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

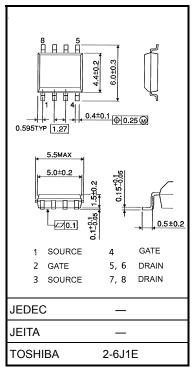
TPC8210

Lithium Ion Battery Applications Portable Equipment Applications Notebook PC Applications

- Low drain-source ON resistance: RDS (ON) = $11 \text{ m}\Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 13 \text{ S} (typ.)$
- Low leakage current: $I_{DSS} = 10 \ \mu A \ (max) \ (V_{DS} = 30 \ V)$
- Enhancement mode: V_{th} = 1.3 to 2.5 V (V_{DS} = 10 V, I_D = 1 mA)

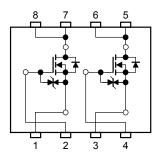
Absolute Maximum Ratings (Ta = 25°C)

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Cha	racteristics	Symbol	Rating	Unit	
Drain-source vo	Itage	V _{DSS}	30	V	
Drain-gate volta	ge (R _{GS} = 20 kΩ)	V _{DGR}	30	V	
Gate-source vol	tage	V _{GSS}	±20	V	
Drain current	D C (Note 1)	Ι _D	8	А	
Dialificulterit	Pulse (Note 1)	I _{DP}	32	Ą	
Drain power dissipation	Single-device operation (Note 3a)	P _{D (1)}	1.5	W	
(t = 10 s) (Note 2a)	Single-device value at dual operation (Note 3b)	P _{D(2)}	1.1		
Drain power dissipation (t = 10 s) (Note 2b)	Single-device operation (Note 3a)	P _{D (1)}	0.75	W	
	Single-device value at dual operation (Note 3b)	P _{D (2)}	0.45		
Single pulse ava	alanche energy (Note 4)	E _{AS}	83.2	mJ	
Avalanche curre	ent	I _{AR}	8	А	
Repetitive avala Single-device va	nche energy alue at dual operation (Note 2a, 3b, 5)	E _{AR}	0.1	mJ	
Channel temper	ature	T _{ch}	150	°C	
Storage tempera	ature range	T _{stg}	-55 to 150	°C	



Weight: 0.08 g (typ.)

Circuit Configuration



Note: (Note 1), (Note 2), (Note 3), (Note 4) and (Note 5): See the next page.

Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings. Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc.).

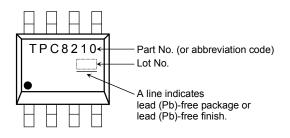
This transistor is an electrostatic-sensitive device. Please handle with caution.

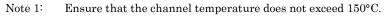
Unit: mm

Thermal Characteristics

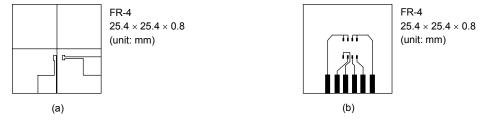
Characteristics	Symbol	Max	Unit		
Thermal resistance, channel to ambient (t = 10 s) (Note 2a)	Single-device operation (Note 3a)	R _{th (ch-a) (1)}	83.3		
	Single-device value at dual operation (Note 3b)	R _{th (ch-a) (2)}	114	°C/W	
Thermal resistance, channel to ambient	Single-device operation (Note 3a)	R _{th (ch-a) (1)}	167	C/W	
(t = 10 s) (Note 2	Single-device value at dual operation (Note 3b)	R _{th (ch-a) (2)}	278	ſ	

Marking (Note 6)





Note 2:



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

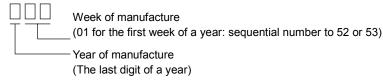
b) Device mounted on a glass-epoxy board (b)

Note 3:

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

Note 4: $V_{DD} = 24 \text{ V}, \text{ T}_{ch} = 25^{\circ}\text{C}$ (initial), L = 1.0 mH, R_G = 25 Ω , I_{AR} = 8 A

- Note 5: Repetitive rating: pulse width limited by maximum channel temperature
- Note 6: on lower left of the marking indicates Pin 1.
 - % Weekly code: (Three digits)



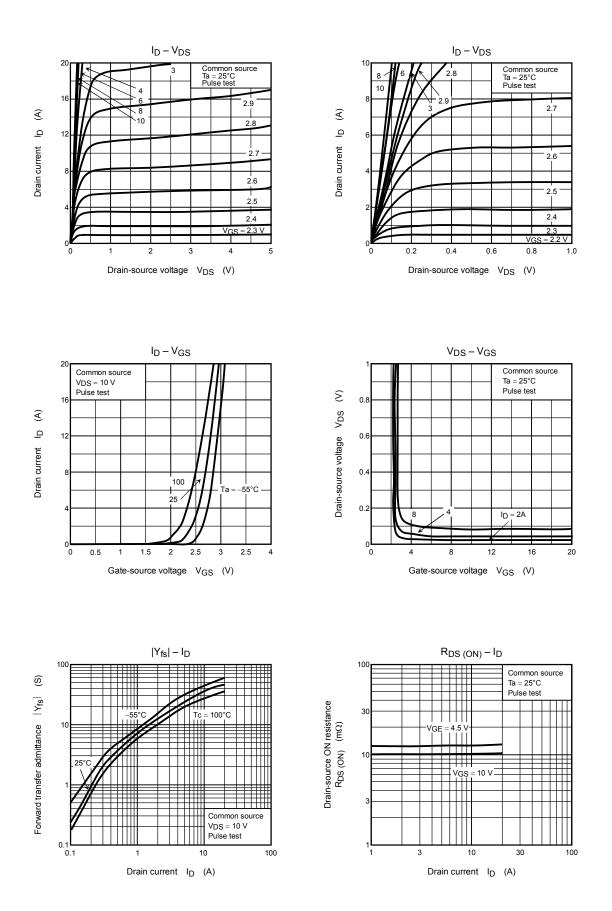
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Тур.	Max	Unit
Gate leakage cu	urrent	I _{GSS}	V _{GS} = ±16 V, V _{DS} = 0 V		—	±10	μA
Drain cut-OFF	current			10	μA		
Drain-source breakdown voltage		V (BR) DSS	I _D = 10 mA, V _{GS} = 0 V	30		-	v
Dialit Source Di	reakdown voltage	V (BR) DSS	I_D = 10 mA, V_{GS} = -20 V	15	_		v
Gate threshold voltage		V _{th}	V _{DS} = 10 V, I _D = 1 mA	1.3	_	2.5	V
Drain-source O	Nresistance	R _{DS (ON)}	V _{GS} = 4.5 V, I _D = 4 A		13	20	mΩ
Drain-source ON resistance		R _{DS (ON)}	V _{GS} = 10 V, I _D = 4 A	1	11	15	mc2
Forward transfer admittance		Y _{fs}	V _{DS} = 10 V, I _D = 4 A	6.5	13	_	S
Input capacitan	ce	C _{iss}		_	3530	_	
Reverse transfer capacitance		C _{rss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz	_	495	_	pF
Output capacitance		C _{oss}		-	580	_	
Switching time	Rise time	tr	$V_{GS} \stackrel{10 \text{ V}}{_{0 \text{ V}}} \stackrel{I_{D} = 4 \text{ A}}{_{0 \text{ V}}} \stackrel{V_{OUT}}{_{0 \text{ V}}} \stackrel{I_{D} = 4 \text{ A}}{_{0 \text{ V}}} \stackrel{V_{OUT}}{_{0 \text{ V}}} \stackrel{I_{D} = 4 \text{ A}}{_{0 \text{ V}}} \stackrel{V_{OUT}}{_{0 \text{ V}}} \stackrel{I_{D} = 4 \text{ A}}{_{0 \text{ V}}} \stackrel{V_{OUT}}{_{0 \text{ V}}} \stackrel{I_{D} = 4 \text{ A}}{_{0 \text{ V}}} \stackrel{V_{OUT}}{_{0 \text{ V}}} \stackrel{I_{D} = 4 \text{ A}}{_{0 \text{ V}}} \stackrel{V_{OUT}}{_{0 \text{ V}}} \stackrel{I_{D} = 4 \text{ A}}{_{0 \text{ V}}} \stackrel{I_{D} = 4 \text{ A}}{_{0 \text{ V}}} \stackrel{V_{OUT}}{_{0 \text{ V}}} \stackrel{I_{D} = 4 \text{ A}}{_{0 \text{ V}}} \stackrel{V_{OUT}}{_{0 \text{ V}}} \stackrel{I_{D} = 4 \text{ A}}{_{0 \text{ V}}} $	_	26	_	
	Turn-ON time	t _{on}			39		ns
	Fall time	t _f			32		115
	Turn-OFF time	t _{off}	Duty \leq 1%, t_w = 10 μs		115		
Total gate charge (Gate-source plus gate-drain)		Qg	V _{DD} ≈ 24 V, V _{GS} = 10 V, I _D = 8 A		75	_	
Gate-source charge		Q _{gs}		_	6	_	nC
Gate-drain ("miller") charge		Q _{gd}		_	19	_	

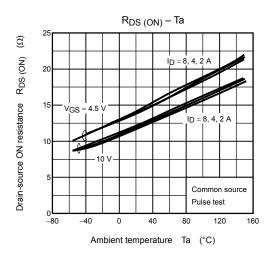
Source-Drain Ratings and Characteristics (Ta = 25°C)

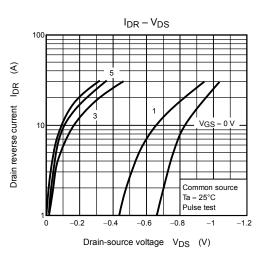
Charact	eristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Drain reverse current	Pulse (Note 1)	I _{DRP}	—	_	_	32	А
Forward voltage (orward voltage (diode) V _{DSF}		I _{DR} = 8 A, V _{GS} = 0 V	_	_	-1.2	V

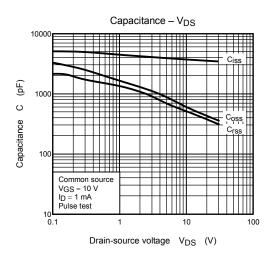
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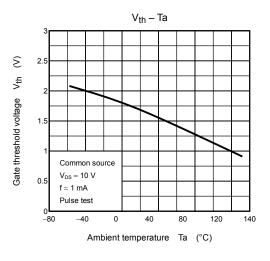


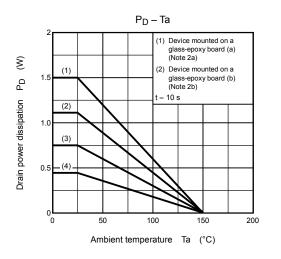
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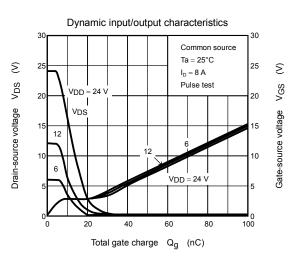


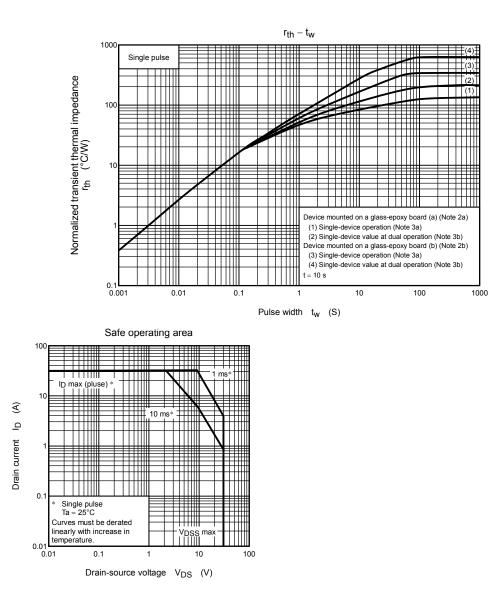












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