

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

TPC8117

Lithium Ion Battery Applications

Notebook PC Applications

- Small footprint due to small and thin package
- Low drain-source ON-resistance : $R_{DS(ON)} = 3.0 \text{ m}\Omega$ (typ.)
- High forward transfer admittance : $|Y_{fs}| = 54 \text{ S}$ (typ.)
- Low leakage current: $I_{DSS} = -10 \text{ }\mu\text{A}$ (max) ($V_{DS} = -30 \text{ V}$)
- Enhancement mode: $V_{th} = -0.8 \text{ to } -2.0 \text{ V}$ ($V_{DS} = -10 \text{ V}$, $I_D = -1 \text{ mA}$)

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

Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	-30	V
Drain-gate voltage ($R_{GS} = 20 \text{ k}\Omega$)		V_{DGR}	-30	V
Gate-source voltage		V_{GSS}	± 20	V
Drain current	DC (Note 1)	I_D	-18	A
	Pulse (Note 1)	I_{DP}	-72	
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}	211	mJ
Avalanche current		I_{AR}	-18	A
Repetitive avalanche energy (Note 2a) (Note 4)		E_{AR}	0.030	mJ
Channel temperature		T_{ch}	150	$^\circ\text{C}$
Storage temperature range		T_{stg}	-55 to 150	$^\circ\text{C}$

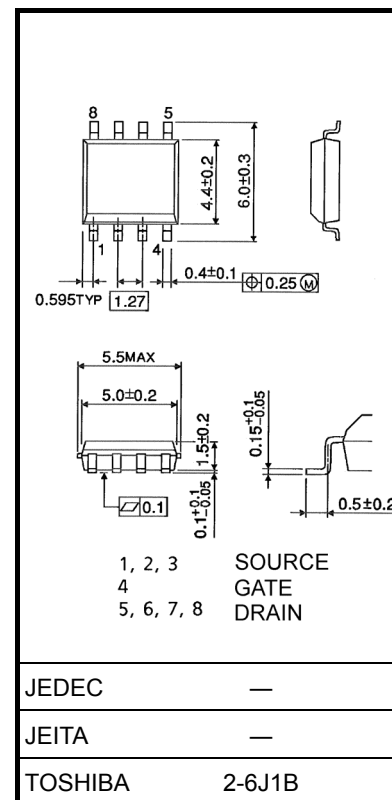
Note 1, Note 2, Note 3 and Note 4: See the next page.

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).

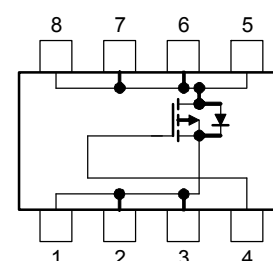
This transistor is an electrostatic-sensitive device. Handle with care.

Unit: mm



Weight: 0.080 g (typ.)

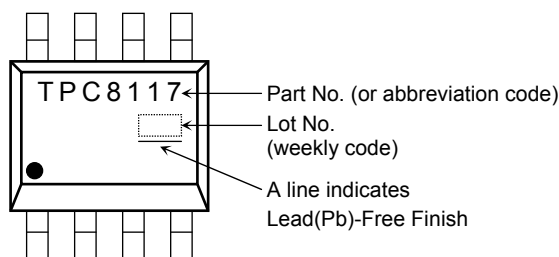
Circuit Configuration



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

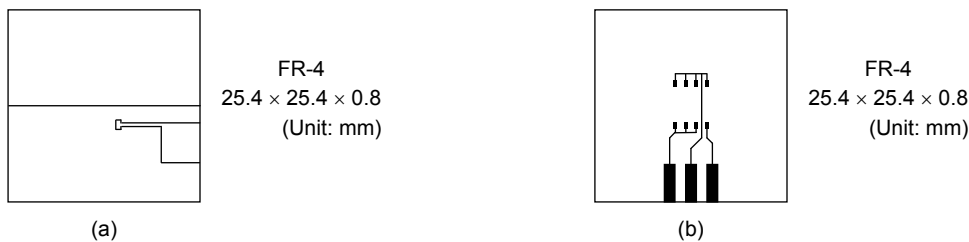
Marking (Note 5)



Note 1: 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)

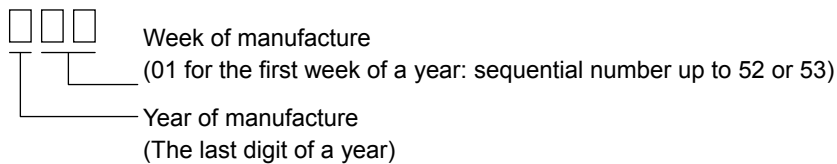


Note 3: $V_{DD} = -24\text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 500\text{ }\mu\text{H}$, $R_G = 25\text{ }\Omega$, $I_{AR} = -18\text{ A}$

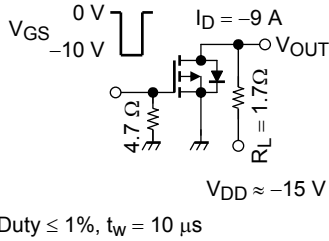
Note 4: Repetitive rating: pulse width limited by maximum channel temperature

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

※ Weekly code: (Three digits)

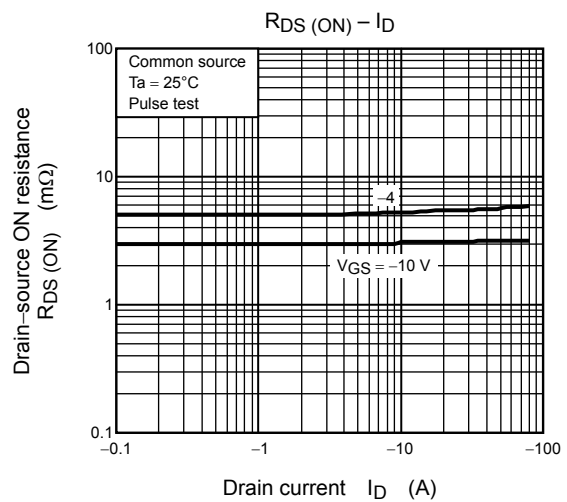
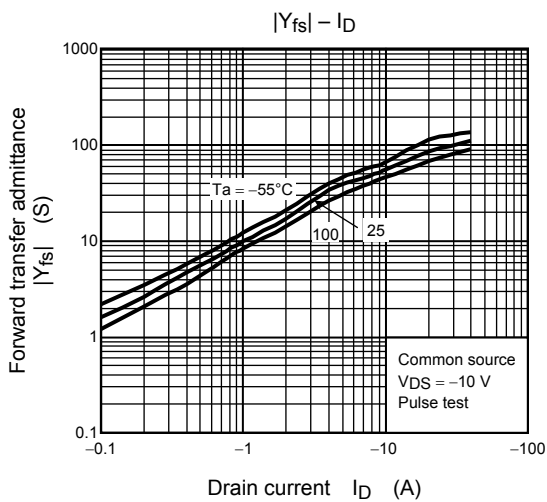
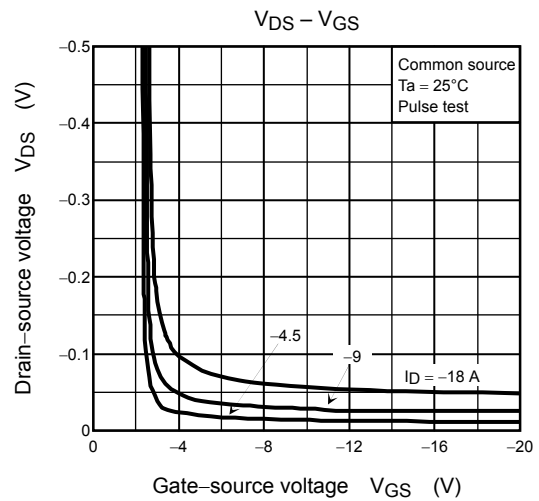
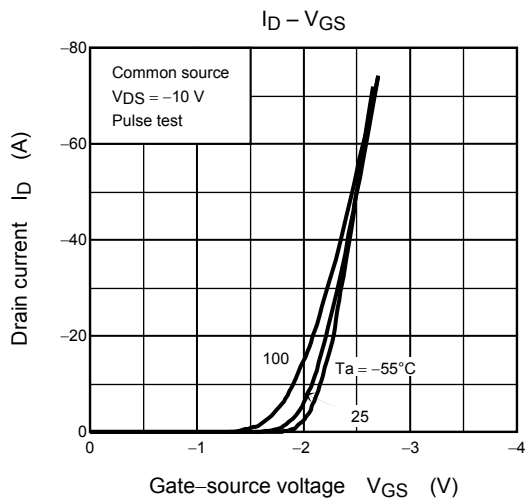
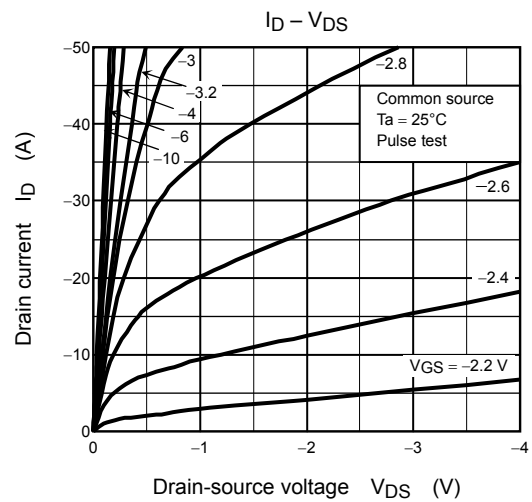
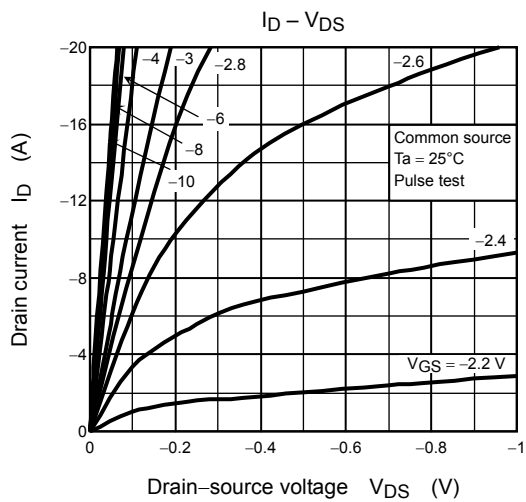


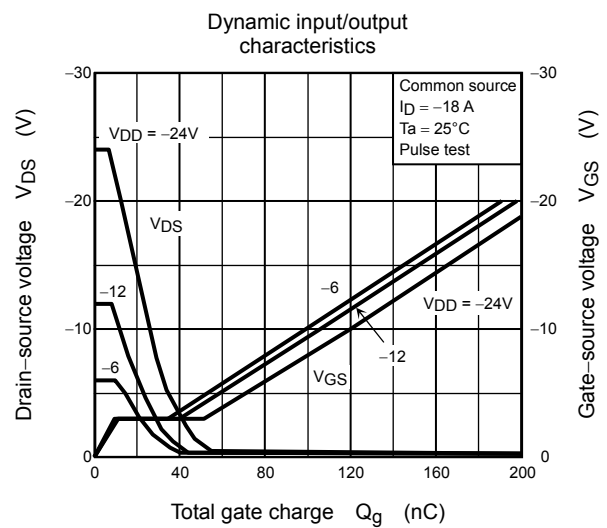
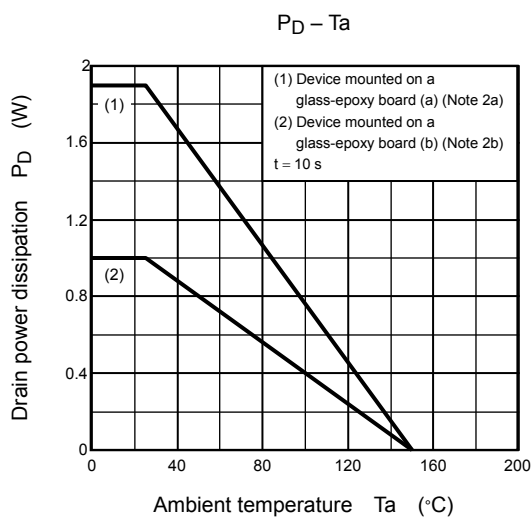
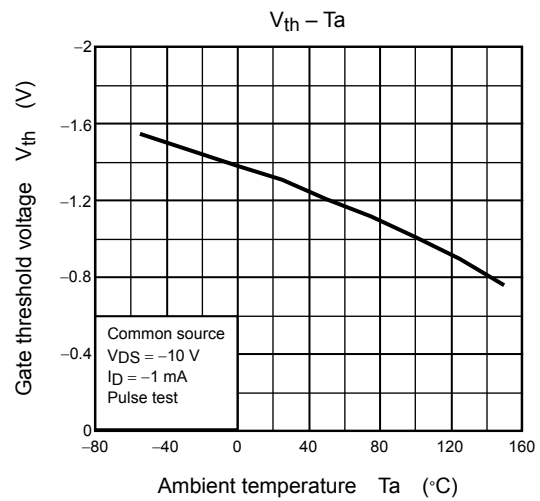
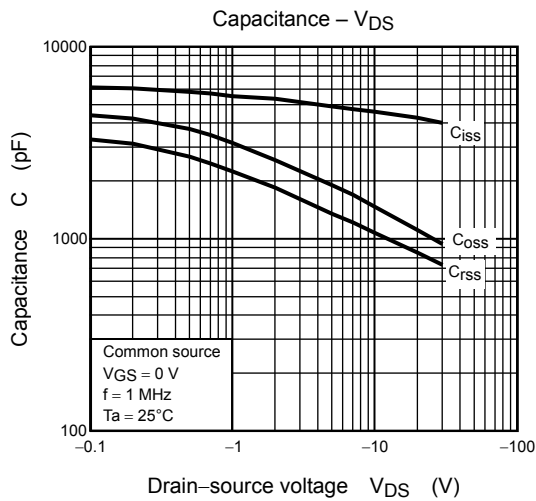
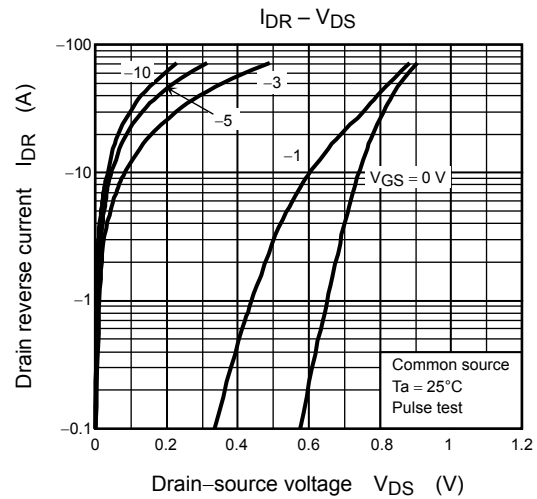
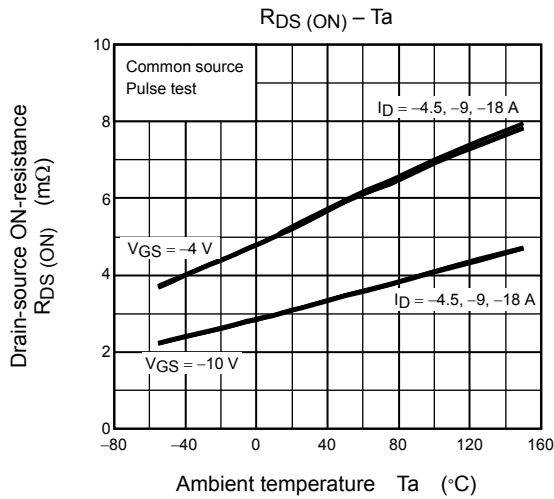
Electrical Characteristics (Ta = 25°C)

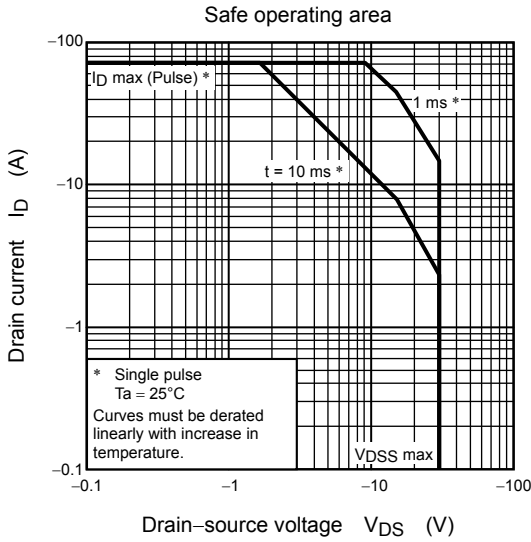
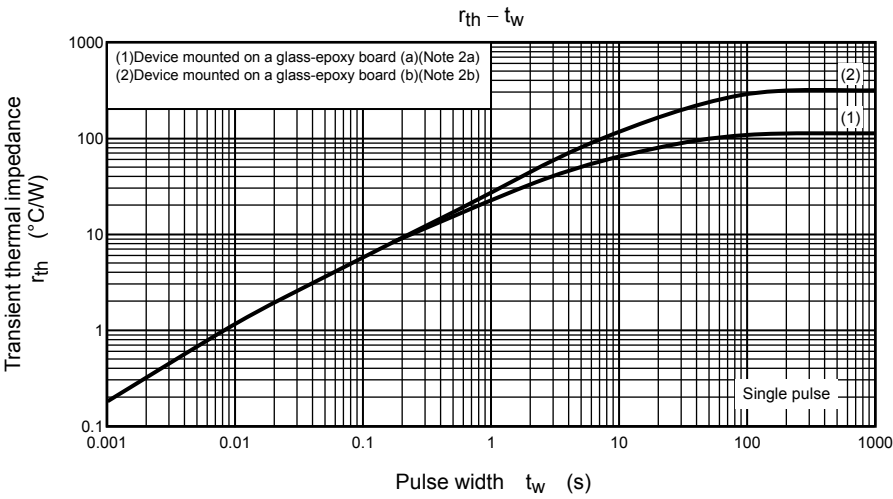
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I _{GSS}	V _{GS} = ±20 V, V _{DS} = 0 V	—	—	±100	nA
Drain cut-OFF current		I _{DSS}	V _{DS} = -30 V, V _{GS} = 0 V	—	—	-10	μA
Drain-source breakdown voltage		V (BR) DSS	I _D = -10 mA, V _{GS} = 0 V	-30	—	—	V
		V (BR) DSX	I _D = -10 mA, V _{GS} = 20 V	-13	—	—	
Gate threshold voltage		V _{th}	V _{DS} = -10 V, I _D = -1 mA	-0.8	—	-2.0	V
Drain-source ON-resistance		R _{DS} (ON)	V _{GS} = -4 V, I _D = -9 A	—	5.5	7.9	mΩ
			V _{GS} = -10 V, I _D = -9 A	—	3.0	3.9	
Forward transfer admittance		Y _{fs}	V _{DS} = -10 V, I _D = -9 A	27	54	—	S
Input capacitance		C _{iss}	V _{DS} = -10 V, V _{GS} = 0 V, f = 1 MHz	—	4600	—	pF
Reverse transfer capacitance		C _{rss}		—	970	—	
Output capacitance		C _{oss}		—	1500	—	
Switching time	Rise time	t _r		—	10	—	ns
	Turn-ON time	t _{on}		—	20	—	
	Fall time	t _f		—	300	—	
	Turn-OFF time	t _{off}		—	800	—	
Total gate charge (gate-source plus gate-drain)		Q _g	V _{DD} ≈ -24 V, V _{GS} = -10 V, I _D = -18 A	—	130	—	nC
Gate-source charge 1		Q _{gs1}		—	12	—	
Gate-drain ("miller") charge		Q _{gd}		—	40	—	

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

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current	Pulse (Note 1)	I_{DRP}	—	—	—	-72	A
Forward voltage (diode)		V_{DSF}	$I_{DR} = -18 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	1.2	V







RESTRICTIONS ON PRODUCT USE

20070701-EN GENERAL

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In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc.
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