

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

# TPC8110

Lithium Ion Battery Applications

Notebook PC Applications

Portable Equipment Applications

- Small footprint due to small and thin package
- Low drain-source ON resistance:  $R_{DS(ON)} = 17 \text{ m}\Omega$  (typ.)
- High forward transfer admittance:  $|Y_{fs}| = 16 \text{ S}$  (typ.)
- Low leakage current:  $I_{DSS} = -10 \text{ }\mu\text{A}$  (max) ( $V_{DS} = -40 \text{ V}$ )
- Enhancement-mode:  $V_{th} = -0.8 \text{ to } -2.0 \text{ V}$  ( $V_{DS} = -10 \text{ V}$ ,  $I_D = -1 \text{ mA}$ )

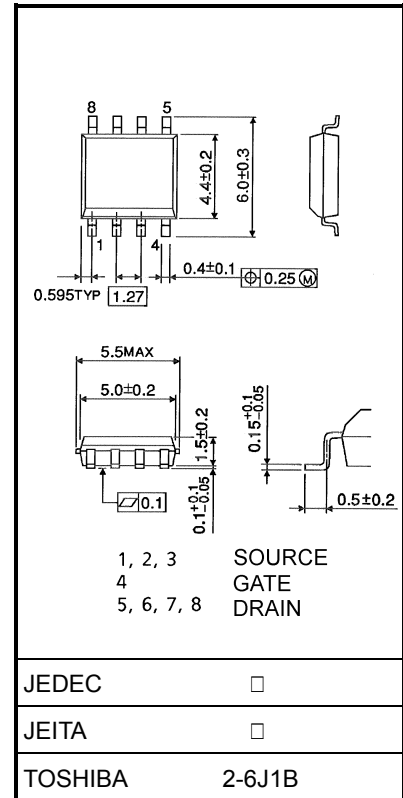
## Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

Characteristics		Symbol	Rating	Unit
Drain-source voltage		$V_{DSS}$	-40	V
Drain-gate voltage ( $R_{GS} = 20 \text{ k}\Omega$ )		$V_{DGR}$	-40	V
Gate-source voltage		$V_{GSS}$	$\pm 20$	V
Drain current	DC (Note 1)	$I_D$	-8	A
	Pulsed (Note 1)	$I_{DP}$	-32	
Drain power dissipation ( $t = 10 \text{ s}$ ) (Note 2a)		$P_D$	1.9	W
Drain power dissipation ( $t = 10 \text{ s}$ ) (Note 2b)		$P_D$	1.0	W
Single pulse avalanche energy (Note 3)		$E_{AS}$	59.4	mJ
Avalanche current		$I_{AR}$	-8	A
Repetitive avalanche energy (Note 2a) (Note 4)		$E_{AR}$	0.19	mJ
Channel temperature		$T_{ch}$	150	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	-55 to 150	$^\circ\text{C}$

Note: For (Note 1), (Note 2), (Note 3) and (Note 4), please refer to the next page.

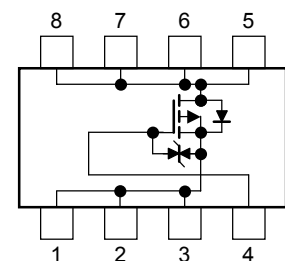
This transistor is an electrostatic sensitive device. Please handle with caution.

Unit: mm



Weight: 0.080 g (typ.)

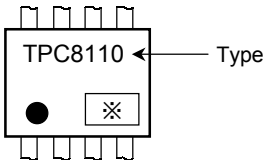
## Circuit Configuration



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

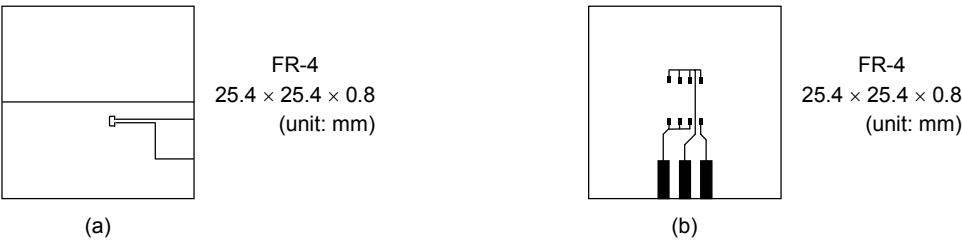
Marking (Note 5)



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)

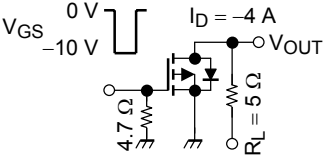


Note 3:  $V_{DD} = -24\text{ V}$ ,  $T_{ch} = 25^\circ\text{C}$  (initial),  $L = 1.0\text{ mH}$ ,  $R_G = 25\ \Omega$ ,  $I_{AR} = -8\text{ A}$

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

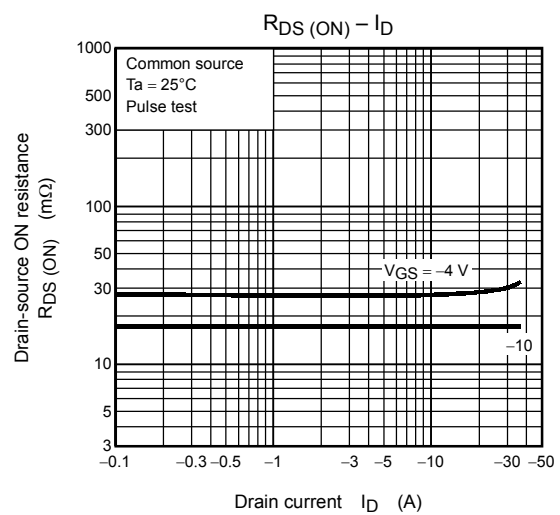
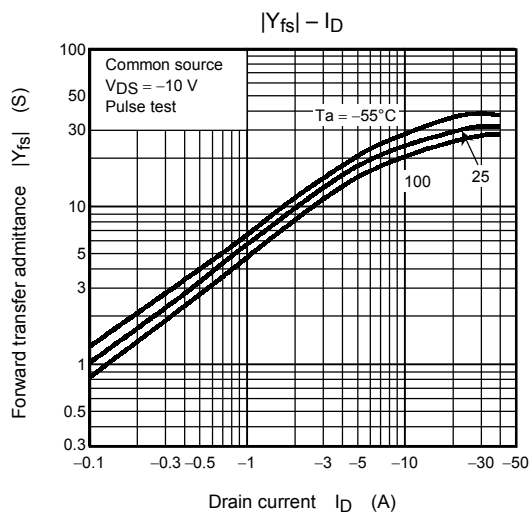
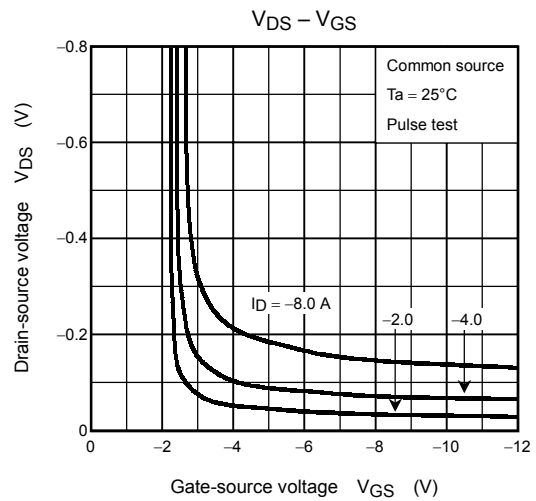
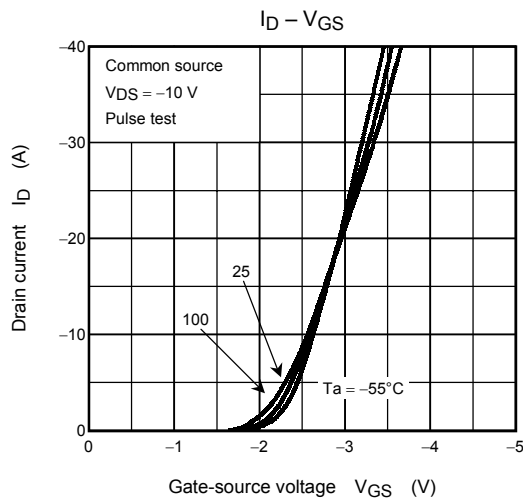
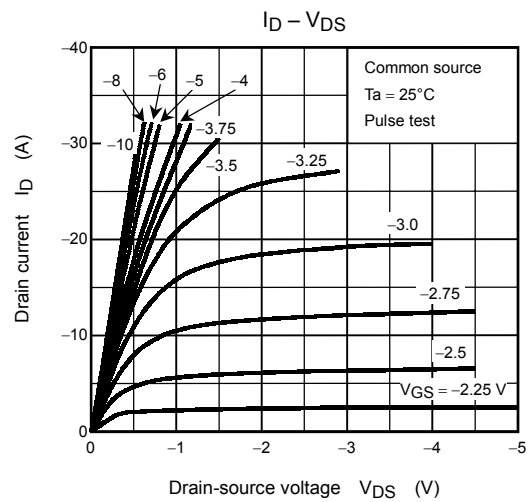
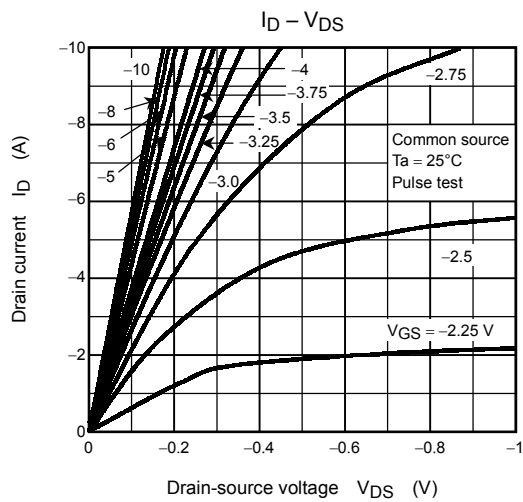
Note 5: • on lower left of the marking indicates Pin 1.  
※ shows lot number. (year of manufacture: last decimal digit of the year of manufacture, month of manufacture: January to December are denoted by letters A to L respectively.)

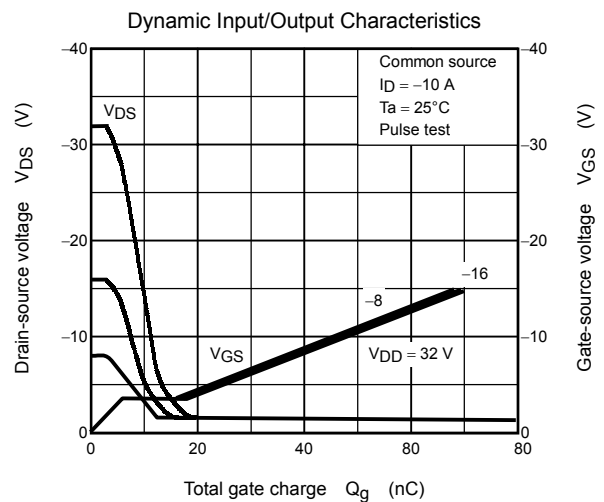
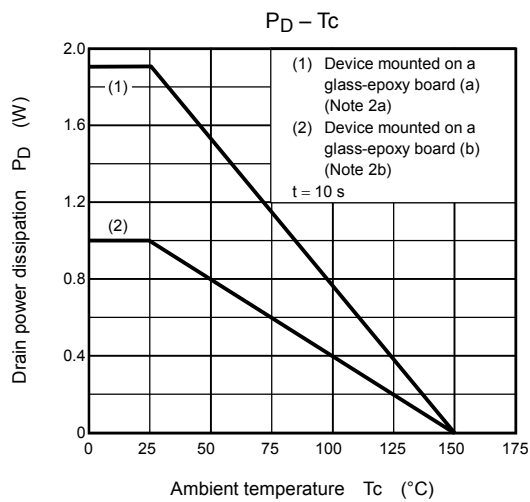
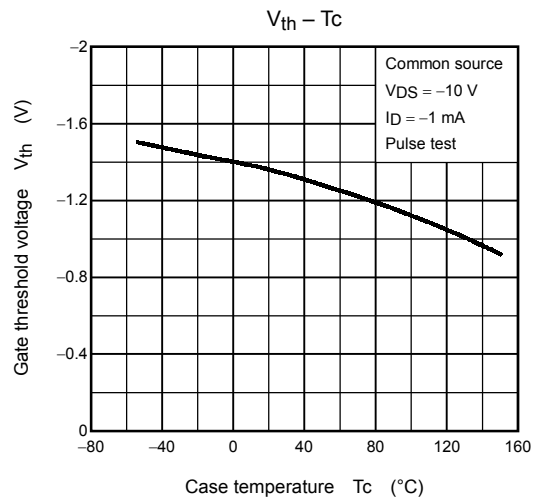
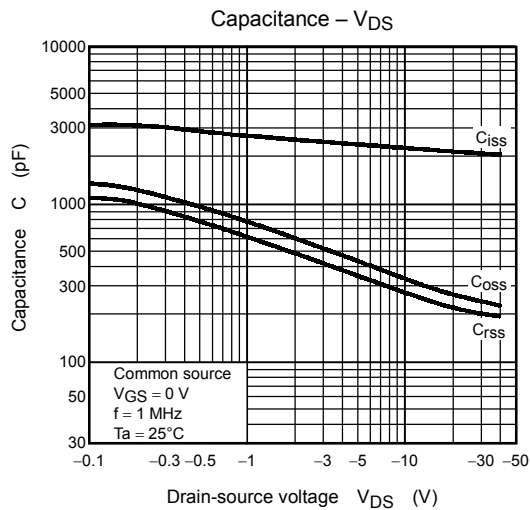
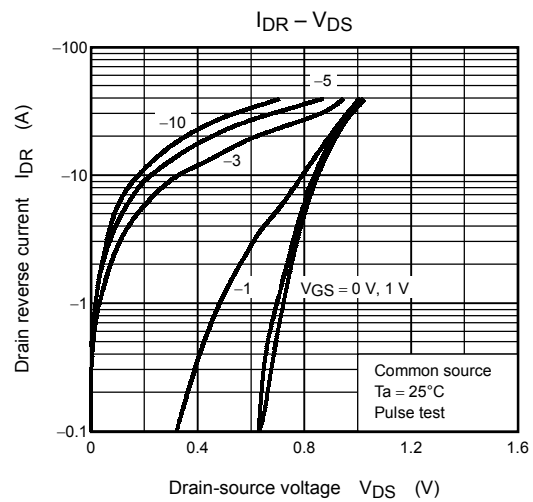
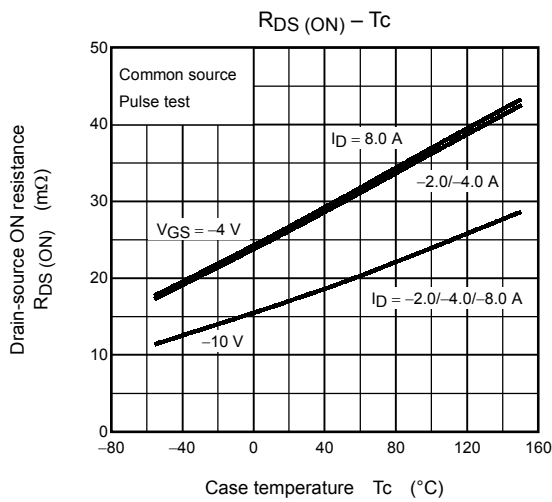
## Electrical Characteristics (Ta = 25°C)

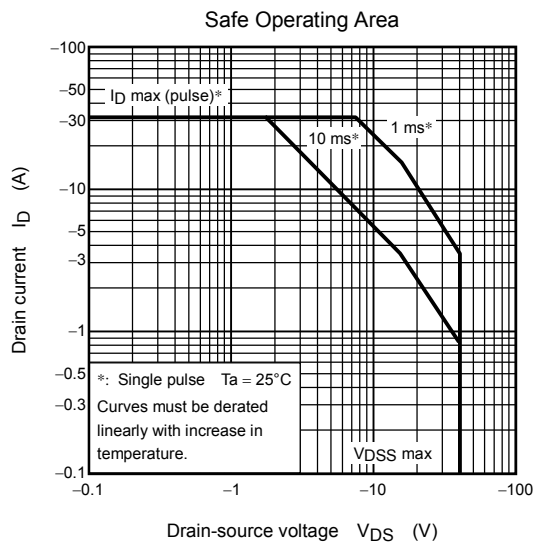
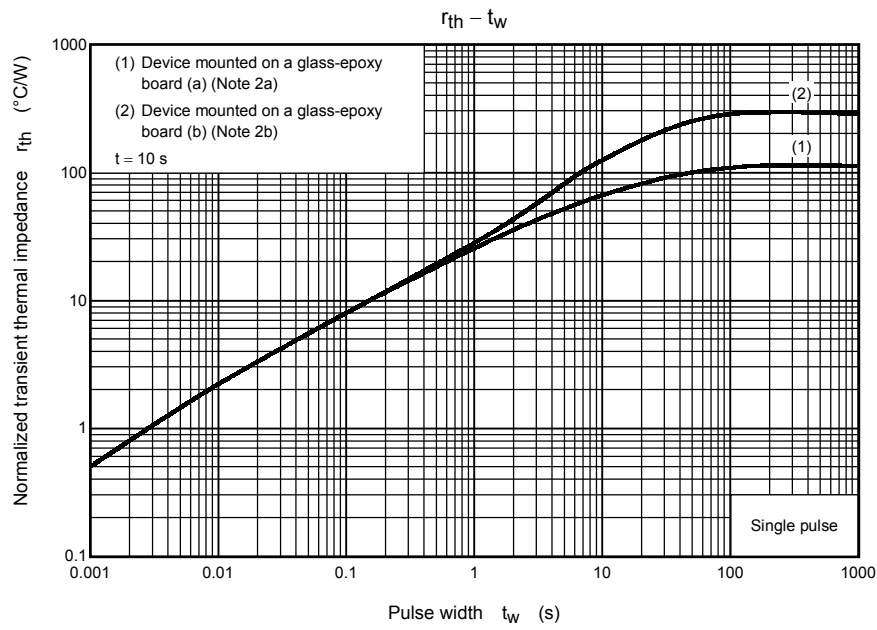
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I <sub>GSS</sub>	V <sub>GS</sub> = ±16 V, V <sub>DS</sub> = 0 V	—	—	±10	μA
Drain cut-OFF current		I <sub>DSS</sub>	V <sub>DS</sub> = -40 V, V <sub>GS</sub> = 0 V	—	—	-10	μA
Drain-source breakdown voltage		V <sub>(BR)</sub> DSS	I <sub>D</sub> = -10 mA, V <sub>GS</sub> = 0 V	-40	—	—	V
		V <sub>(BR)</sub> DSX	I <sub>D</sub> = -10 mA, V <sub>GS</sub> = 20 V	-25	—	—	
Gate threshold voltage		V <sub>th</sub>	V <sub>DS</sub> = -10 V, I <sub>D</sub> = -1 mA	-0.8	—	-2.0	V
Drain-source ON resistance		R <sub>DS</sub> (ON)	V <sub>GS</sub> = -4 V, I <sub>D</sub> = -4.0 A	—	27	35	mΩ
			V <sub>GS</sub> = -10 V, I <sub>D</sub> = -4.0 A	—	17	25	
Forward transfer admittance		Y <sub>fs</sub>	V <sub>DS</sub> = -10 V, I <sub>D</sub> = -4.0 A	8	16	—	S
Input capacitance		C <sub>iss</sub>	V <sub>DS</sub> = -10 V, V <sub>GS</sub> = 0 V, f = 1 MHz	—	2180	—	pF
Reverse transfer capacitance		C <sub>rss</sub>		—	275	—	
Output capacitance		C <sub>oss</sub>		—	330	—	
Switching time	Rise time	t <sub>r</sub>	 V <sub>DD</sub> ≈ -20 V Duty ≤ 1%, t <sub>w</sub> = 10 μs	—	6.0	—	ns
	Turn-ON time	t <sub>on</sub>		—	15	—	
	Fall time	t <sub>f</sub>		—	30	—	
	Turn-OFF time	t <sub>off</sub>		—	115	—	
Total gate charge (gate-source plus gate-drain)		Q <sub>g</sub>	V <sub>DD</sub> ≈ -32 V, V <sub>GS</sub> = -10 V, I <sub>D</sub> = -8 A	—	48	—	nC
Gate-source charge 1		Q <sub>gs1</sub>		—	5.5	—	
Gate-drain (“miller”) charge		Q <sub>gd</sub>		—	12	—	

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

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current	Pulse (Note 1)	$I_{DRP}$	—	—	—	-32	A
Forward voltage (diode)		$V_{DSF}$	$I_{DR} = -8 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	1.2	V







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