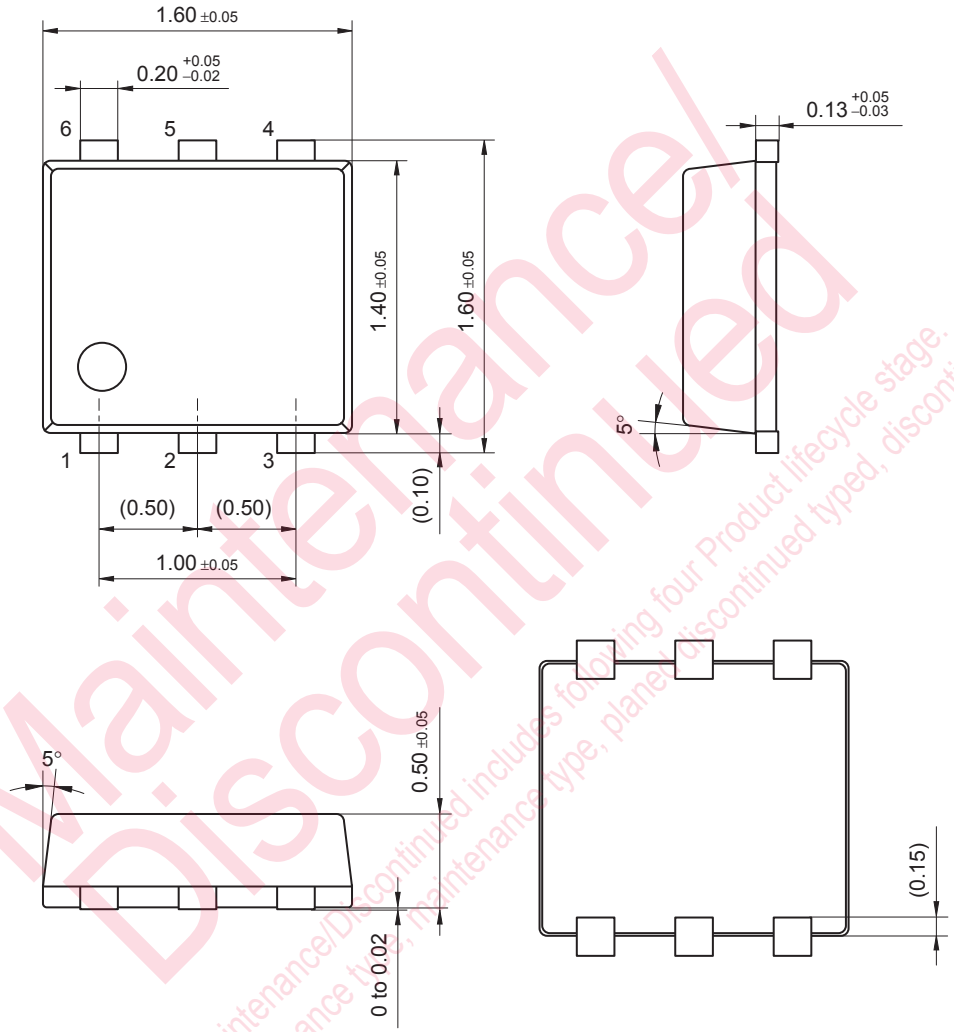


C_t — V_R



WSSMini6-F1

Unit: mm



Request for your special attention and precautions in using the technical information and semiconductors described in this book

(1) If any of the products or technical information described in this book is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially, those with regard to security export control, must be observed.

(2) The technical information described in this book is intended only to show the main characteristics and application circuit examples of the products. No license is granted in and to any intellectual property right or other right owned by Panasonic Corporation or any other company. Therefore, no responsibility is assumed by our company as to the infringement upon any such right owned by any other company which may arise as a result of the use of technical information described in this book.

(3) The products described in this book are intended to be used for standard applications or general electronic equipment (such as office equipment, communications equipment, measuring instruments and household appliances).
Consult our sales staff in advance for information on the following applications:
- Special applications (such as for airplanes, aerospace, automobiles, traffic control equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
- Any applications other than the standard applications intended.

(4) The products and product specifications described in this book are subject to change without notice for modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.

(5) When designing your equipment, comply with the range of absolute maximum rating and the guaranteed operating conditions (operating power supply voltage and operating environment etc.). Especially, please be careful not to exceed the range of absolute maximum rating on the transient state, such as power-on, power-off and mode-switching. Otherwise, we will not be liable for any defect which may arise later in your equipment.
Even when the products are used within the guaranteed values, take into the consideration of incidence of break down and failure mode, possible to occur to semiconductor products. Measures on the systems such as redundant design, arresting the spread of fire or preventing glitch are recommended in order to prevent physical injury, fire, social damages, for example, by using the products.

(6) Comply with the instructions for use in order to prevent breakdown and characteristics change due to external factors (ESD, EOS, thermal stress and mechanical stress) at the time of handling, mounting or at customer's process. When using products for which damp-proof packing is required, satisfy the conditions, such as shelf life and the elapsed time since first opening the packages.

20080805