

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

# TPC8007-H

LITHIUM ION BATTERY APPLICATIONS

NOTE BOOK PC, PORTABLE EQUIPMENTS APPLICATIONS

HIGH SPEED AND HIGH EFFICIENCY DC-DC CONVERTERS

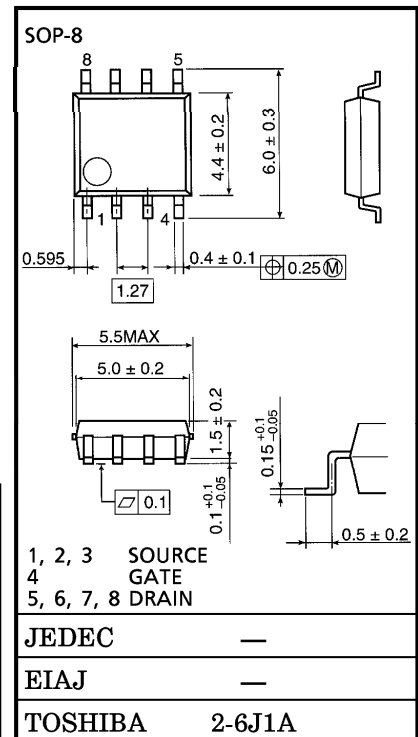
INDUSTRIAL APPLICATIONS

Unit in mm

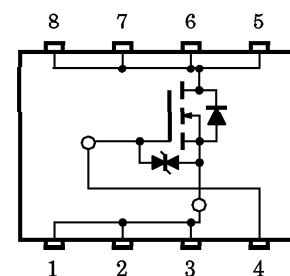
- High Speed Switching
- Small Gate Charge :  $Q_g = 44\text{nC}$  (Typ.)
- Low Drain-Source ON Resistance :  $R_{DS(ON)} = 8\text{m}\Omega$  (Typ.)
- High Forward Transfer Admittance :  $|Y_{fs}| = 20\text{S}$  (Typ.)
- Low Leakage Current :  $I_{DSS} = 10\mu\text{A}$  (Max.) ( $V_{DS} = 30\text{V}$ )
- 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		$V_{GSS}$	$\pm 20$	V
Drain Current	DC	$I_D$	13	A
	Pulse	$I_{DP}$	52	A
Drain Power Dissipation ( $T_a = 25^\circ\text{C}$ )		$P_D$	2.4	W
Single Pulse Avalanche Energy**		$E_{AS}$	219	mJ
Avalanche Current		$I_{AR}$	13	A
Repetitive Avalanche Energy*		$E_{AR}$	0.24	mJ
Channel Temperature		$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature Range		$T_{stg}$	$-55 \sim 150$	$^\circ\text{C}$



CIRCUIT CONFIGURATION



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THERMAL CHARACTERISTICS

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

Note ;

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

\*\*  $V_{DD} = 24\text{V}$ , Starting  $T_{ch} = 25^\circ\text{C}$ ,  $L = 1.0\text{mH}$ ,  $R_G = 25\Omega$ ,  $I_{AR} = 13\text{A}$ **This transistor is an electrostatic sensitive device. Please handle with caution.**

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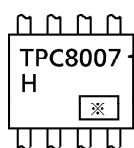
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Gate Leakage Current	$I_{GSS}$	$V_{GS} = \pm 16V, V_{DS} = 0V$	—	—	$\pm 10$	$\mu A$	
Drain Cut-Off Current	$I_{DSS}$	$V_{DS} = 30V, V_{GS} = 0V$	—	—	10	$\mu A$	
Drain-Source Breakdown Voltage	$V_{(BR) DSS}$	$I_D = 10mA, V_{GS} = 0V$	30	—	—	V	
	$V_{(BR) DSX}$	$I_D = 10mA, V_{GS} = -20V$	15	—	—	V	
Gate Threshold Voltage	$V_{th}$	$V_{DS} = 10V, I_D = 1mA$	1.3	—	2.5	V	
Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS} = 4.5V, I_D = 6.5A$	—	12	17	m $\Omega$	
		$V_{GS} = 10V, I_D = 6.5A$	—	8	10		
Forward Transfer Admittance	$ Y_{fs} $	$V_{DS} = 10V, I_D = 6.5A$	10	20	—	S	
Input Capacitance	$C_{iss}$	$V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$	—	2040	—	pF	
Reverse Transfer Capacitance	$C_{rss}$		—	520	—		
Output Capacitance	$C_{oss}$		—	750	—		
Switching Time	Rise Time	$t_r$		—	7	—	ns
	Turn-On Time	$t_{on}$		—	19	—	
	Fall Time	$t_f$		—	15	—	
	Turn-Off Time	$t_{off}$		$V_{IN} : t_r, t_f < 5ns$ $Duty \leq 1\%, t_w = 10\mu s$	—	61	
Total Gate Charge (Gate-Source Plus Gate-Drain)	$Q_g$	$V_{DD} \doteq 24V, V_{GS} = 10V, I_D = 13A$	—	44	—	nC	
Gate-Source Charge	$Q_{gs}$		—	35	—		
Gate-Drain ("Miller") Charge	$Q_{gd}$		—	10	—		

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	$I_{DR}$	—	—	—	13	A
Pulse Drain Reverse Current	$I_{DRP}$	—	—	—	52	A
Diode Forward Voltage	$V_{DSF}$	$I_{DR} = 13A, V_{GS} = 0V$	—	—	-1.2	V

MARKING

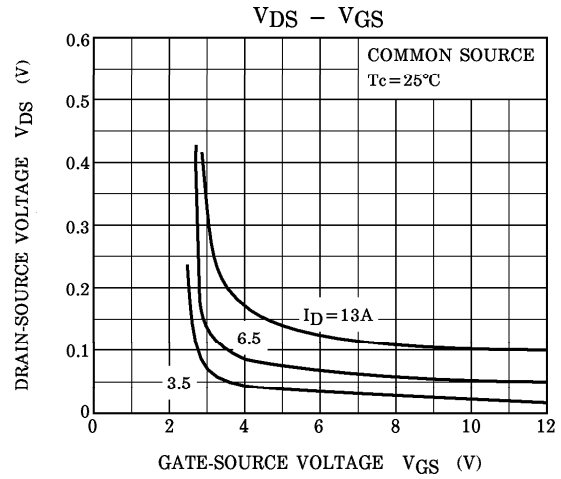
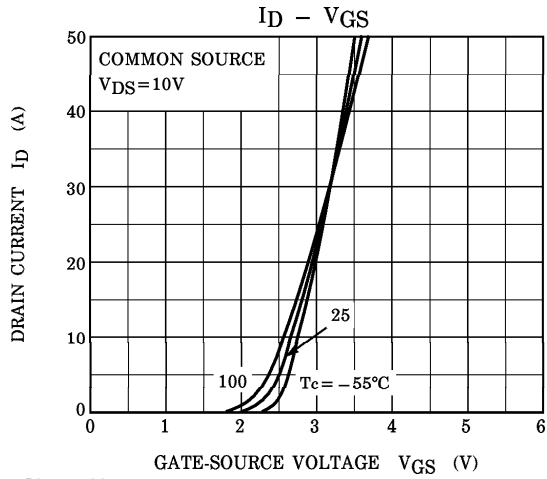
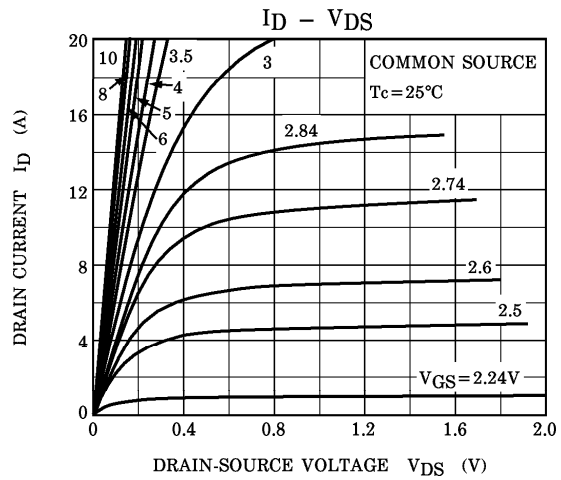
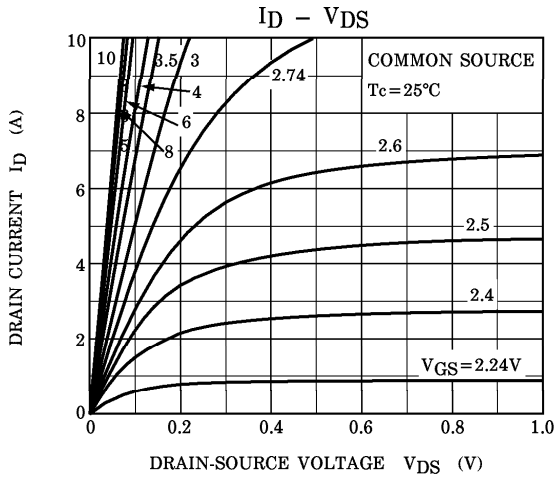


TYPE

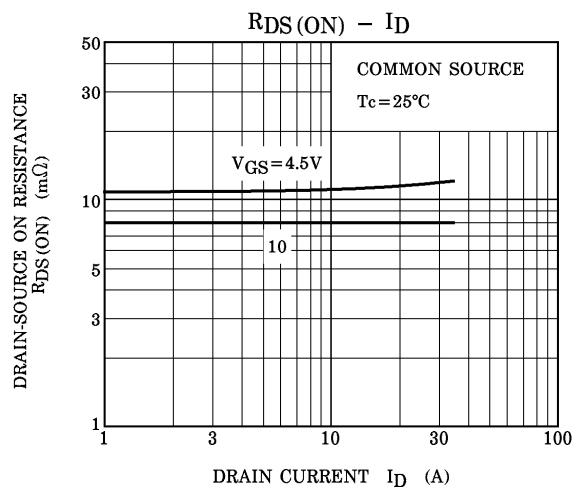
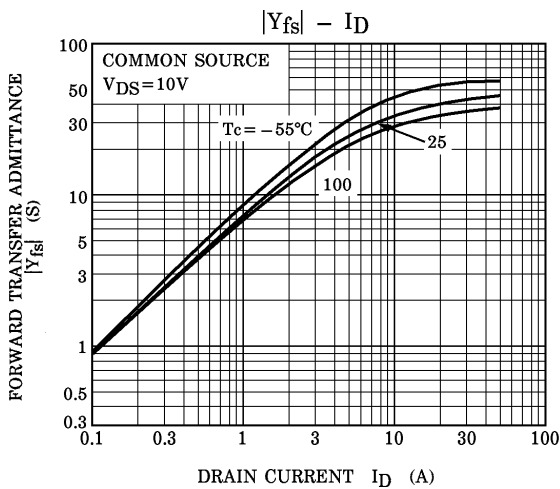
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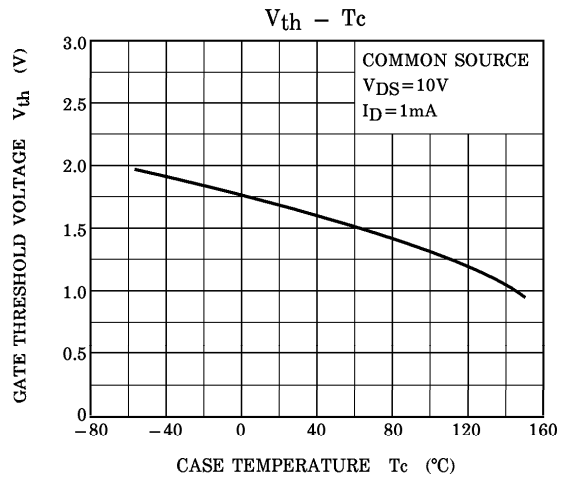
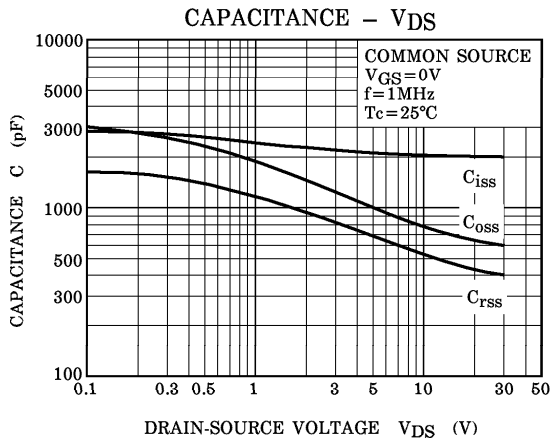
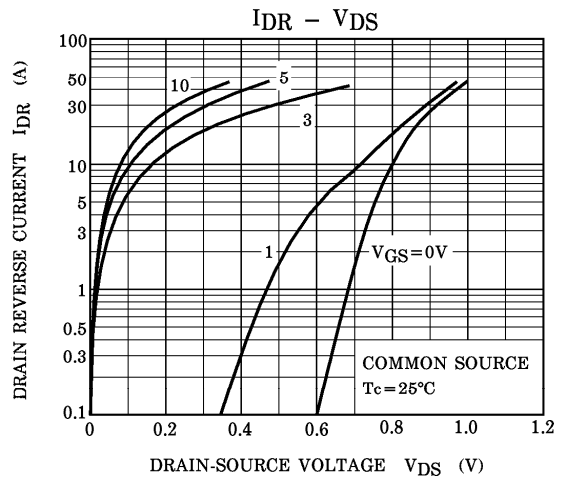
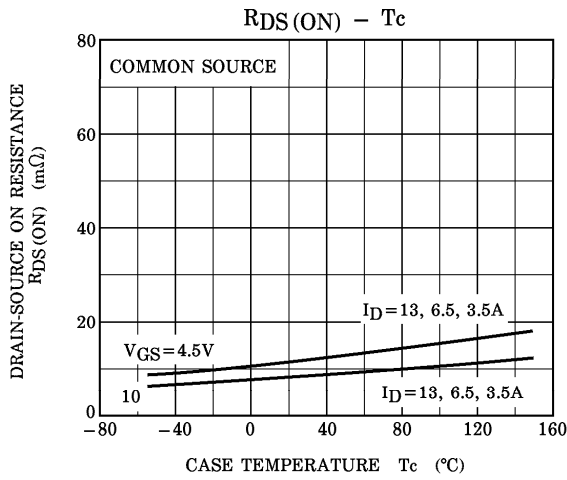
□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)

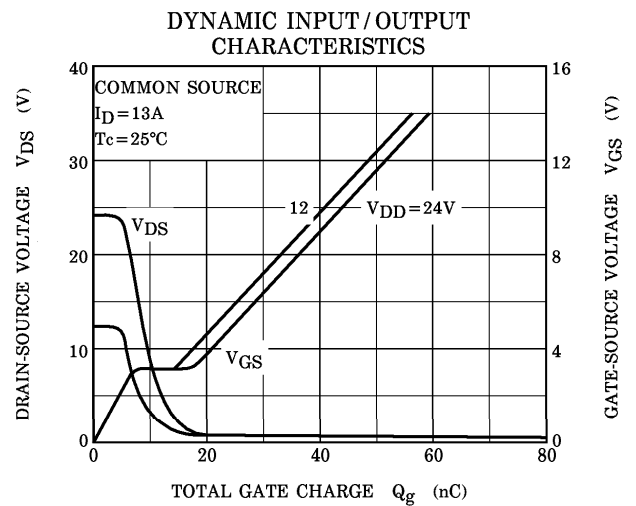
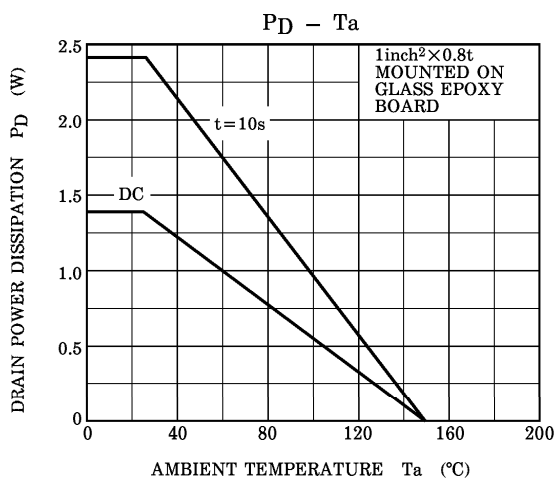


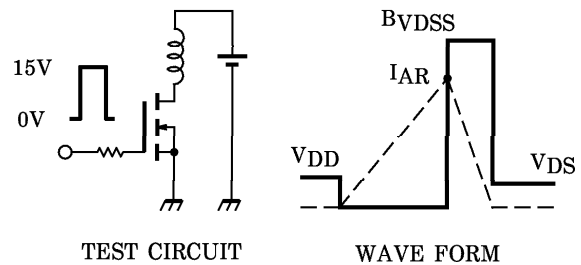
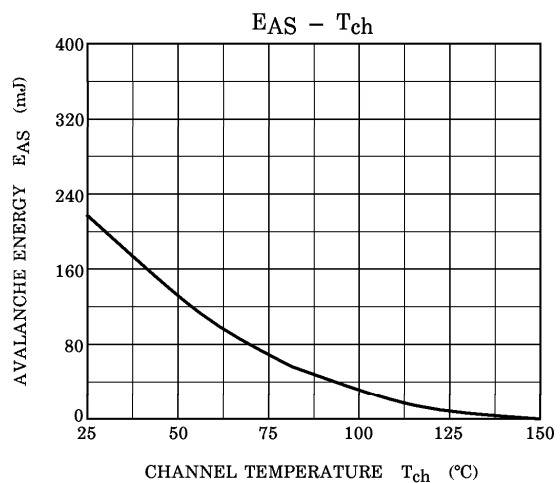
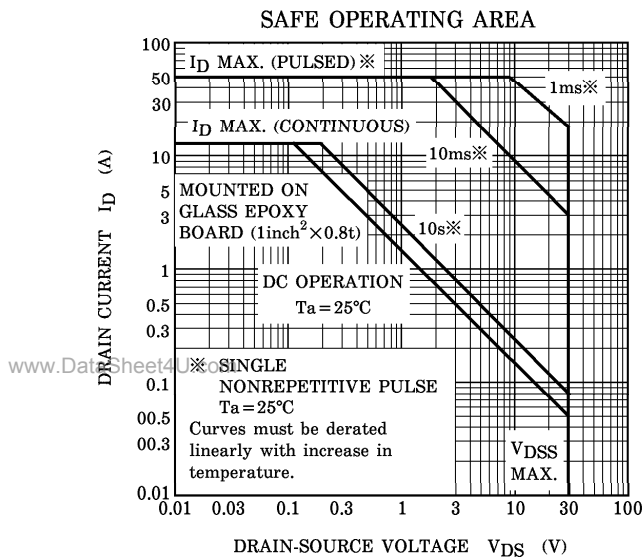
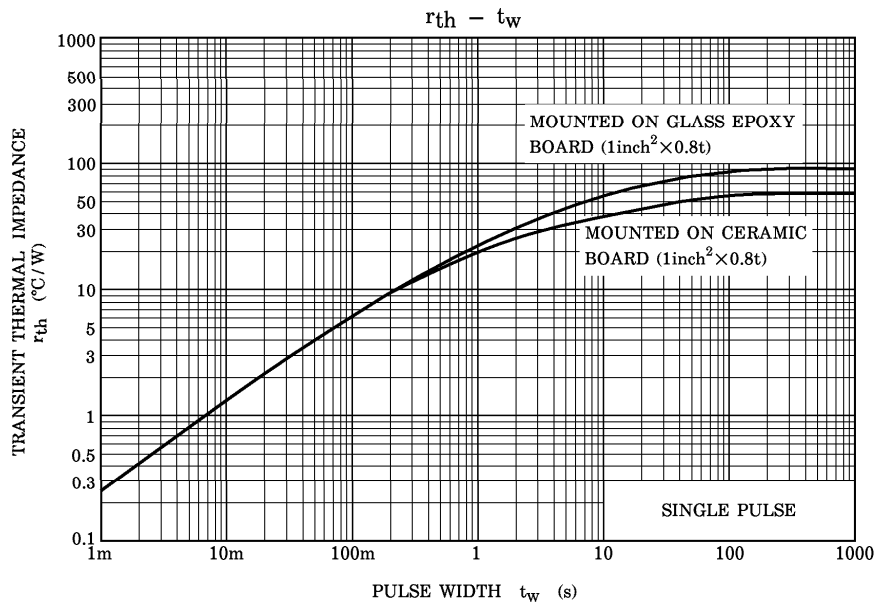
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Peak  $I_{AR} = 13A$ ,  $R_G = 25\Omega$      $E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left( \frac{B_{VDSS}}{B_{VDSS} - V_{DD}} \right)$   
 $V_{DD} = 24V$ ,  $L = 1.0mH$