

# TPCP8J01

Notebook PC Applications

Portable Equipment Applications

- Lead(Pb)-Free
- Small mounting area due to small and thin package
- Low drain-source ON resistance: P Channel  $R_{DS(ON)} = 27\text{ m}\Omega$  (typ.)
- High forward transfer admittance: P Channel  $|Y_{fs}| = 9.6\text{ S}$  (typ.)
- Low leakage current:  $I_{DSS} = -10\text{ }\mu\text{A}$  ( $V_{DS} = -32\text{ V}$ )
- Enhancement-mode: P Channel  $V_{th} = -0.8\text{ to }-2.0\text{ V}$   
( $V_{DS} = -10\text{ V}$ ,  $I_D = -1\text{ mA}$ )

## Maximum Ratings (Ta = 25°C)

### MOSFET

Characteristics		Symbol	Rating	Unit
Drain-source voltage		$V_{DSS}$	-32	V
Drain-gate voltage ( $R_{GS} = 20\text{ k}\Omega$ )		$V_{DGR}$	-32	V
Gate-source voltage		$V_{GSS}$	$\pm 20$	V
Drain current	DC (Note 1)	$I_D$	-5.5	A
	Pulse (Note 1)	$I_{DP}$	-22	
Drain power dissipation (t = 5 s) (Note 2a)		$P_D$	2.14	W
Drain power dissipation (t = 5 s) (Note 2b)		$P_D$	1.06	W
Single pulse avalanche energy (Note 3)		$E_{AS}$	5.8	mJ
Avalanche current		$I_{AR}$	-3	A
Repetitive avalanche energy (Note 4)		$E_{AR}$	0.21	mJ

### BRT

Characteristics		Symbol	Rating	Unit
Collector-base voltage		$V_{CBO}$	50	V
Collector-emitter voltage		$V_{CEO}$	50	V
Emitter-base voltage		$V_{EBO}$	6	V
Collector current	DC (Note 1)	$I_C$	100	mA
Collector power dissipation		$P_C$	200	mW

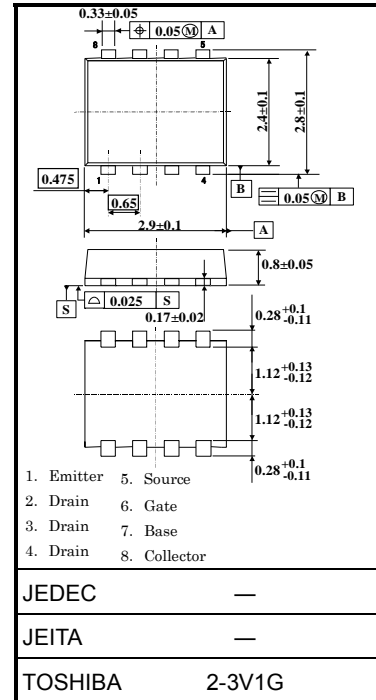
## Common Maximum Ratings (Ta=25°C)

Characteristics		Symbol	Rating	Unit
Junction temperature		$T_J$	150	°C
Storage temperature range		$T_{stg}$	-55~150	°C

This transistor is an electrostatic-sensitive device. Handle with caution.

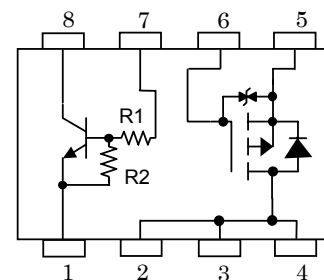
Note: For Notes 1 to 5, refer to the next page.

Unit: mm

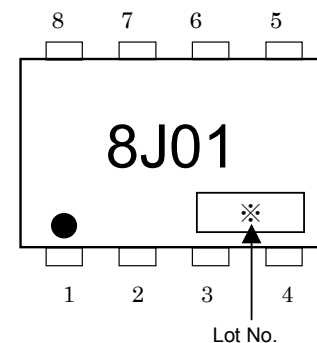


Weight: 0.011 g (typ.)

## Circuit Configuration



## Marking (Note5)

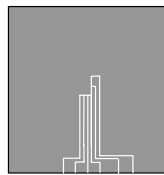


**Thermal Characteristics**

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to ambient (t = 5 s) (Note 2a)	$R_{th(ch-a)}$	58.4	°C/W
Thermal resistance, channel to ambient (t = 5 s) (Note 2b)	$R_{th(ch-a)}$	117.9	°C/W

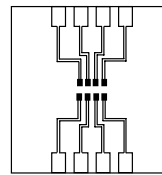
Note 1: Ensure that the channel temperature does not exceed 150°C.

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



FR-4  
25.4 × 25.4 × 0.8  
(Unit: mm)

(a)



FR-4  
25.4 × 25.4 × 0.8  
(Unit: mm)

(b)

Note 3:  $V_{DD} = -24\text{ V}$ ,  $T_{ch} = 25^\circ\text{C}$  (initial),  $L = 0.5\text{ mH}$ ,  $R_G = 25\ \Omega$ ,  $I_{AR} = -3.0\text{ A}$

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

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

※ Weekly code (three digits):



Week of manufacture  
(01 for the first week of the year, continues up to 52 or 53)  
Year of manufacture  
(The last digit of the calendar year)

## Electrical Characteristics (Ta = 25°C)

### MOSFET

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		$I_{GSS}$	$V_{GS} = \pm 16\text{ V}, V_{DS} = 0\text{ V}$	—	—	$\pm 10$	$\mu\text{A}$
Drain cut-off current		$I_{DSS}$	$V_{DS} = -32\text{ V}, V_{GS} = 0\text{ V}$	—	—	-10	$\mu\text{A}$
Drain-source breakdown voltage		$V_{(BR)DSS}$	$I_D = -10\text{ mA}, V_{GS} = 0\text{ V}$	-32	—	—	V
		$V_{(BR)DSX}$	$I_D = -10\text{ mA}, V_{GS} = 20\text{ V}$	-15	—	—	
Gate threshold voltage		$V_{th}$	$V_{DS} = -10\text{ V}, I_D = -1\text{ mA}$	-0.8	—	-2.0	V
Drain-source ON resistance		$R_{DS(ON)}$	$V_{GS} = -4\text{ V}, I_D = -3.0\text{ A}$	—	38	49	$\text{m}\Omega$
			$V_{GS} = -10\text{ V}, I_D = -3.0\text{ A}$	—	27	35	
Forward transfer admittance		$ Y_{fs} $	$V_{DS} = -10\text{ V}, I_D = -3.0\text{ A}$	4.8	9.6	—	S
Input capacitance		$C_{iss}$	$V_{DS} = -10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	—	1760	—	pF
Reverse transfer capacitance		$C_{rss}$		—	200	—	
Output capacitance		$C_{oss}$		—	210	—	
Switching time	Rise time	$t_r$		—	2.8	—	ns
	Turn-on time	$t_{on}$		—	12	—	
	Fall time	$t_f$		—	22	—	
	Turn-off time	$t_{off}$		—	90	—	
Total gate charge (gate-source plus gate-drain)		$Q_g$	$V_{DD} \approx -24\text{ V}, V_{GS} = -10\text{ V}, I_D = -5.5\text{ A}$	—	34	—	nC
Gate-source charge 1		$Q_{gs1}$		—	4.7	—	
Gate-drain ("miller") charge		$Q_{gd}$		—	7.2	—	

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current (Pulse) (Note 1)	$I_{DRP}$	—	—	—	-22	A
Forward voltage (diode)	$V_{DSF}$	$I_{DR} = -5.5\text{ A}, V_{GS} = 0\text{ V}$	—	—	1.2	V

**BRT**

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	$I_{CBO}$	$V_{CB} = 50\text{ V}, I_E = 0$	—	—	100	nA
	$I_{CEO}$	$V_{CB} = 50\text{ V}, I_E = 0$	—	—	100	
Emitter cut-off current	$I_{EBO}$	$V_{EB} = 6\text{ V}, I_C = 0$	0.081	—	0.15	mA
DC current gain	$h_{FE}$	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$	80	—	—	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 5\text{ mA}, I_B = 0.25\text{ mA}$	—	0.1	0.3	V
Input voltage (ON)	$V_{I(ON)}$	$V_{CE} = 0.2\text{ V}, I_C = 5\text{ mA}$	0.7	—	1.8	V
Input voltage (OFF)	$V_{I(OFF)}$	$V_{CE} = 5\text{ V}, I_C = 0.1\text{ mA}$	0.5	—	1.0	V
Transition frequency	$f_T$	$V_{CE} = 10\text{ V}, I_C = 5\text{ mA}$	—	250	—	MHz
Collector output capacitance	$C_{ob}$	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	3	6	pF
Input resistor	R1	—	7	10	13	k $\Omega$
Resistor ratio	R1/R2	—	0.191	0.213	0.232	

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