Q1:TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE(U−MOSⅢ)

Q2:INCLUDES SCHOTTKY BARRIER DIODE FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE(U−MOSⅢ)

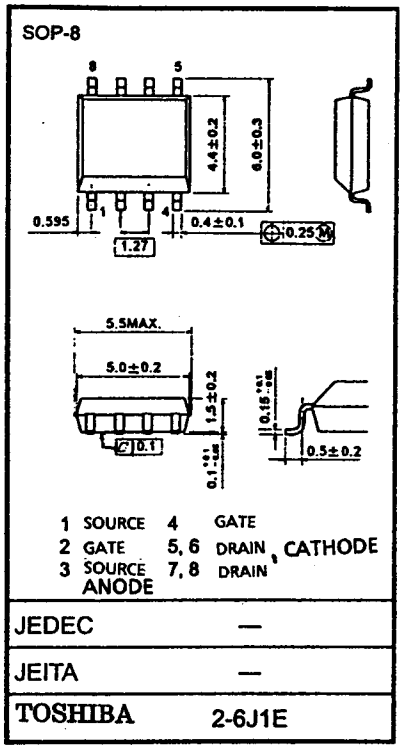
TPC8A01

TENTATIVE

DC-DC CONVERTER
NOTE BOOK PC
PORTABLE MACHINES AND TOOLS

- Includes Schottky Barrier Diode Type. (Q2)
- Compact and thin package, and a small mounting area. (Q1, Q2)
- High Speed Switching. (Q1)
- Small Gate Charge. (Q1): Qg= nC(Typ.)
- Low Drain - Source ON Resistance. (Q2) : $R_{DS(ON)}$= mΩ (Typ.)
- High Forword Transfer Admittance. (Q2) : $|Y_{fs}|$= S (Typ.)
- Low Leakage Current. (Q1, Q2) : I_{DSS}=10μA (Max.) (V_{DS}=30V)
- Enhancement − Mode. (Q1, Q2) : V_{th}=1.3~2.5V (V_{DS}=10V, I_D=1mA)

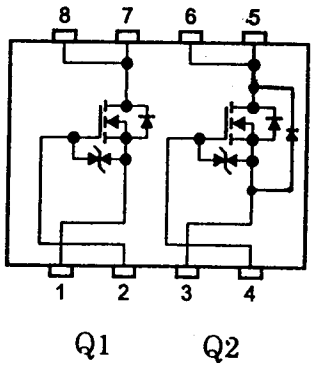
UNIT: mm



JEDEC	—
JEITA	—
TOSHIBA	2-6J1E

Weight: 0.08g (Typ)

CIRCUIT CONFIGURATION



MAXIMUM RATINGS (Ta=25℃)

CHARACTERISTIC		SYMBOL	RATING Q1	RATING Q2	UNIT
Drain - Source Voltage		V_{DSS}	30	30	V
Drain - Gate Voltage (R_{GS}=20kΩ)		V_{DGR}	30	30	V
Gate - Source Voltage		V_{GSS}	±20	±20	V
Drain Current	DC (Note1)	I_D	6	8.6	A
	Pulse	I_{DP}	24	34.4	A
Drain Power Dissipation (t=10s) (Note2a)	Single-deviceOperation (Note3a)	$P_{D(1)}$	1.5		W
	Single-device value at dual Operation (Note3b)	$P_{D(2)}$	1.1		
Drain Power Dissipation (t=10s) (Note2b)	Single-deviceOperation (Note3a)	$P_{D(1)}$	0.75		
	Single-device value at dual Operation (Note3b)	$P_{D(2)}$	0.45		
Single Pulse Avalanche Energy (Note4)		E_{AS}			mJ
Avalanche Current (Note1)		I_{AR}	6.0	8.6	A
Repetitive Avalanche Energy Single-device value at dual Operation (Note2a, 3b, 5)		E_{AR}	0.11		mJ
Channel Temperature		T_{ch}	150		℃
Storage Temperature Range		T_{stg}	−55~150		℃

Note: (Note1), (Note2), (Note3), (Note4), (Note5) Please see next page.

THIS TRANSISTOR IS AN ELECTROSTATIC SENSITIVE DEVICE.

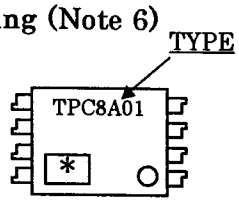
PLEASE HANDLE WITH CAUTION.

TENTATIVE

THERMAL CHARACTERISTICS

CHARACTERISTICS		SYMBOL	MAX.	UNIT
Thermal resistance, channel to ambient (t=10s) (Note 2a)	Single-device operation (Note3a)	$R_{th(ch-a)(1)}$	83.3	℃/W
	Single-device value at dual operation (Note3b)	$R_{th(ch-a)(2)}$	114	
Thermal resistance, channel to ambient (t=10s) (Note 2b)	Single-device operation (Note3a)	$R_{th(ch-a)(1)}$	167	
	Single-device value at dual operation (Note3b)	$R_{th(ch-a)(2)}$	278	

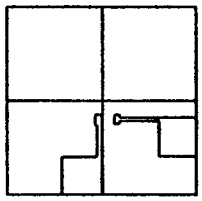
Marking (Note 6)



Note1: Please use devices on condition that the channel temperature is below 150℃.

Note2:

(a) Device mounted on glass-epoxy board (a)



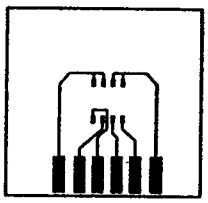
FR-4

25.4X25.4X0.8

(Unit in mm)

(a)

(b) Device mounted on glass-epoxy board (b)



FR-4

25.4X25.4X0.8

(Unit in mm)

(b)

Note3:

(a) The power dissipation and thermal resistance values shown are for a single device (During single-device operation, power is only applied to one device)

(b) The power dissipation and thermal resistance values shown are for a single device (During dual operation, power is evenly applied to both device)

Note4: Q1: V_{DD}=24V, T_{ch}=25℃(initial), L= mH, I_{AR}= A, R_G=25Ω

Q2: V_{DD}=24V, T_{ch}=25℃(initial), L= mH, I_{AR}= A, R_G=25Ω

Note5: Repetitive rating ; Pulse Width Limited by maximunm channel temperature.

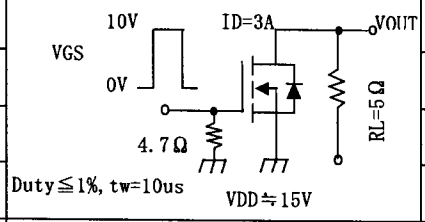
Note6: ○ on lower right of the marking indicates Pin 1

* shows lot number. (Year of manufacture: last decimal digit of the year of manufacture, Month of manufacture: January to December are denoted by letter A to L respectively)

Q 1

TENTATIVE

Electrical Characteristics (T_a=25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	V_{GS}=±16V,V_{DS}=0V	–	–	±10	μA
Drain cut-OFF current		I_{DSS}	V_{DS}=30V,V_{GS}=0V	–	–	10	μA
Drain-source breakdown voltage		$V_{(BR)DSS}$	I_D=10mA,V_{GS}=0V	30	–	–	V
		$V_{(BR)DSX}$	I_D=10mA,V_{GS}=-20V	15	–	–	
Gate threshold voltage		V_{th}	V_{DS}=10V,I_D=1mA	1.3	–	2.5	V
Drain-source ON resistance		$R_{DS(ON)}$	V_{GS}=4.5V,I_D=4A	–	26	33	mΩ
			V_{GS}=10V,I_D=6A	–	18	23	
Forward transfer admittance		$\|Y_{fs}\|$	V_{DS}=10V,I_D=3.0A	3.8	7.6	–	S
Input capacitance		C_{iss}	V_{DS}=10V,V_{GS}=0V,f=1MHz	–	830	–	pF
Reverse transfer capacitance		C_{rss}		–	130	–	
Output capacitance		C_{oss}		–	400	–	
Switching time	Rise time	t_r		–	18	–	ns
	Turn-ON time	t_{on}		–	25	–	
	Fall time	t_f		–	3.3	–	
	Turn-OFF time	t_{off}		–	20	–	
Total gate charge (gate-source plus gate-drain)		Q_g	V_{DD}≒24V,V_{GS}=10V,I_D=6.0A	–	14	–	nC
Gate-source charge 1		Q_{gs1}		–		–	
Gate-Drain("miller")charge		Q_{gd}		–	3.4	–	

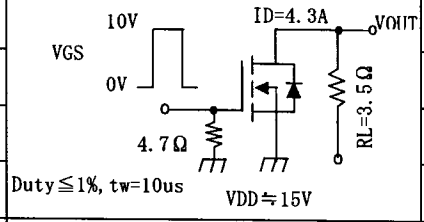
Source-Drain Diode Ratings and Characteristics (T_a=25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current	Pulse	I_{DRP}	–	–	–	24	A
Diode foward voltage		V_{DSF}	I_{DR}=6.0A,V_{GS}=0V	–	–	-1.2	V

Q 2

TENTATIVE

Electrical Characteristics (T_a=25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	V_{GS}=±16V,V_{DS}=0V	–	–	±10	μA
Drain cut-OFF current		I_{DSS}	V_{DS}=30V,V_{GS}=0V	–	–	500	μA
Drain-source breakdown voltage		$V_{(BR)DSS}$	I_D=10mA,V_{GS}=0V	30	–	–	V
		$V_{(BR)DSX}$	I_D=10mA,V_{GS}=-20V	15	–	–	
Gate threshold voltage		V_{th}	V_{DS}=10V,I_D=1mA	1.3	–	2.5	V
Drain-source ON resistance		$R_{DS(ON)}$	V_{GS}=4.5V,I_D=8.6A	–	20	26	mΩ
			V_{GS}=10V,I_D=8.6A	–	16	21	
Forward transfer admittance		$\|Y_{fs}\|$	V_{DS}=10V,I_D=4.3A	5.7	11.4	–	S
Input capacitance		C_{iss}	V_{DS}=10V,V_{GS}=0V,f=1MHz	–	2120	–	pF
Reverse transfer capacitance		C_{rss}		–	230	–	
Output capacitance		C_{oss}		–	430	–	
Switching time	Rise time	t_r		–	7.1	–	ns
	Turn-ON time	t_{on}		–	18	–	
	Fall time	t_f		–	5.6	–	
	Turn-OFF time	t_{off}		–	33	–	
Total gate charge (gate-source plus gate-drain)		Q_g	V_{DD}≒24V,V_{GS}=10V,I_D=8.6A	–	35	–	nC
Gate-source charge 1		Q_{gs1}		–		–	
Gate-Drain("miller")charge		Q_{gd}		–	6.6	–	

Source-Drain Diode Ratings and Characteristics (T_a=25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current	Pulse	I_{DRP}	–	–	–		A
Diode foward voltage		V_{DSF}	I_{DR}=1.0A,V_{GS}=0V	–	-0.48	-0.5	V

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