

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

TPCM8006

Lithium Ion Battery Applications

Notebook PC Applications

Portable Equipment Applications

Unit: mm

- Small footprint due to a small and thin package
- Low drain-source ON-resistance: $R_{DS(ON)} = 5.5 \text{ m}\Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 46 \text{ S}$ (typ.)
- Low leakage current: $I_{DSS} = 10 \text{ }\mu\text{A}$ (max) ($V_{DS} = 30 \text{ V}$)
- Enhancement mode: $V_{th} = 1.3 \text{ to } 2.5 \text{ V}$ ($V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$)

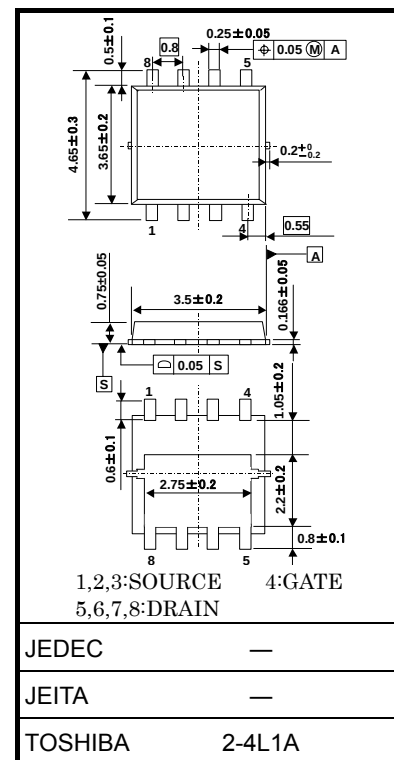
Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

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	A
	Pulsed (Note 1)	I_{DP}	
Drain power dissipation ($T_c = 25^\circ\text{C}$)	P_D	30	W
Drain power dissipation ($t = 10 \text{ s}$) (Note 2a)	P_D	2.3	W
Drain power dissipation ($t = 10 \text{ s}$) (Note 2b)	P_D	1.0	W
Single-pulse avalanche energy (Note 3)	E_{AS}	81	mJ
Avalanche current	I_{AR}	25	A
Repetitive avalanche energy ($T_c = 25^\circ\text{C}$) (Note 4)	E_{AR}	3.0	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.

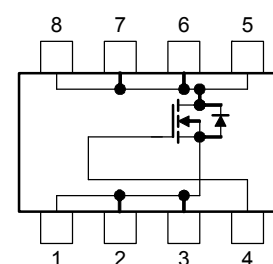
Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within 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.



Weight: 0.028 g (typ.)

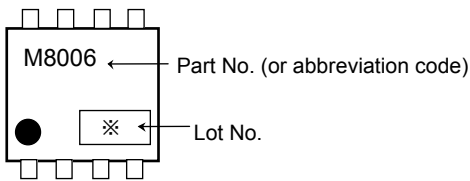
Circuit Configuration



Thermal Characteristics

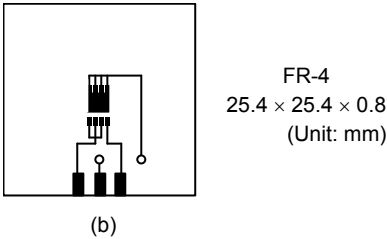
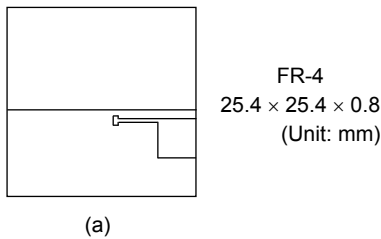
Characteristic	Symbol	Max	Unit
Thermal resistance, channel to case (Tc = 25°C)	R _{th} (ch-c)	4.17	°C/W
Thermal resistance, channel to ambient (t = 10 s) (Note 2a)	R _{th} (ch-a)	54.3	°C/W
Thermal resistance, channel to ambient (t = 10 s) (Note 2b)	R _{th} (ch-a)	125	°C/W

Marking (Note 5)



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

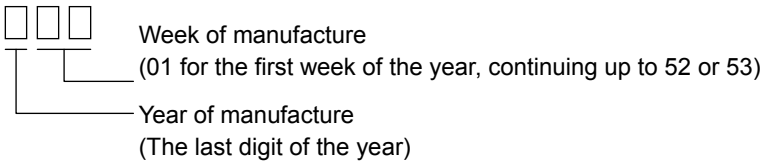
Note 2: (a) Device mounted on a glass-epoxy board (a) (b) Device mounted on a glass-epoxy board (b)



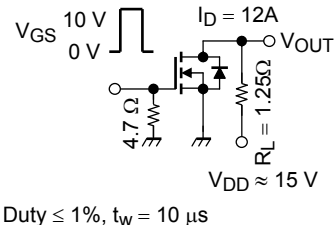
Note 3: V_{DD} = 24 V, T_{ch} = 25°C (initial), L = 100 μH, I_{AR} = 25 A

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

Note 5: * Weekly code: (Three digits)

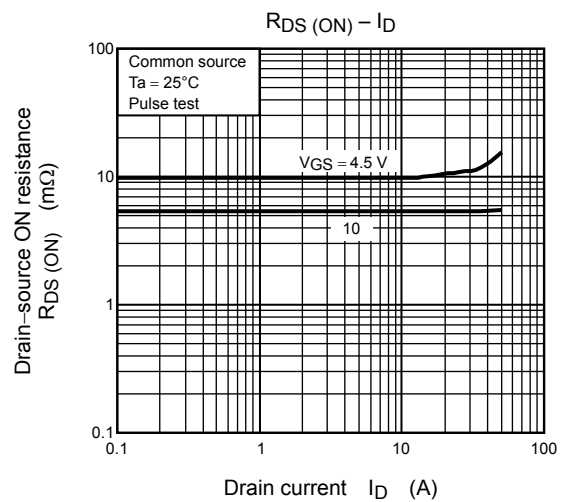
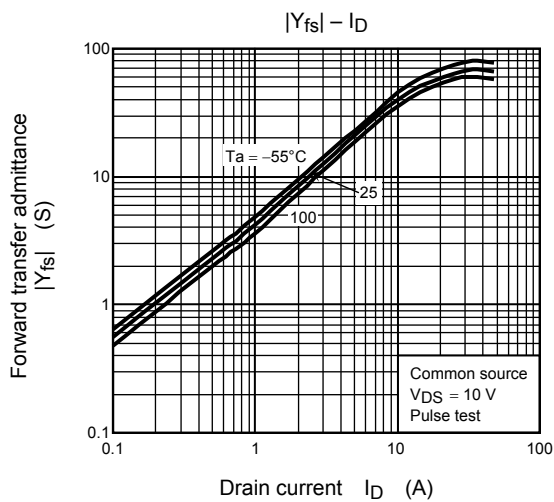
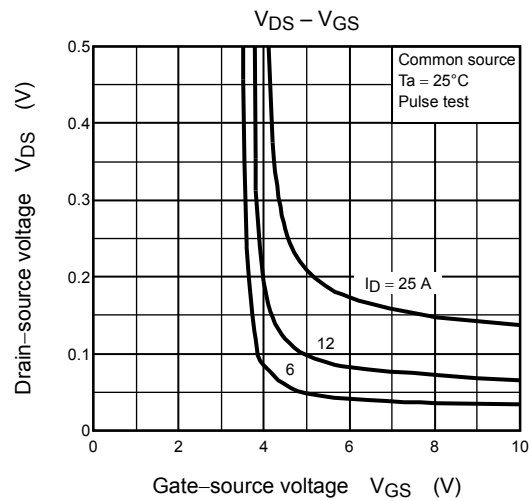
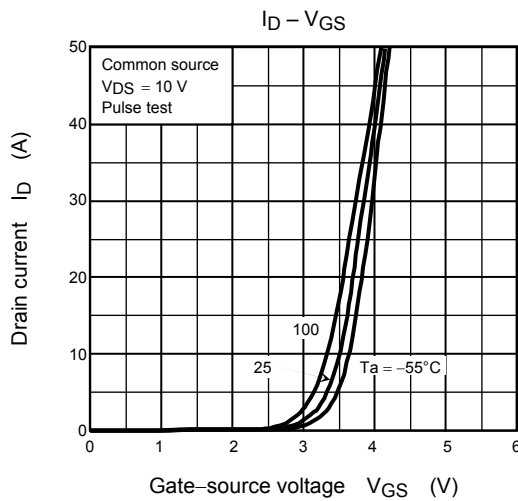
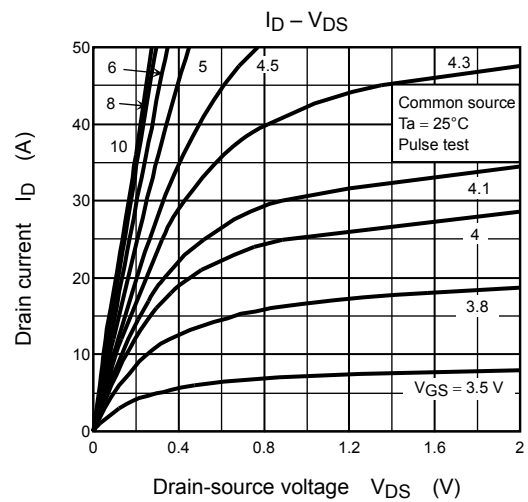
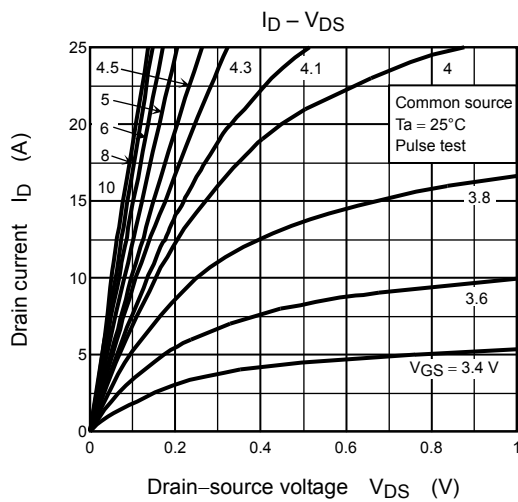


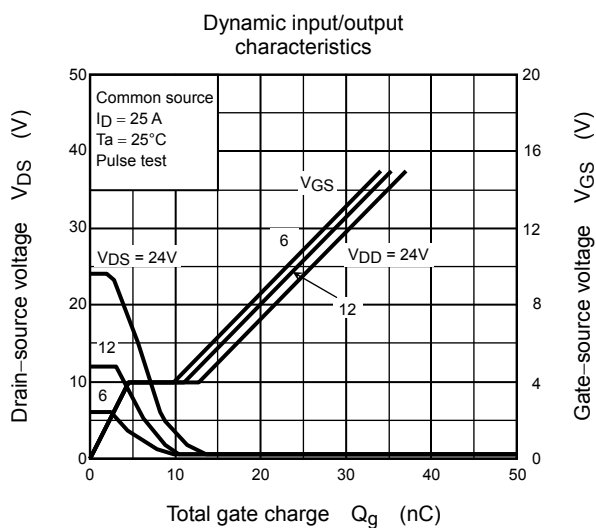
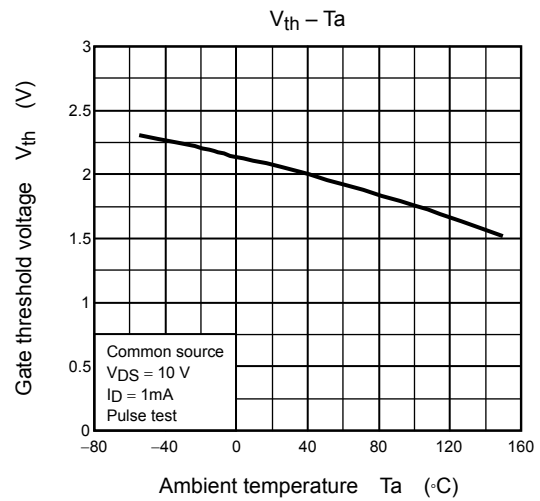
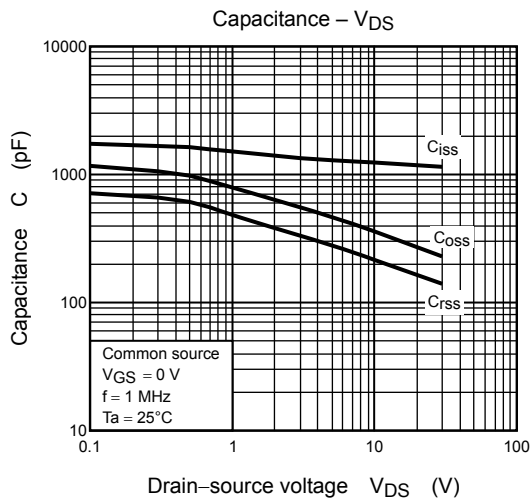
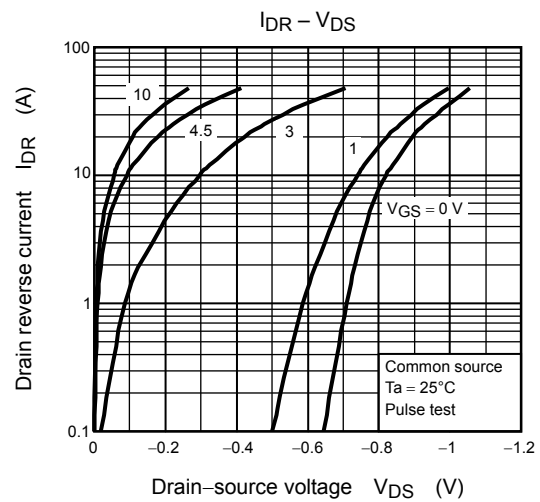
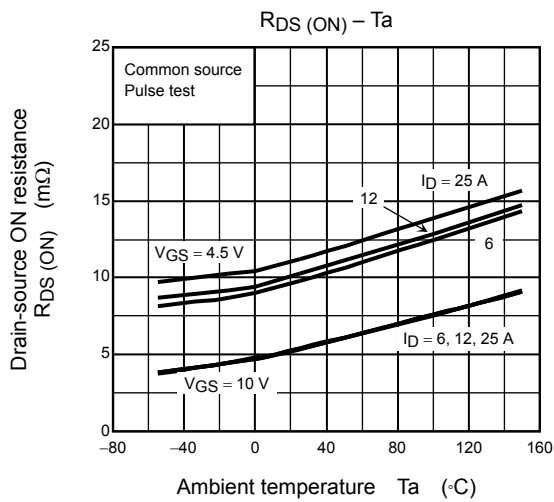
Electrical Characteristics (Ta = 25°C)

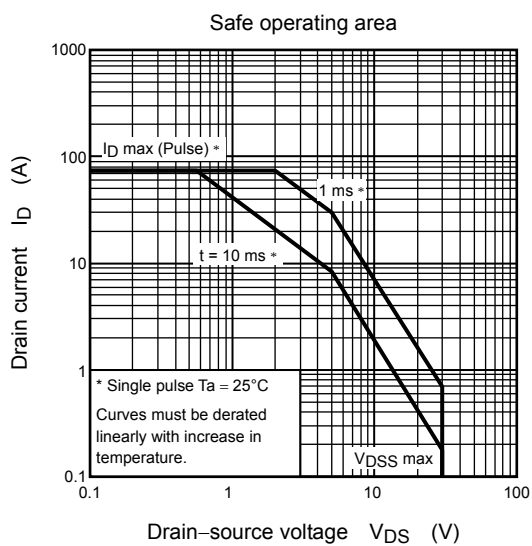
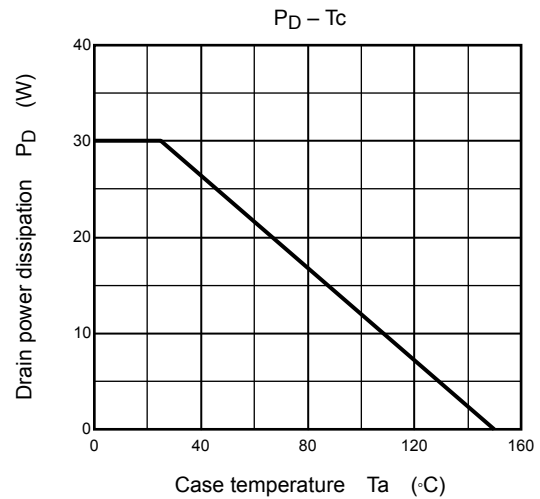
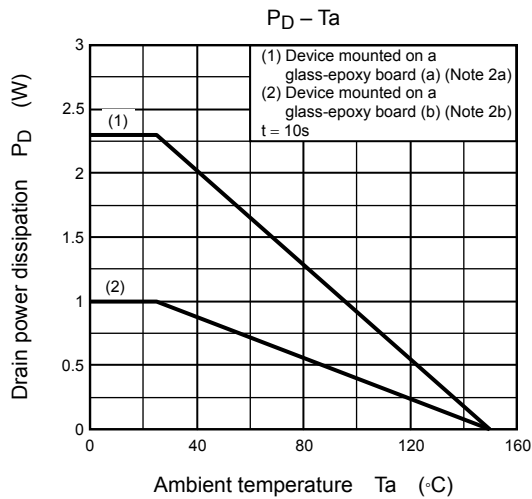
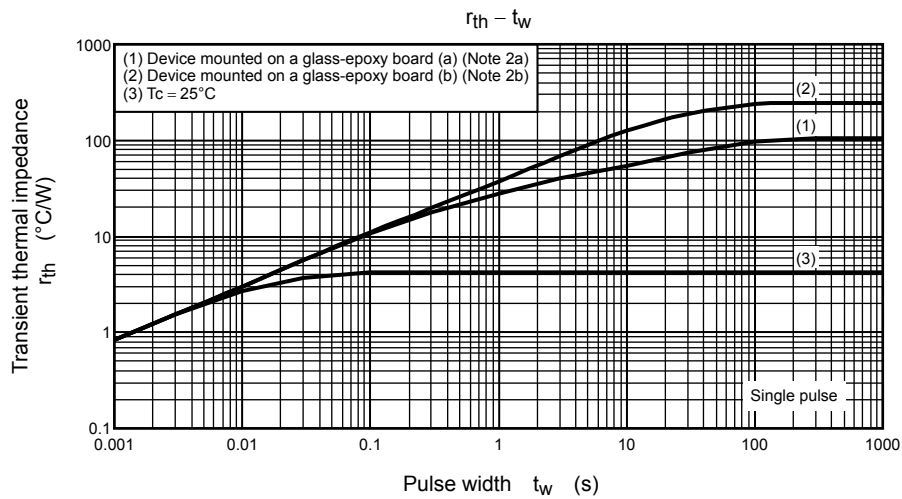
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I _{GSS}	V _{GS} = ±20 V, V _{DS} = 0 V	—	—	±100	nA
Drain cutoff current		I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V	—	—	10	μA
Drain-source breakdown voltage		V _(BR) DSS	I _D = 10 mA, V _{GS} = 0 V	30	—	—	V
		V _(BR) DSX	I _D = 10 mA, V _{GS} = −20 V	10	—	—	
Gate threshold voltage		V _{th}	V _{DS} = 10 V, I _D = 1 mA	1.3	—	2.5	V
Drain-source ON-resistance		R _{DS} (ON)	V _{GS} = 4.5 V, I _D = 12 A	—	9	13.5	mΩ
			V _{GS} = 10 V, I _D = 12 A	—	5.5	7	
Forward transfer admittance		Y _{fs}	V _{DS} = 10 V, I _D = 12 A	23	46	—	S
Input capacitance		C _{iss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz	—	1270	—	pF
Reverse transfer capacitance		C _{rss}		—	240	—	
Output capacitance		C _{oss}		—	380	—	
Switching time	Rise time	t _r	 V_{GS} 10 V 0 V I_D = 12 A V_{OUT} 4.7 Ω R_L = 1.25 Ω V_{DD} ≈ 15 V Duty ≤ 1%, t_w = 10 μs	—	11	—	ns
	Turn-on time	t _{on}		—	20	—	
	Fall time	t _f		—	14	—	
	Turn-off time	t _{off}		—	38	—	
Total gate charge (gate-source plus gate-drain)		Q _g	V _{DD} ≈ 24 V, V _{GS} = 10 V, I _D = 25 A	—	26	—	nC
Gate-source charge 1		Q _{gs1}		—	4.5	—	
Gate-drain (“Miller”) charge		Q _{gd}		—	8.2	—	

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

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current	Pulse (Note 1)	I_{DRP}	—	—	—	75	A
Forward voltage (diode)		V_{DSF}	$I_{DR} = 25 \text{ A}$, $V_{GS} = 0 \text{ V}$	—	—	-1.2	V







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