

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

TPCC8103

Notebook PC Applications

Portable Equipment Applications

- Small footprint due to a small and thin package
- Low drain-source ON-resistance:
 $R_{DS(ON)} = 9.4 \text{ m}\Omega$ (typ.) ($V_{GS} = -10 \text{ V}$)
- Low leakage current: $I_{DSS} = -10 \text{ }\mu\text{A}$ (max) ($V_{DS} = -30 \text{ V}$)
- Enhancement mode: $V_{th} = -0.8 \text{ to } -2.0 \text{ V}$ ($V_{DS} = -10 \text{ V}$, $I_D = -1.0 \text{ mA}$)

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

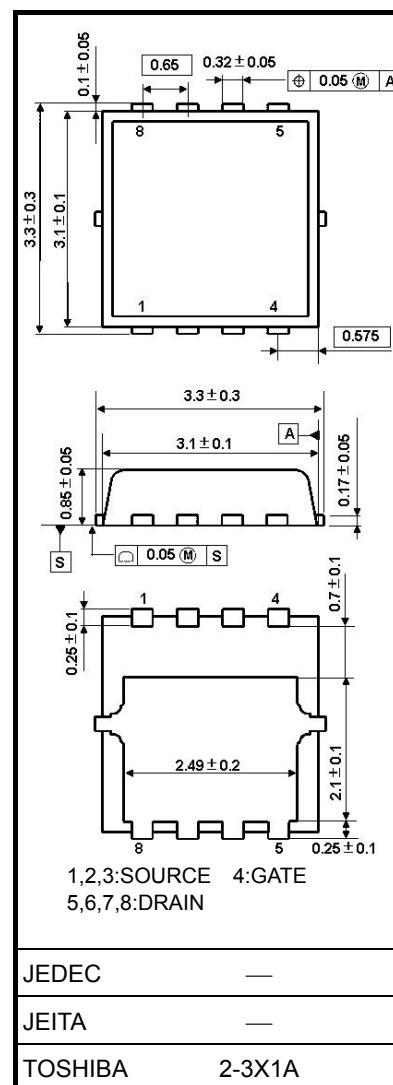
Characteristic		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	-30	V
Drain-gate voltage ($R_{GS} = 20 \text{ k}\Omega$)		V_{DGR}	-30	V
Gate-source voltage		V_{GSS}	± 20	V
Drain current	DC (Note 1)	I_D	-18	A
	Pulsed (Note 1)	I_{DP}	-54	
Drain power dissipation ($T_c = 25^\circ\text{C}$)		P_D	27	W
Drain power dissipation ($t = 10 \text{ s}$) (Note 2a)		P_D	1.9	W
Drain power dissipation ($t = 10 \text{ s}$) (Note 2b)		P_D	0.7	W
Single-pulse avalanche energy (Note 3)		E_{AS}	84	mJ
Avalanche current		I_{AR}	-18	A
Repetitive avalanche energy ($T_c = 25^\circ\text{C}$) (Note 4)		E_{AR}	1.59	mJ
Channel temperature		T_{ch}	150	$^\circ\text{C}$
Storage temperature range		T_{stg}	-55 to 150	$^\circ\text{C}$

Note: For Notes 1 to 4, refer to 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).

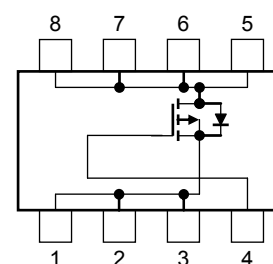
This transistor is an electrostatic-sensitive device. Handle with care.

Unit: mm



Weight: 0.02 g (typ.)

Circuit Configuration

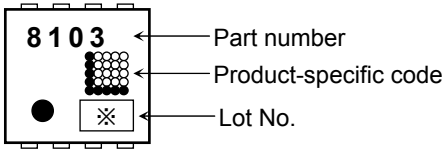


Start of commercial production
2009-06

Thermal Characteristics

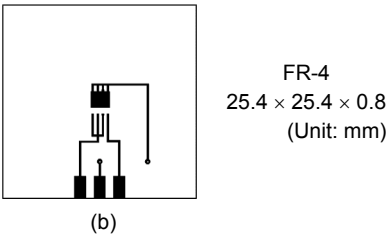
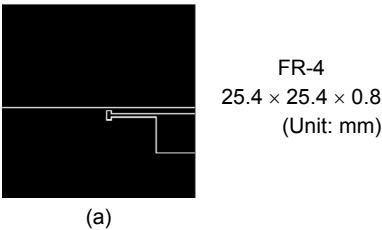
Characteristic	Symbol	Max	Unit
Thermal resistance, channel to case ($T_c = 25^{\circ}\text{C}$)	$R_{th (ch-c)}$	4.7	$^{\circ}\text{C/W}$
Thermal resistance, channel to ambient ($t = 10\text{ s}$) (Note 2a)	$R_{th (ch-a)}$	66	$^{\circ}\text{C/W}$
Thermal resistance, channel to ambient ($t = 10\text{ s}$) (Note 2b)	$R_{th (ch-a)}$	180	$^{\circ}\text{C/W}$

Marking (Note 5)



Note 1: Ensure that the channel temperature does not exceed 150°C.

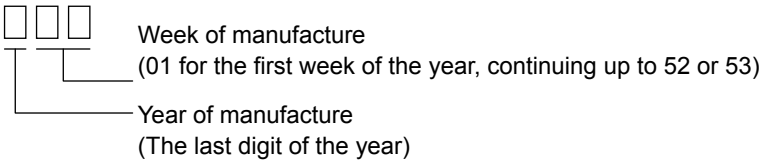
Note 2: (a) Device mounted on a glass-epoxy board (a) (b) Device mounted on a glass-epoxy board (b)



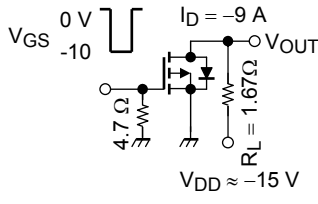
Note 3: $V_{DD} = -24\text{ V}$, $T_{ch} = 25^{\circ}\text{C}$ (initial), $L = 200\text{ }\mu\text{H}$, $R_G = 25\text{ }\Omega$, $I_{AR} = -18\text{ A}$

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

Note 5: * Weekly code: (Three digits)

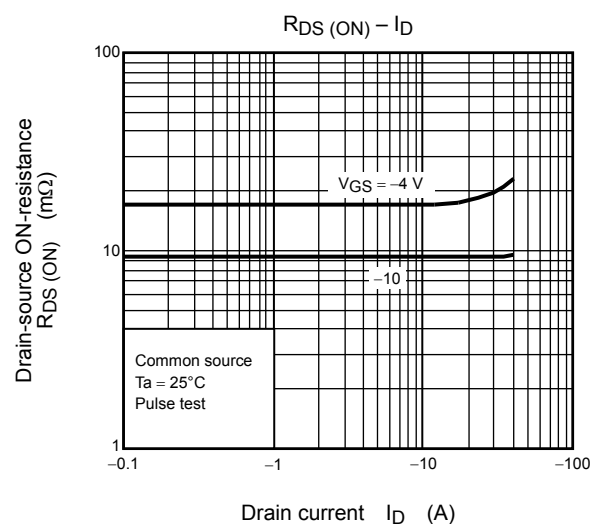
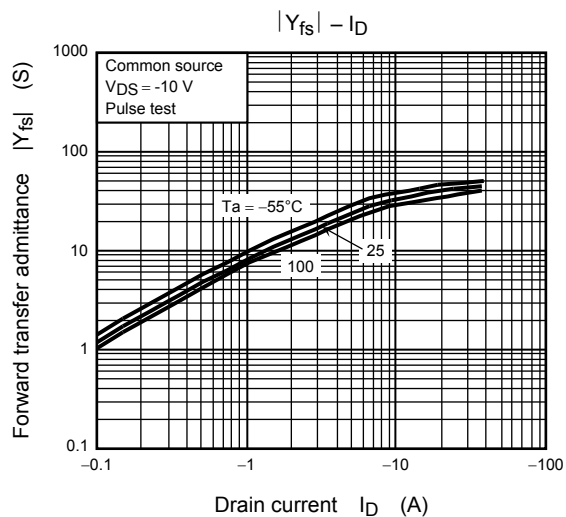
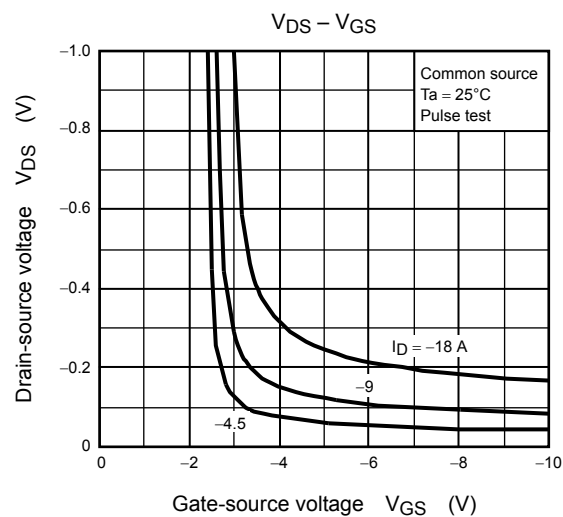
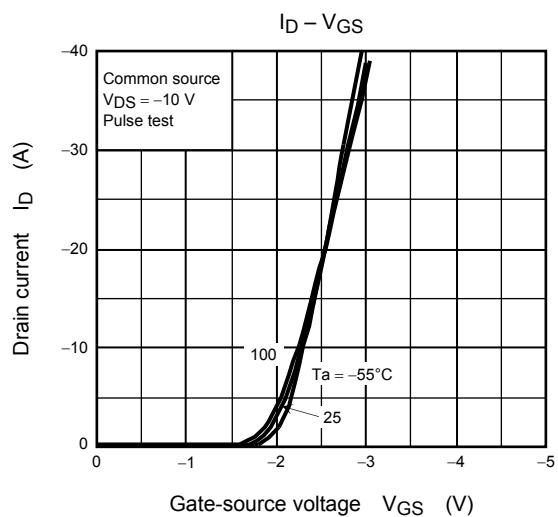
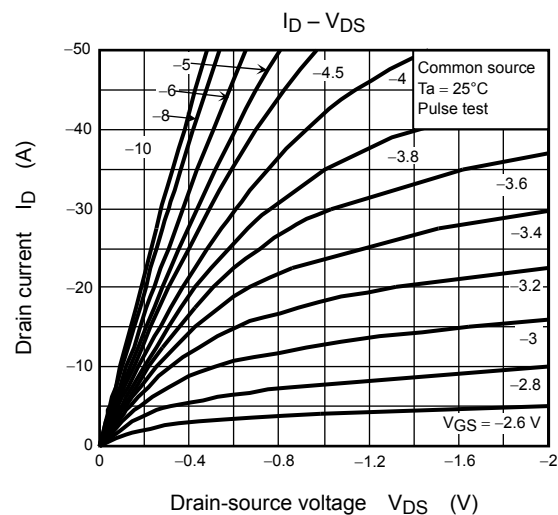
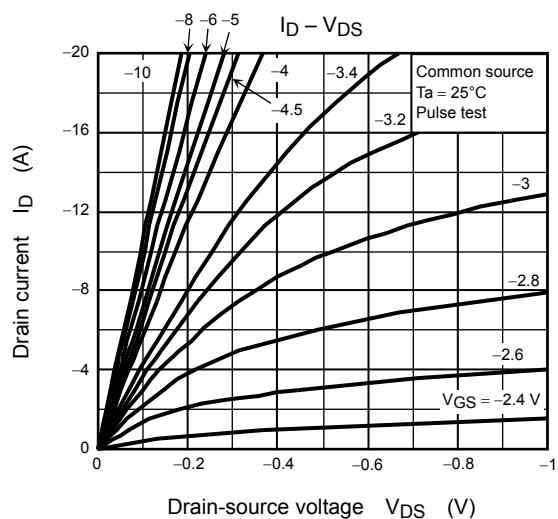


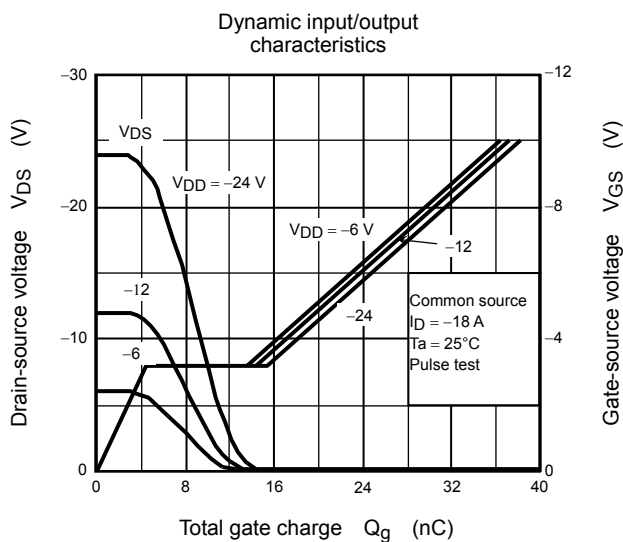
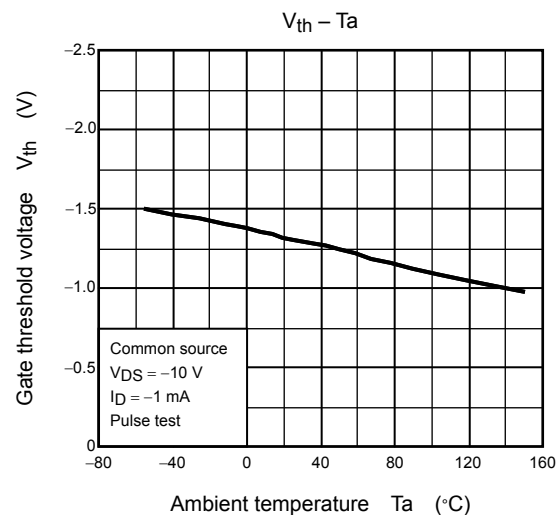
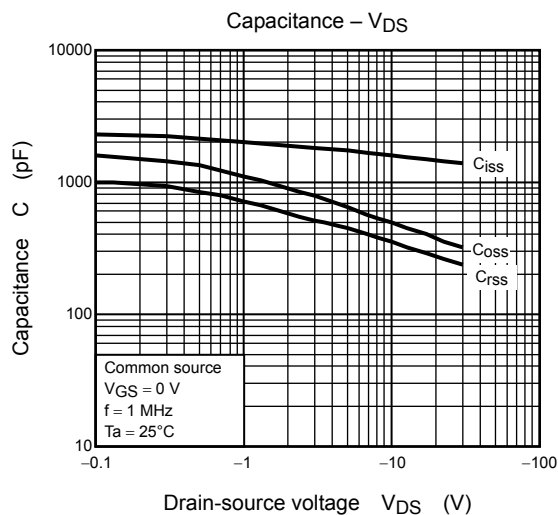
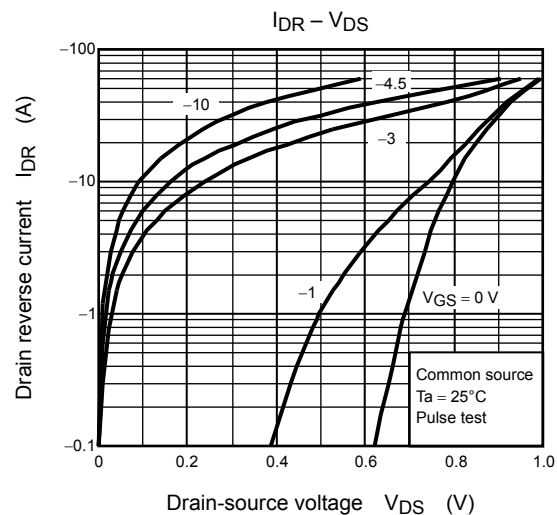
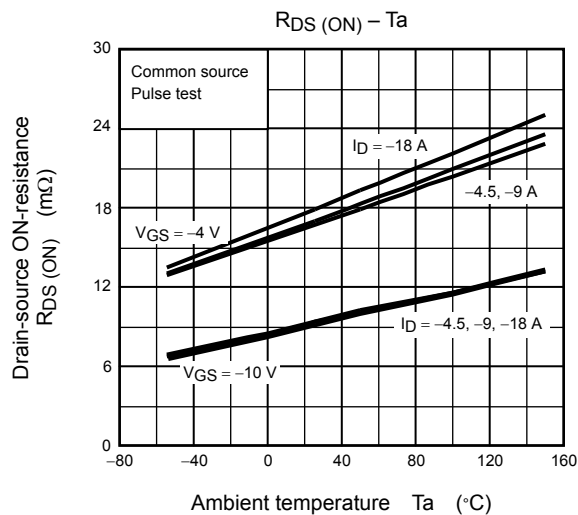
Electrical Characteristics (Ta = 25°C)

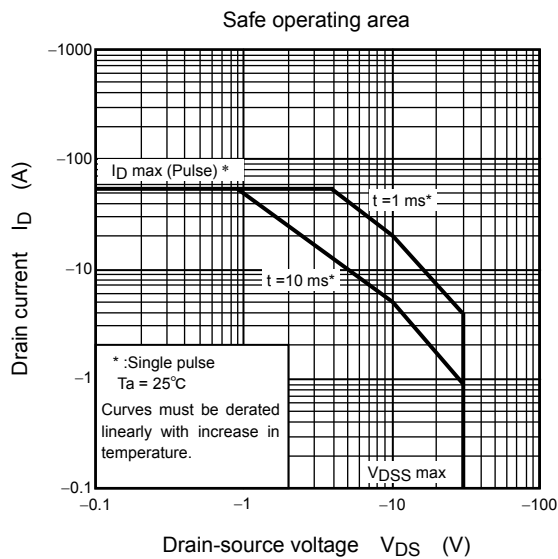
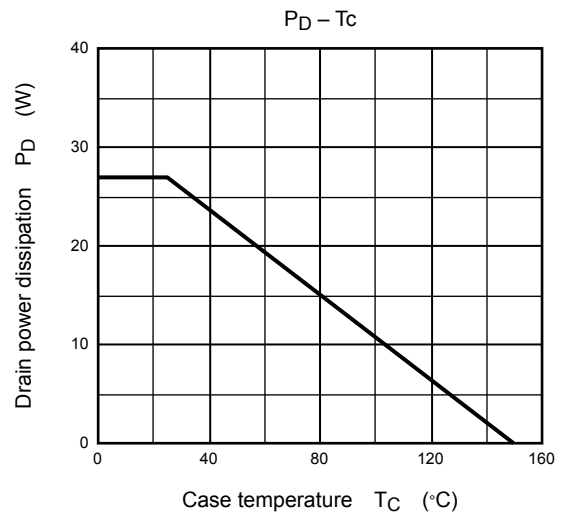
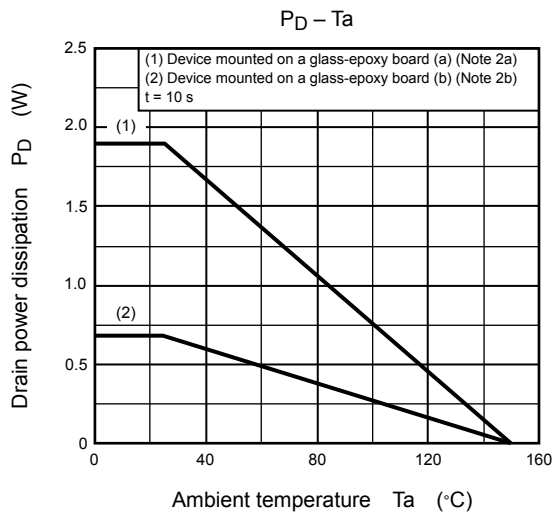
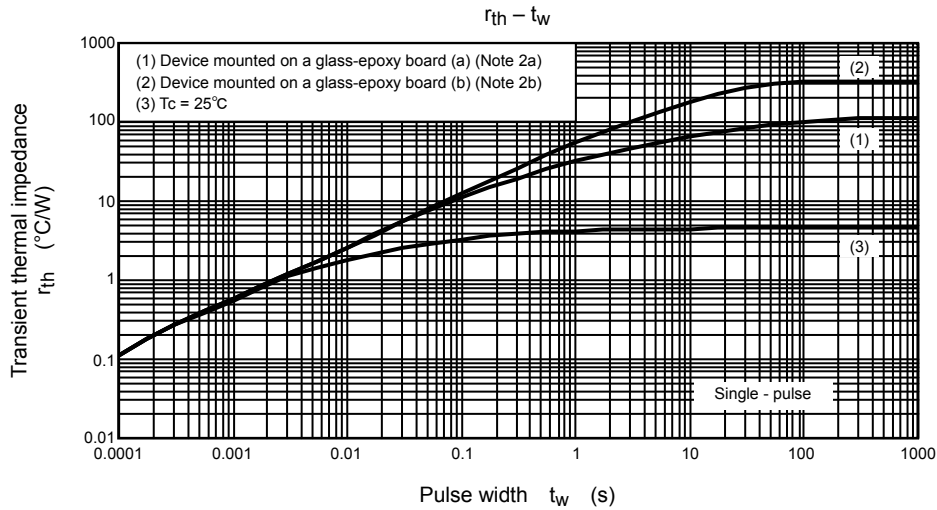
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I _{GSS}	V _{GS} = ±20 V, V _{DS} = 0 V	—	—	±100	nA
Drain cutoff current		I _{DSS}	V _{DS} = -30 V, V _{GS} = 0 V	—	—	-10	μA
Drain-source breakdown voltage		V (BR) DSS	I _D = -10 mA, V _{GS} = 0 V	-30	—	—	V
		V (BR) DSX	I _D = -10 mA, V _{GS} = 20 V	-13	—	—	
Gate threshold voltage		V _{th}	V _{DS} = -10 V, I _D = -1.0 mA	-0.8	—	-2.0	V
Drain-source ON-resistance		R _{DS (ON)}	V _{GS} = -4 V, I _D = -9 A	—	17	25	mΩ
			V _{GS} = -10 V, I _D = -9 A	—	9.4	12	
Forward transfer admittance		Y _{fs}	V _{DS} = -10 V, I _D = -9 A	15	30	—	S
Input capacitance		C _{iss}	V _{DS} = -10 V, V _{GS} = 0 V, f = 1 MHz	—	1600	—	pF
Reverse transfer capacitance		C _{rss}		—	340	—	
Output capacitance		C _{oss}		—	490	—	
Switching time	Rise time	t _r	 <p>Duty ≤ 1%, t_w = 10 μs</p>	—	9.3	—	ns
	Turn-on time	t _{on}		—	16	—	
	Fall time	t _f		—	68	—	
	Turn-off time	t _{off}		—	175	—	
Total gate charge (gate-source plus gate-drain)		Q _g	V _{DD} ≈ -24 V, V _{GS} = -10 V, I _D = -18 A	—	38	—	nC
Gate-source charge 1		Q _{gs1}		—	4.5	—	
Gate-drain (“Miller”) charge		Q _{gd}		—	11	—	

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

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current	Pulse (Note 1)	I_{DRP}	—	—	—	-54	A
Forward voltage (diode)		V_{DSF}	$I_{DR} = -18 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	1.2	V







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