

Silicon P Channel MOS Type (U-MOS-II) / Silicon Epitaxial Schottky Barrier Diode

TENTATIVE

TPCP8BA1

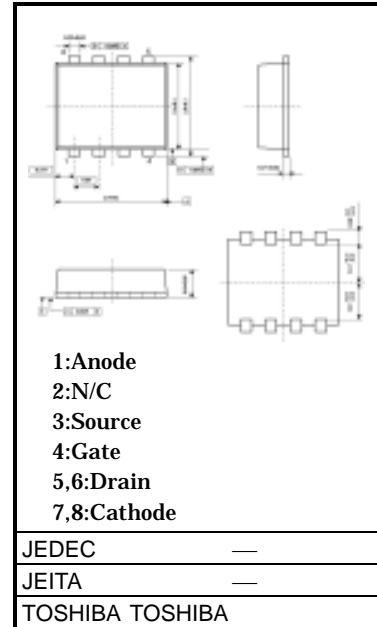
DC-DC Converter

単位: mm

- Combined Pch MOSFET and Schottky Diode into one Package.
- Low RDS (ON) and Low VF

Maximum Ratings (Ta = 25°C) MOSFET

Characteristics	Symbol	Rating	Unit
Drain-Source voltage	V _{DS}	-20	V
Gate-Source voltage	V _{GSS}	±12	V
Drain current	DC	I _D	-1.3
	Pulse	I _{DP} (Note 2)	-2.6
Drain power dissipation	P _D (Note 1)	1.0	W
Channel temperature	T _{ch}	150	°C



Weight: mg (typ)

Maximum Ratings (Ta = 25°C) SCHOTTKY DIODE

Characteristics	Symbol	Rating	Unit
Maximum (peak) reverse voltage	V _{RM}	30	V
Reverse voltage	V _R	25	V
Average forward current	I _O	0.7	A
Peak one cycle surge forward current (non-repetitive)	I _{FSM}	4 (50 Hz)	A
Junction temperature	T _j	125	°C

Maximum Ratings (Ta = 25°C) MOSFET, DIODE COMMON

Characteristics	Symbol	Rating	Unit
Storage temperature	T _{stg}	-55~125	°C
Operating temperature	T _{opr} (Note 3)	-40~85	°C

Note 1: Mounted on FR4 board
(25.4 mm × 25.4 mm × 1.6 t, Cu pad: 645 mm²)

Note 2: The pulse width limited by max channel temperature.

Note 3: Operating temperature limited by max channel temperature and max junction temperature.

Handling Precaution

When handling individual devices (which are not yet mounting on a circuit board), be sure that the environment is protected against electrostatic discharge. Operators should wear anti-static clothing and use containers and other objects that are made of anti-static materials.

The Channel-to-Ambient thermal resistance R_{th} (ch-a) and the drain power dissipation P_D vary according to the board material, board area, board thickness and pad area. When using this device, please take heat dissipation fully into account.

MOSFET

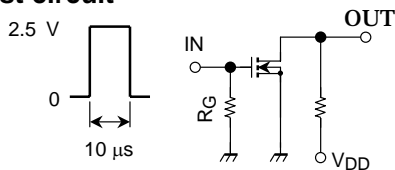
Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GSS}	$V_{GS} = \pm 12\text{ V}, V_{DS} = 0$	—	—	± 1	μA
Drain-Source breakdown voltage	$V_{(BR) DSS}$	$I_D = -1\text{ mA}, V_{GS} = 0$	-20	—	—	V
	$V_{(BR) DSX}$	$I_D = -1\text{ mA}, V_{GS} = +12\text{ V}$	-8	—	—	
Drain Cut-off current	I_{DSS}	$V_{DS} = -20\text{ V}, V_{GS} = 0$	—	—	-1	μA
Gate threshold voltage	V_{th}	$V_{DS} = -3\text{ V}, I_D = -0.1\text{ mA}$	-0.5	—	-1.1	V
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = -3\text{ V}, I_D = -0.65\text{ A}$ (注 4)	1.3	2.7	—	S
Drain-Source ON resistance	$R_{DS(ON)}$	$I_D = -0.65\text{ A}, V_{GS} = -4\text{ V}$ (注 4)	—	140	180	m Ω
		$I_D = -0.65\text{ A}, V_{GS} = -2.5\text{ V}$ (注 4)	—	200	260	
		$I_D = -0.65\text{ A}, V_{GS} = -2.0\text{ V}$ (注 4)	—	260	460	
Input capacitance	C_{iss}	$V_{DS} = -10\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$	—	370	—	pF
Reverse transfer capacitance	C_{rss}	$V_{DS} = -10\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$	—	73	—	pF
Output capacitance	C_{oss}	$V_{DS} = -10\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$	—	116	—	pF
Switching time	Turn-on time	t_{on}	$V_{DD} = -10\text{ V}, I_D = -0.65\text{ A}$		—	ns
	Turn-off time	t_{off}	$V_{GS} = 0 \sim -2.5\text{ V}, R_G = 4.7\ \Omega$		—	

Note 4: Pulse measurement

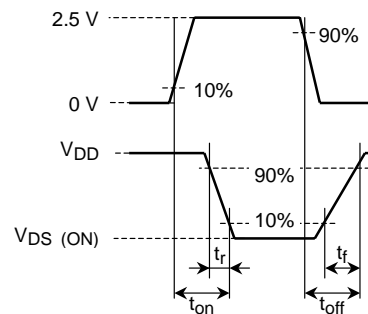
Switching Time Test Circuit

(a) Test circuit



$V_{DD} = 10\text{ V}$
 $R_G = 4.7\ \Omega$
 Duty $\leq 1\%$
 IN: $t_r, t_f < 5\text{ ns}$
 Common Source
 $T_a = 25^\circ\text{C}$

(b) V_{IN}



(c) V_{out}

Precaution

V_{th} can be expressed as voltage between gate and source when low operating current value is $I_D = -100\ \mu\text{A}$ for this product. For normal switching operation, $V_{GS(ON)}$ requires higher voltage than V_{th} and $V_{GS(OFF)}$ requires lower voltage than V_{th} .

(Relationship can be established as follows: $V_{GS(OFF)} < V_{th} < V_{GS(ON)}$)

Please take this into consideration for using the device.

V_{GS} recommended voltage of -2.5 V or higher to turn on this product.

Schottky Diode**Electrical Characteristics (Ta = 25°C)**

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Forward voltage	V _F (1)	I _F = 0.5 A	—	0.36	0.41	V
	V _F (2)	I _F = 0.7 A	—	0.40	0.45	V
Reverse current	I _R	V _R = 10V	—	—	100	μA
Total capacitance	C _T	V _R = 10 V, f = 1 MHz	—	20	—	pF

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