

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type ( $\pi$ -MOSV)

# TPC8012-H

## Switching Regulator Application DC-DC Converters

- Low drain-source ON resistance:  $R_{DS(ON)} = 0.28 \Omega$  (typ.)
- High forward transfer admittance:  $|Y_{fs}| = 1.35 S$  (typ.)
- Low leakage current:  $I_{DSS} = 100 \mu A$  (max) ( $V_{DS} = 200 V$ )
- Enhancement mode:  $V_{th} = 3.0$  to  $5.0 V$  ( $V_{DS} = 10 V, I_D = 1 mA$ )

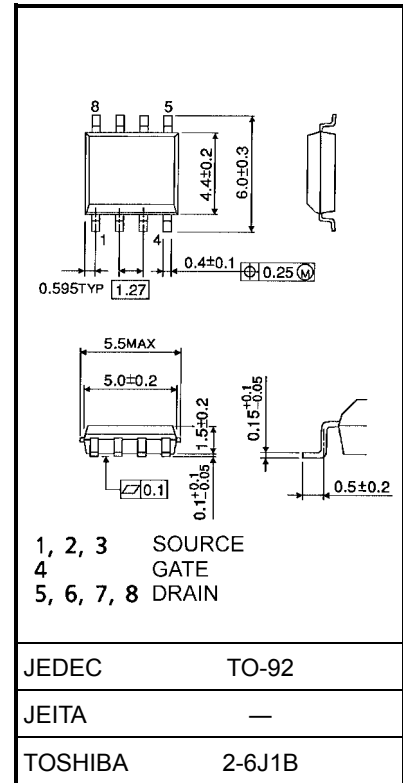
### Maximum Ratings ( $T_a = 25^\circ C$ )

Characteristics		Symbol	Rating	Unit
Drain-source voltage		$V_{DSS}$	200	V
Drain-gate voltage ( $R_{GS} = 20 k\Omega$ )		$V_{DGR}$	200	V
Gate-source voltage		$V_{GSS}$	$\pm 30$	V
Drain current	DC (Note 1)	$I_D$	1.8	A
	Pulse (Note 1)	$I_{DP}$	7.2	
Drain power dissipation ( $t = 10 s$ ) (Note 2a)		$P_D$	1.9	W
Drain power dissipation ( $t = 10 s$ ) (Note 2b)		$P_D$	1.0	W
Single pulse avalanche energy (Note 3)		$E_{AS}$	2.05	mJ
Avalanche current		$I_{AR}$	1.8	A
Repetitive avalanche energy (Note 2a) (Note 4)		$E_{AR}$	0.19	mJ
Channel temperature		$T_{ch}$	150	$^\circ C$
Storage temperature range		$T_{stg}$	-55 to 150	$^\circ C$

Note: (Note 1), (Note 2), (Note 3), (Note 4) Please see next page.

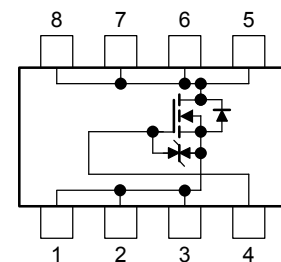
This transistor is an electrostatic sensitive device. Please handle with caution.

Unit: mm



Weight: 0.80 g (typ.)

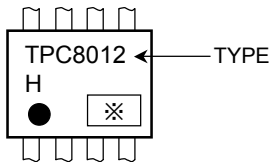
### Circuit Configuration



## Thermal Characteristics

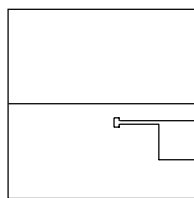
Characteristics	Symbol	Max	Unit
Thermal resistance, channel to ambient (t = 10 s) (Note 2a)	$R_{th(ch-a)}$	65.8	°C/W
Thermal resistance, channel to ambient (t = 10 s) (Note 2b)	$R_{th(ch-a)}$	125	°C/W

## Marking (Note 5)



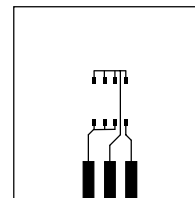
Note 1: Please use devices on condition that the channel temperature is below 150°C.

Note 2: (a) Device mounted on a glass-epoxy board (a) (b) Device mounted on a glass-epoxy board (b)



(a)

FR-4  
25.4 × 25.4 × 0.8  
(Unit: mm)



(b)

FR-4  
25.4 × 25.4 × 0.8  
(Unit: mm)

Note 3:  $V_{DD} = 50\text{ V}$ ,  $T_{ch} = 25^\circ\text{C}$  (initial),  $L = 1.0\text{ mH}$ ,  $R_G = 25\ \Omega$ ,  $I_{AR} = 1.8\text{ A}$

Note 4: Repetitive rating; pulse width limited by maximum channel temperature

Note 5: • on lower left of the marking indicates Pin 1.

※ shows lot number. (year of manufacture: last decimal digit of the year of manufacture, month of manufacture: January to December are denoted by letters A to L respectively.)

## Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		$I_{GSS}$	$V_{GS} = \pm 25\text{ V}, V_{DS} = 0\text{ V}$	—	—	$\pm 10$	$\mu\text{A}$
Drain cut-OFF current		$I_{DSS}$	$V_{DS} = 200\text{ V}, V_{GS} = 0\text{ V}$	—	—	100	$\mu\text{A}$
Drain-source breakdown voltage		$V_{(BR)DSS}$	$I_D = 10\text{ mA}, V_{GS} = 0\text{ V}$	200	—	—	V
Gate threshold voltage		$V_{th}$	$V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$	3.0	—	5.0	V
Drain-source ON resistance		$R_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 0.9\text{ A}$	—	0.28	0.40	$\Omega$
Forward transfer admittance		$ Y_{fs} $	$V_{DS} = 10\text{ V}, I_D = 0.9\text{ A}$	0.65	1.35	—	S
Input capacitance		$C_{iss}$	$V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	—	440	—	pF
Reverse transfer capacitance		$C_{rss}$		—	80	—	
Output capacitance		$C_{oss}$		—	260	—	
Switching time	Rise time	$t_r$	<p> <math>V_{GS} = 10\text{ V}</math>  <math>0\text{ V}</math>  <math>I_D = 0.9\text{ A}</math>  <math>V_{OUT}</math>  <math>50\ \Omega</math>  <math>R_L = 111\ \Omega</math>  <math>V_{DD} \approx 100\text{ V}</math>                      Duty <math>\leq 1\%</math>, <math>t_w = 10\ \mu\text{s}</math> </p>	—	23	—	ns
	Turn-ON time	$t_{on}$		—	28	—	
	Fall time	$t_f$		—	22	—	
	Turn-OFF time	$t_{off}$		—	73	—	
Total gate charge (gate-source plus gate-drain)		$Q_g$	$V_{DD} \approx 160\text{ V}, V_{GS} = 10\text{ V}, I_D = 1.8\text{ A}$	—	11	—	nC
Gate-source charge 1		$Q_{gs1}$		—	6	—	
Gate-drain ("miller") charge		$Q_{gd}$		—	5	—	

## Source-Drain Ratings and Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current	Pulse (Note 1)	$I_{DRP}$	—	—	—	7.2	A
Forward voltage (diode)		$V_{DSF}$	$I_{DR} = 1.8\text{ A}, V_{GS} = 0\text{ V}$	—	—	-1.5	V

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