

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type (-MOSVII)

TPCA8007-H

Switching Regulator Applications

Motor Drive Applications

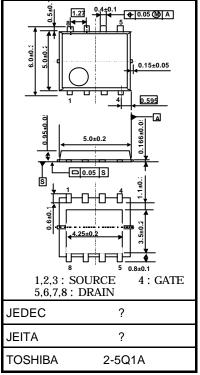
- Small footprint due to small and thin package
- High speed switching
- Low drain-source ON resistance

: R DS (ON) = 30 mO (typ.) (VG=10V, ID=10A)

- High forward transfer admittance: $|Y_{fs}| = 19 \text{ S}$ (typ.)
- Low leakage current: $IDSS = 100 \ \mu A \ (max) \ (VDS = 100 \ V)$
- Enhancement mode: $V_{th} = 3.0$ to 5.0 V ($V_{DS} = 10$ V, $I_D = 1$ mA)

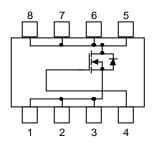
Characte	ristics	Symbol	Rating	Unit
Drain-source voltage		V _{DSS}	100	V
Drain-gate voltage (F	$R_{GS} = 20 \text{ k}\Omega$	V _{DGR}	100	V
Gate-source voltage		V _{GSS}	±20	V
Drain current	DC (Note 1)	I _D	20	А
Drain current	Pulsed (Note 1)	(Note 1) I _{DP} 40	A	
Drain power dissipati	on (Tc=25)	PD	45	W
Drain power dissipati	on (t = 10 s) (Note 2a)	PD	2.8	W
Drain power dissipati	on (t = 10 s) (Note 2b)	PD	1.6	W
Single pulse avalanch	ne energy (Note 3)	E _{AS}	351	mJ
Avalanche current		I _{AR}	20	А
Repetitive avalanche (N	energy ote 2a) (Note 4)	E _{AR}	4.5	mJ
Channel temperature		T _{ch}	150	°C
Storage temperature	range	T _{stg}	-55 to 150	°C

Maximum Ratings (Ta = 25°C)



Weight: 0.080 g (typ.)

Circuit Configuration



Note: For (Note 1), (Note 2), (Note 3), (Note 4), please refer to the next page. This transistor is an electrostatic sensitive device. Please handle with caution. Unit: mm

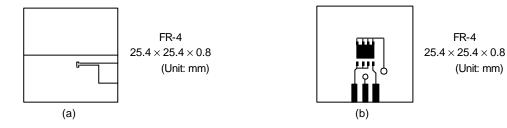
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Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case (Tc=25)	R _{th (ch-c)}	2.78	°C/W
Thermal resistance, channel to ambient (t = 10 s) (Note 2a)	R _{th (ch-a)}	44.6	°C/W
Thermal resistance, channel to ambient (t = 10 s) (Note 2b)	R _{th (ch-a)}	78.1	°C/W

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)



Note 3: $V_{DD} = 50 \text{ V}$, $T_{ch} = 25^{\circ}C$ (initial), L = 1.0 mH, $R_G = 25 \Omega$, $I_{AR} = 20 \text{ A}$ Note 4: Repetitive rating: pulse width limited by max channel temperature

Electrical Characteristics (Ta = 25°C)

Cha	aracteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Gate leakage cu	rrent	lgss	$V_{GS} = \pm 20 V, V_{DS} = 0 V$	_	—	±100	nA
Drain cut-OFF current		I _{DSS}	$V_{DS} = 100 V, V_{GS} = 0 V$		—	100	μA
Drain-source bre	akdown voltage	V (BR) DSS	$I_{D} = 10 \text{ mA}, V_{GS} = 0 \text{ V}$	100	—		V
Gate threshold ve	oltage	V _{th}	$V_{DS} = 10 \text{ V}, I_D = 1 \text{ mA}$	3.0	—	5.0	V
Drain-source ON	resistance	R _{DS (ON)}	$V_{GS} = 10 \text{ V}, \text{ I}_{D} = 10 \text{ A}$	_	30	47	mΩ
Forward transfer admittance		Y _{fs}	$V_{DS} = 10 V$, $I_{D} = 10 A$	9.5	19		S
Input capacitance		C _{iss}	$V_{DS} = 10 V, V_{GS} = 0 V, f = 1 MHz$		1000		pF
Reverse transfer capacitance		C _{rss}			21		
Output capacitance		C _{oss}		_	500		
Switching time	Rise time	t _r	$V_{GS} \stackrel{10}{}_{0V} \int I_{D} = 10 \text{ A}$	_	(2)	_	· ns
	Turn-ON time	t _{on}			(13)	_	
	Fall time	t _f			3		
	Turn-OFF time	t _{off}	$V_{DD}\simeq 50~V \label{eq:VDD}$ Duty \leq 1%, t_w = 10 μs		13	_	
Total gate charge (gate-source plus gate-drain)		Qg	$V_{DD}\simeq 80$ V, $V_{GS}=10$ V, $I_{D}=20$ A		15	_	nC
Gate-source charge 1		Q _{gs1}		_	7.2	_	
Gate-drain ("miller") charge		Q _{gd}			5.0		
Gate switch charge		Q _{SW}			8.5		

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

Characteristics		Symbol	Test Condition	Min	Тур.	Max	Unit
Drain reverse current	Pulse (tw=1ms)	I _{DRP}	—	_		40	Α
Forward voltage (diode)		V _{DSF}	$I_{DR} = 20 \text{ A}, \text{ V}_{GS} = 0 \text{ V}$		_	-1.7	V



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