

TPCF8002

Notebook PC Applications

Portable Equipment Applications

- Small footprint due to a small and thin package
- Low drain-source ON resistance: $R_{DS(ON)} = 16 \text{ m}\Omega$ (typ.)
- Low leakage current: $I_{DSS} = 10 \text{ }\mu\text{A}$ (max) ($V_{DS} = 30 \text{ V}$)
- Enhancement mode: $V_{th} = 1.3 \text{ to } 2.5 \text{ V}$
($V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$)

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

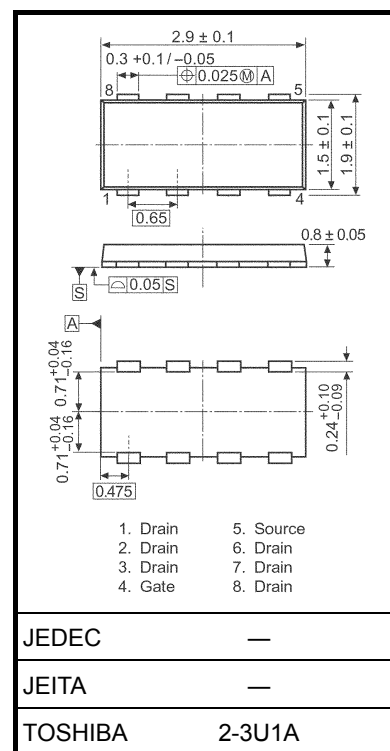
Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	30	V
Drain-gate voltage ($R_{GS} = 20 \text{ k}\Omega$)		V_{DGR}	30	V
Gate-source voltage		V_{GSS}	± 20	V
Drain current	DC (Note 1)	I_D	7	A
	Pulse (Note 1)	I_{DP}	28	
Drain power dissipation ($t = 5 \text{ s}$) (Note 2a)		P_D	2.5	W
Drain power dissipation ($t = 5 \text{ s}$) (Note 2b)		P_D	0.7	W
Single-pulse avalanche energy (Note 3)		E_{AS}	3.2	mJ
Avalanche current		I_{AR}	3.5	A
Channel temperature		T_{ch}	150	$^\circ\text{C}$
Storage temperature range		T_{stg}	-55 to 150	$^\circ\text{C}$

Note: For Notes 1 to 3, 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).

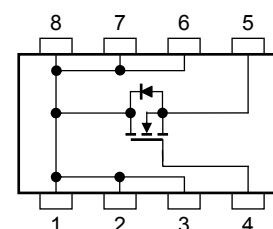
This transistor is an electrostatic-sensitive device. Handle with care.

Unit: mm



Weight: 0.011 g (typ.)

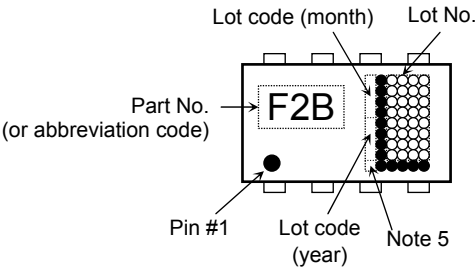
Circuit Configuration



Thermal Characteristics

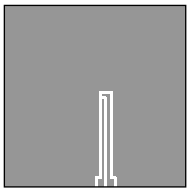
Characteristics	Symbol	Max	Unit
Thermal resistance, channel to ambient (t = 5 s) (Note 2a)	R _{th} (ch-a)	50.0	°C/W
Thermal resistance, channel to ambient (t = 5 s) (Note 2b)	R _{th} (ch-a)	178.6	°C/W

Marking (Note 4)

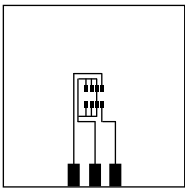


Note 1: Ensure that the channel temperature does not exceed 150°C.

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



(a)



(b)

Note 3: V_{DD} = 24 V, T_{ch} = 25°C (initial), L = 200μH, R_G = 25 Ω, I_{AR} = 3.5 A

Note 4: “●” on the lower left of the marking indicates Pin 1.

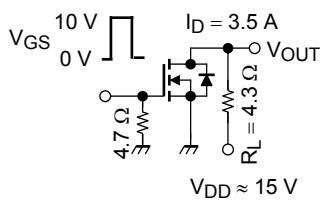
Note 5 A dot marking identifies the indication of product Labels.

Without a dot: [[Pb]]/INCLUDES > MCV

With a dot: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

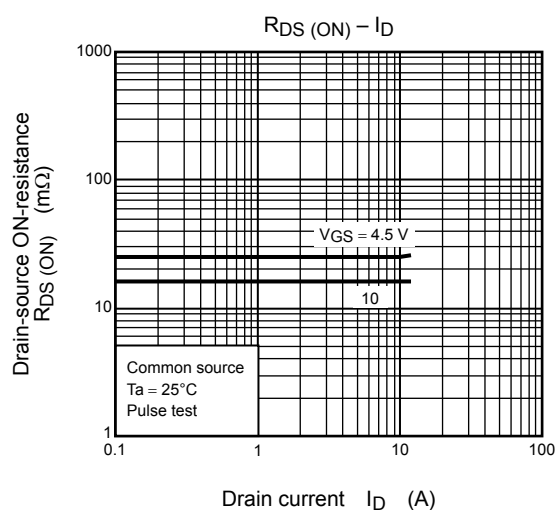
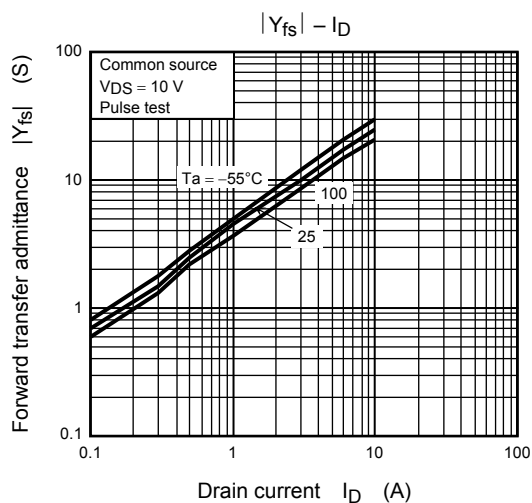
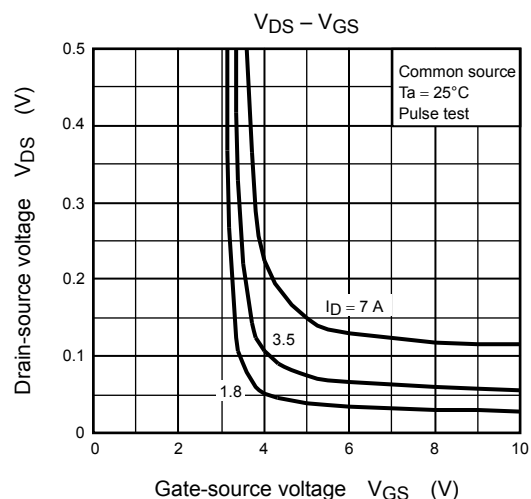
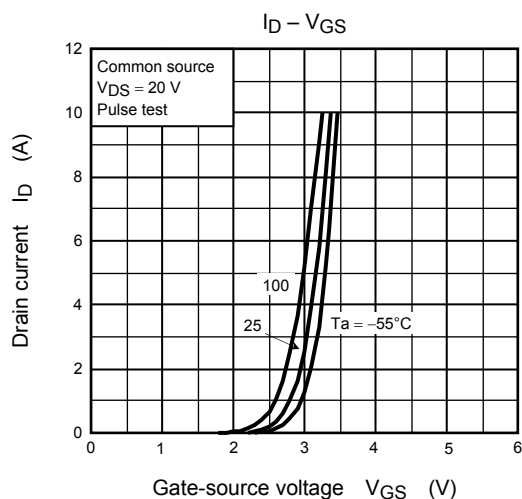
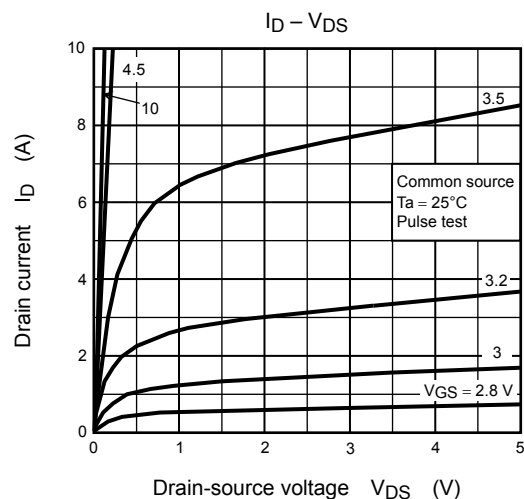
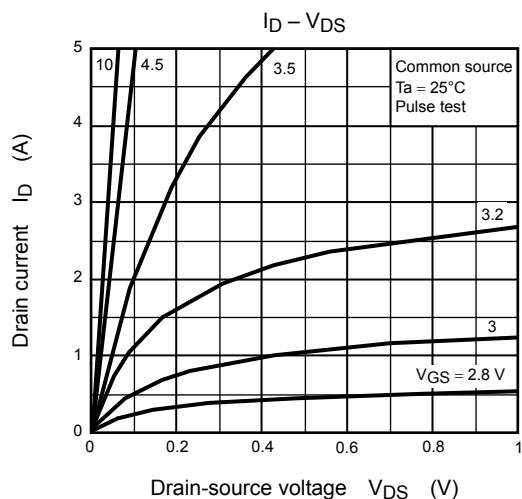
Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

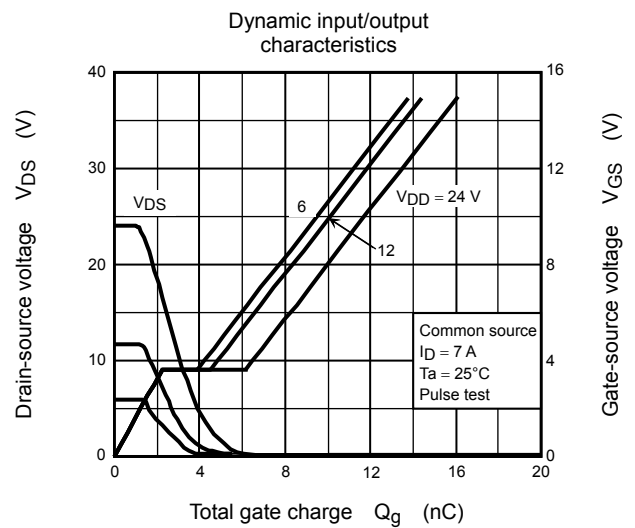
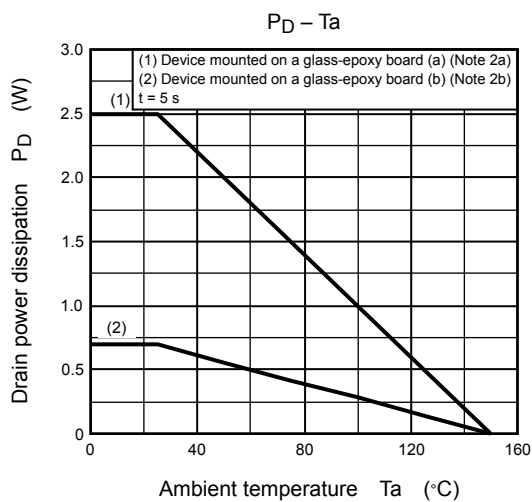
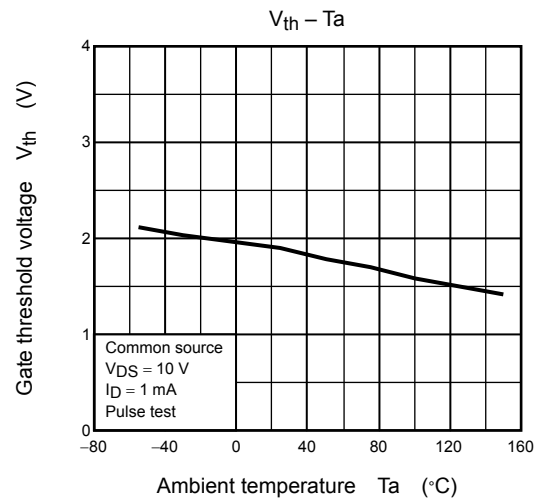
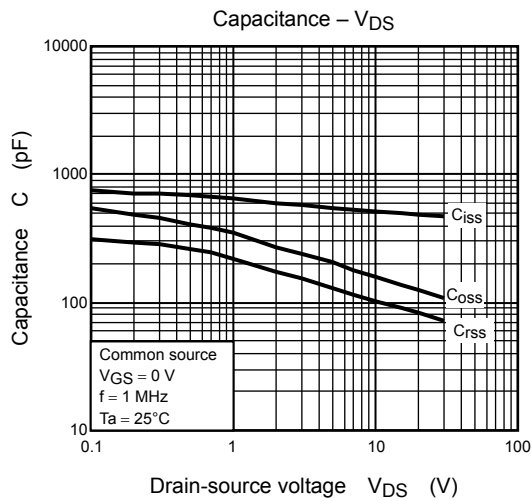
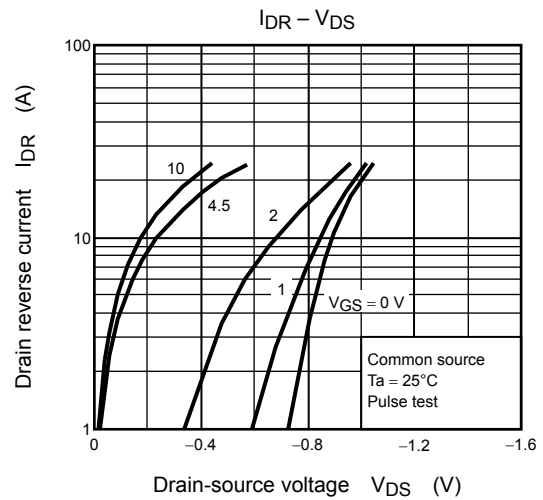
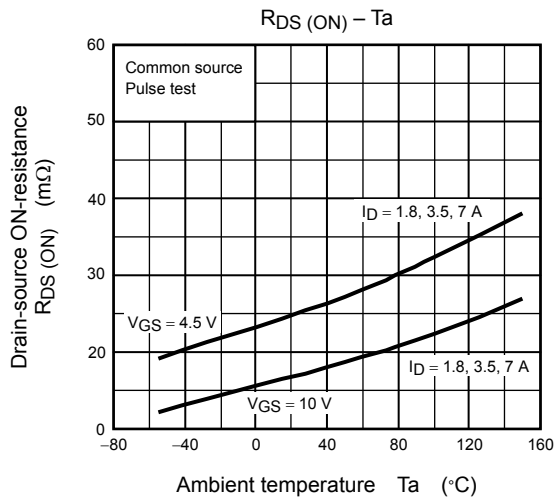
Electrical Characteristics (Ta = 25°C)

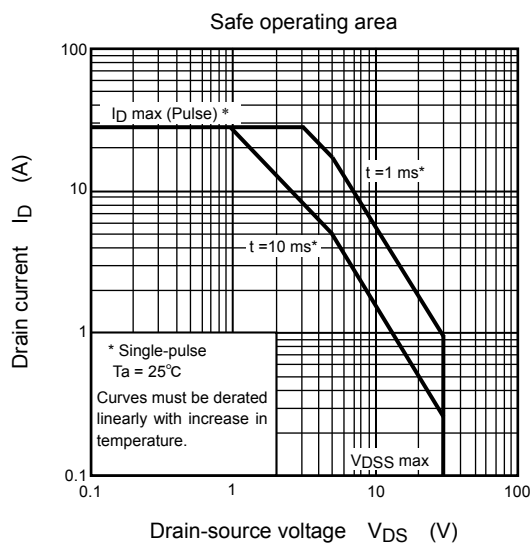
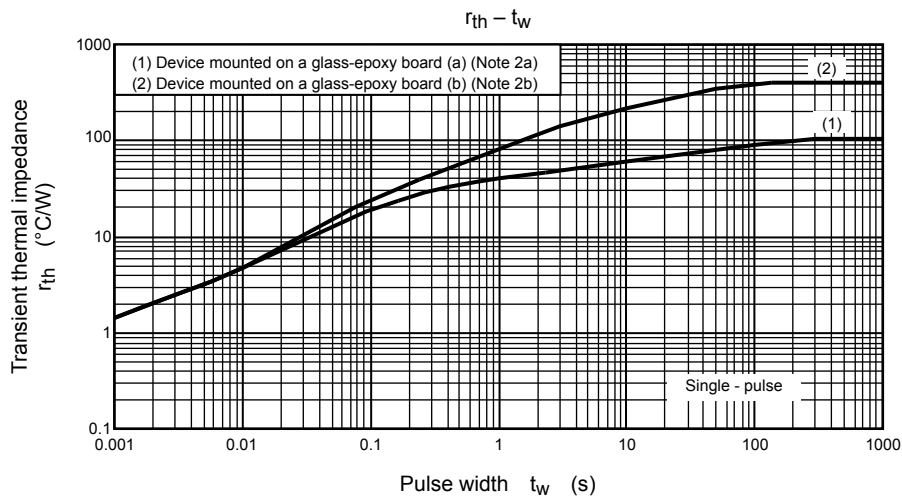
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I _{GSS}	V _{GS} = ±20 V, V _{DS} = 0 V	—	—	±100	nA
Drain cut-off current		I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V	—	—	10	μA
Drain-source breakdown voltage		V (BR) DSS	I _D = 10 mA, V _{GS} = 0 V	30	—	—	V
		V (BR) DSX	I _D = 10 mA, V _{GS} = −20 V	10	—	—	
Gate threshold voltage		V _{th}	V _{DS} = 10 V, I _D = 1mA	1.3	—	2.5	V
Drain-source ON resistance		R _{DS (ON)}	V _{GS} = 4.5 V, I _D = 3.5 A	—	24	32	mΩ
			V _{GS} = 10 V, I _D = 3.5 A	—	16	21	
Input capacitance		C _{iss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz	—	500	—	pF
Reverse transfer capacitance		C _{rss}		—	105	—	
Output capacitance		C _{oss}		—	160	—	
Switching time	Rise time	t _r	 <p>V_{GS} 10 V 0 V</p> <p>I_D = 3.5 A</p> <p>V_{OUT}</p> <p>4.7 Ω</p> <p>4.3 Ω</p> <p>R_L = 4.3 Ω</p> <p>V_{DD} ≈ 15 V</p> <p>Duty ≤ 1%, t_w = 10 μs</p>	—	4.8	—	ns
	Turn-on time	t _{on}		—	8.8	—	
	Fall time	t _f		—	5.3	—	
	Turn-off time	t _{off}		—	21	—	
Total gate charge (gate-source plus gate-drain)		Q _g	V _{DD} ≈ 24 V, V _{GS} = 10 V, I _D = 7.0 A	—	11.5	—	nC
Gate-source charge 1		Q _{gs1}		—	2.1	—	
Gate-drain (“miller”) charge		Q _{gd}		—	3.8	—	

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

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current	Pulse (Note 1)	I_{DRP}	—	—	—	24	A
Forward voltage (diode)		V_{DSF}	$I_{DR} = 7.0 \text{ A}$, $V_{GS} = 0 \text{ V}$	—	—	-1.2	V







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