

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (U-MOSII)

TPC8006-H

LITHIUM ION BATTERY APPLICATIONS

NOTE BOOK PC, PORTABLE EQUIPMENTS APPLICATIONS

HIGH SPEED AND HIGH EFFICIENCY DC-DC CONVERTERS

INDUSTRIAL APPLICATIONS

Unit in mm

- High Speed Switching : 60% speed up
(compare with current type)
- Small Gate Charge : $Q_g = 16 \text{ nC}$ (Typ.)
- Low Drain-Source ON Resistance : $R_{DS(ON)} = 19 \text{ m}\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 8.8 \text{ S}$ (Typ.)
- Low Leakage Current : $I_{DSS} = 10 \mu\text{A}$ (Max.) ($V_{DS} = 30 \text{ V}$)
- Enhancement-Mode : $V_{th} = 1.3 \sim 2.5 \text{ V}$ ($V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$)

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	I_D	7 A
	Pulse	I_{DP}	28 A
Drain Power Dissipation*** ($T_a = 25^\circ\text{C}$)	P_D	2.4	W
Single Pulse Avalanche Energy**	E_{AS}	63.7	mJ
Avalanche Current	I_{AR}	7	A
Repetitive Avalanche Energy*	E_{AR}	0.24	mJ
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	$-55 \sim 150$	$^\circ\text{C}$

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Ambient***	$R_{th(ch-a)}$	52.1	$^\circ\text{C/W}$

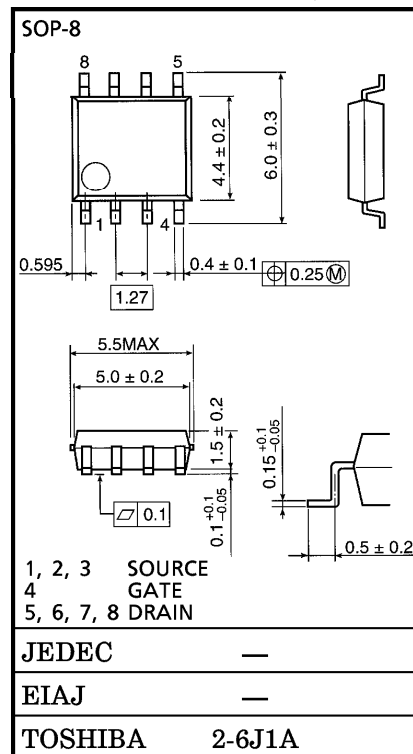
Note ;

* Repetitive rating ; Pulse Width Limited by Max. Junction Temperature.

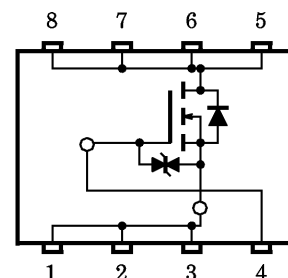
** $V_{DD} = 24 \text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 1.0 \text{ mH}$, $R_G = 25 \Omega$, $I_{AR} = 7 \text{ A}$

*** Drive operation ; Mount on glass epoxy board [$1 \text{ inch}^2 \times 0.8 \text{ t}$] ($t = 10 \text{ s}$)

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



CIRCUIT CONFIGURATION



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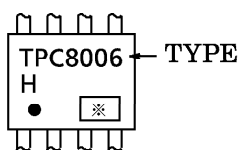
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		IGSS	VGS = ±16 V, VDS = 0 V	—	—	±10	μA
Drain Cut-Off Current		IDSS	VDS = 30 V, VGS = 0 V	—	—	10	μA
Drain-Source Breakdown Voltage	V(BR)DSS	ID = 10 mA, VGS = 0 V	30	—	—	V	
	V(BR)DSX	ID = 10 mA, VGS = -20 V	15	—	—		
Gate Threshold Voltage		Vth	VDS = 10 V, ID = 1 mA	1.3	—	2.5	V
Drain-Source ON Resistance	RDS(ON)	VGS = 4.5 V, ID = 3.5 A	—	29	40	mΩ	
		VGS = 10 V, ID = 3.5 A	—	19	27		
Forward Transfer Admittance		Yfs	VDS = 10 V, ID = 3.5 A	4.4	8.8	—	S
Input Capacitance		Ciss	VDS = 10 V, VGS = 0 V, f = 1 MHz	—	790	—	pF
Reverse Transfer Capacitance		Crss		—	110	—	
Output Capacitance		Coss		—	290	—	
Switching Time	Rise Time	tr	<p> V_{GS} 10 V, 0 V $I_D = 3.5$ A $R_L = 4.3$ Ω $V_{DD} \cong 15$ V </p>	—	5	—	ns
	Turn-On Time	ton		—	13	—	
	Fall Time	tf		—	8	—	
	Turn-Off Time	toff		$V_{IN} : t_r, t_f < 5$ ns Duty ≤ 1%, $t_w = 10$ μs	—	36	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Qg	VDD ≅ 24 V, VGS = 10 V, ID = 7 A	—	16	—	nC
Gate-Source Charge		Qgs		—	12	—	
Gate-Drain ("Miller") Charge		Qgd		—	4	—	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	IDR	—	—	—	7	A
Pulse Drain Reverse Current	IDRP	—	—	—	28	A
Diode Forward Voltage	VDSF	IDR = 7 A, VGS = 0 V	—	—	-1.2	V

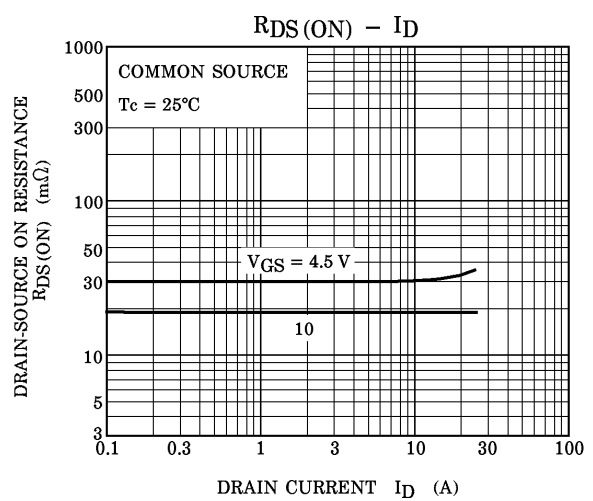
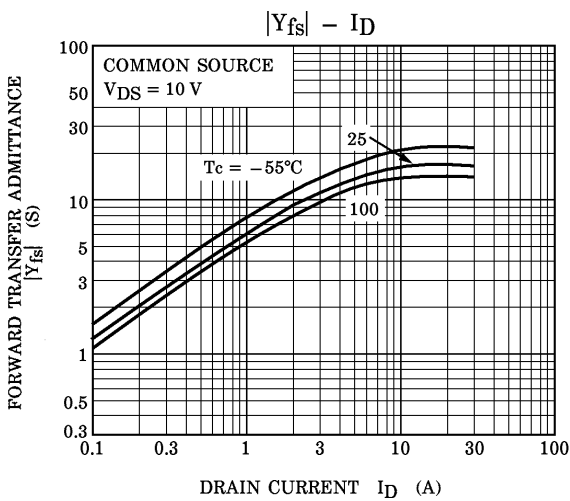
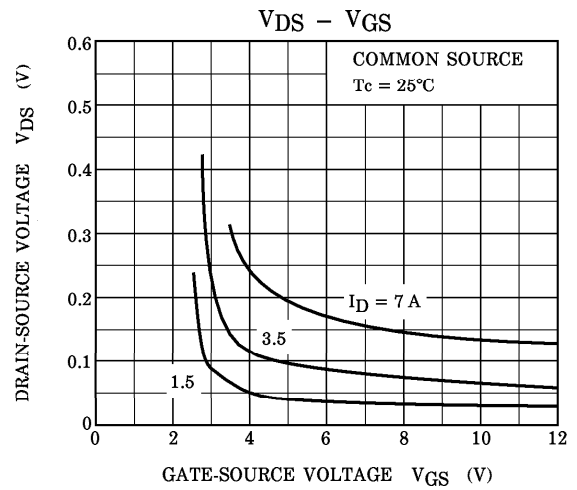
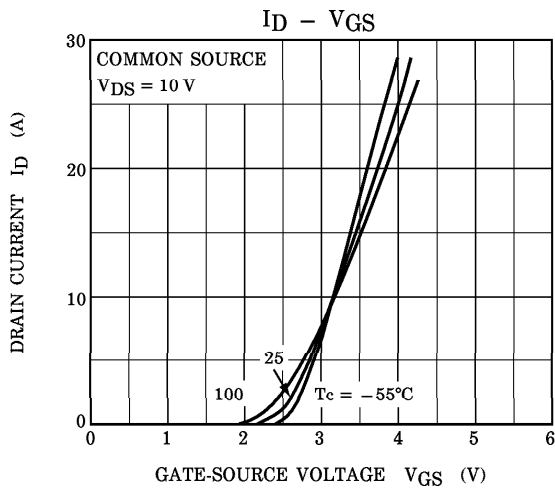
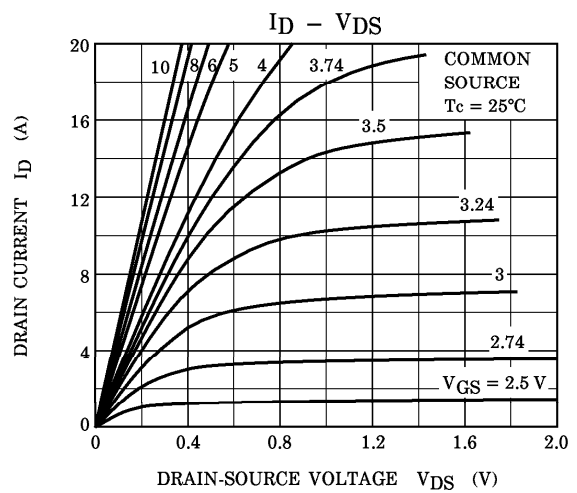
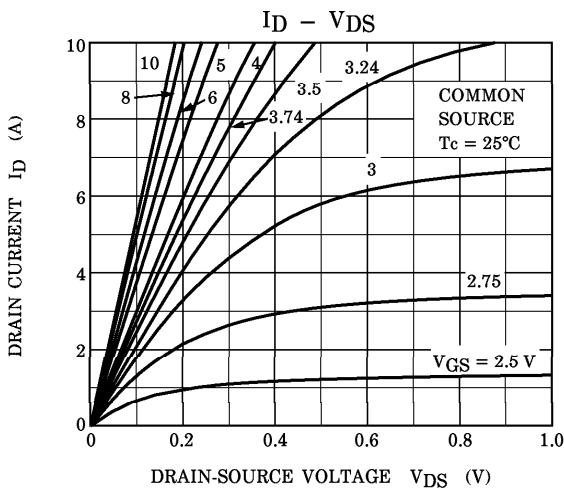
MARKING

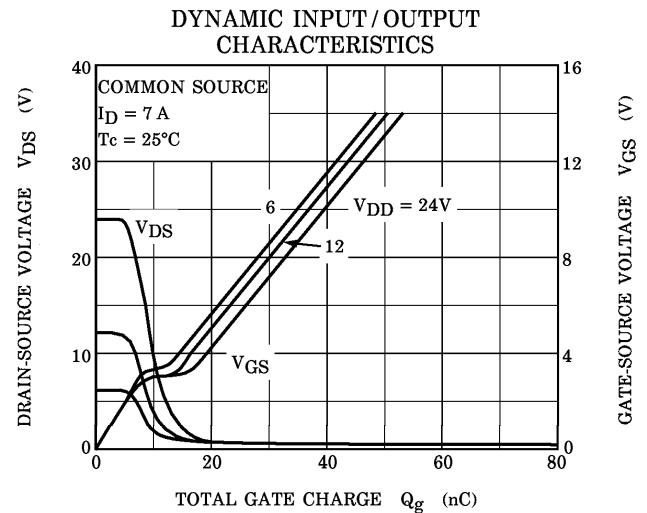
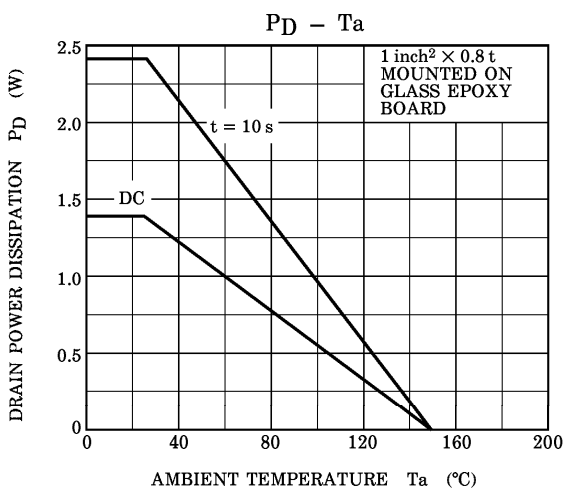
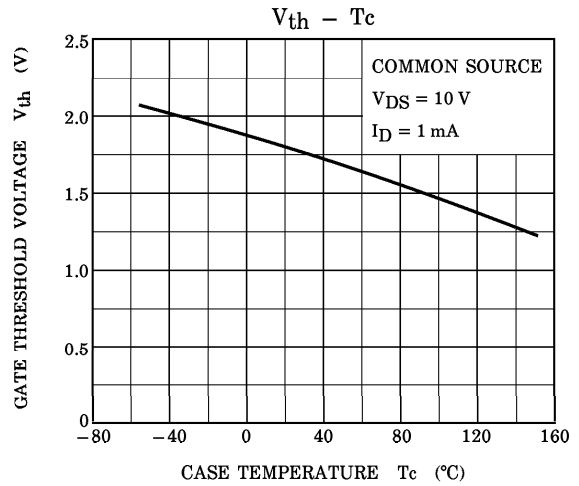
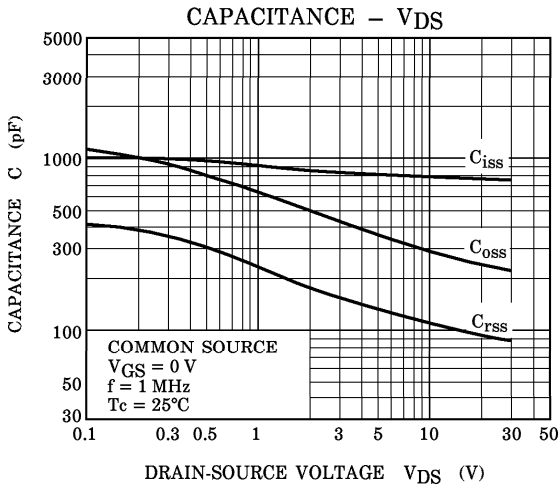
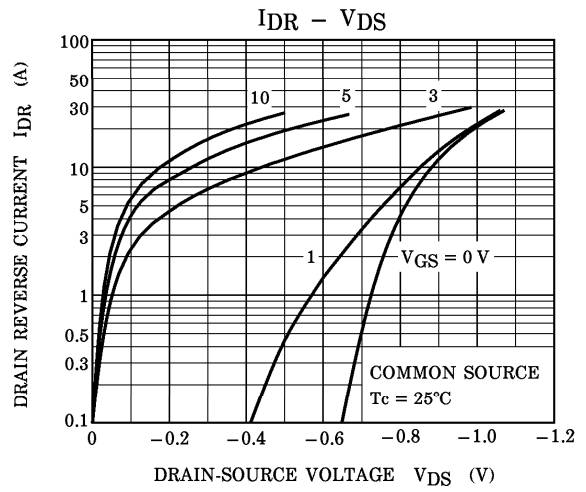
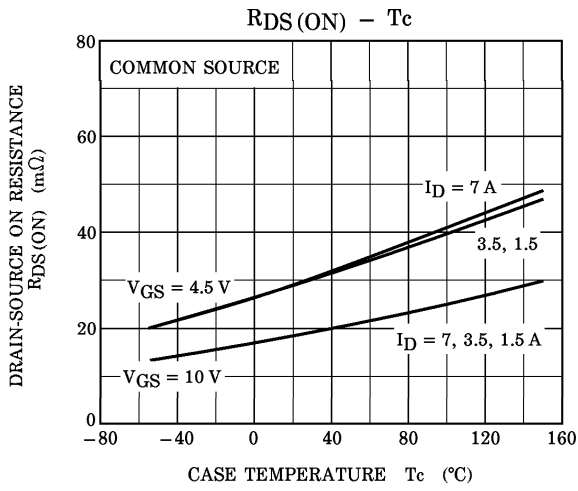


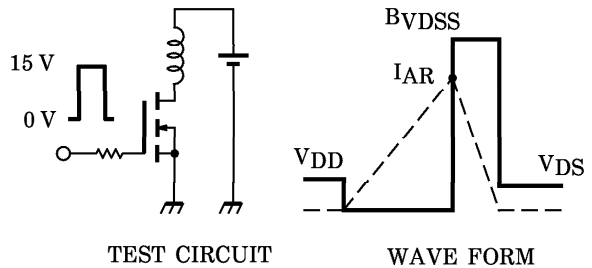
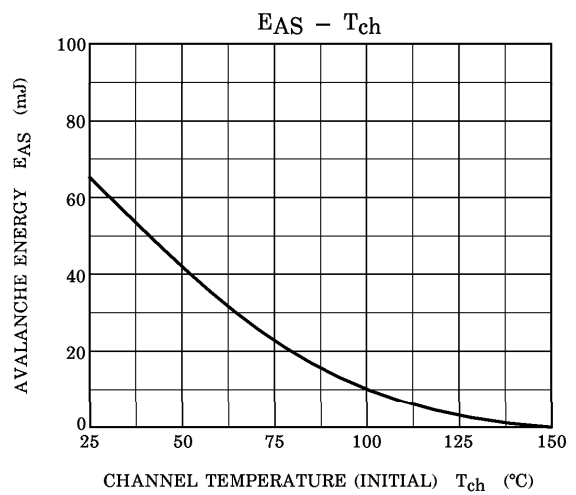
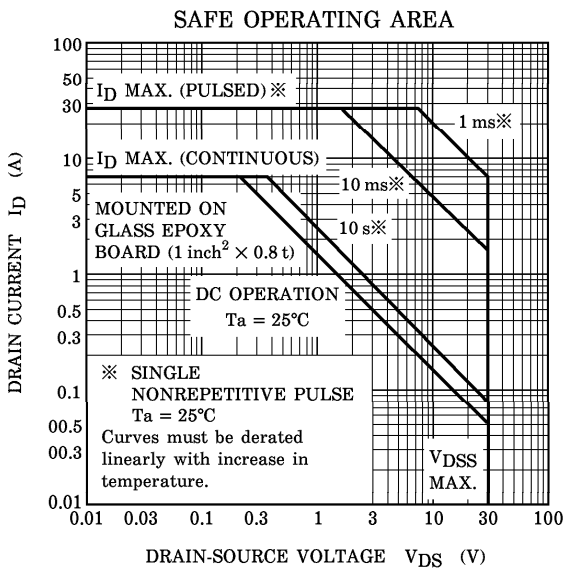
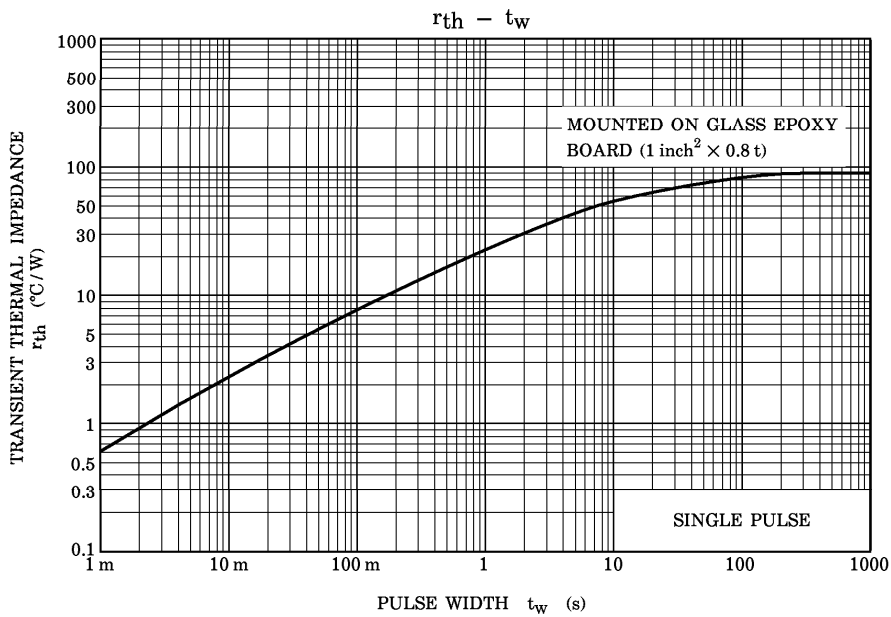
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







Peak $I_{AR} = 7 \text{ A}$, $R_G = 25 \Omega$
 $V_{DD} = 24 \text{ V}$, $L = 1.0 \text{ mH}$

$$E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{B_{V_{DS}}}{B_{V_{DS}} - V_{DD}} \right)$$