

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

TPC8005-H

HIGH SPEED AND HIGH EFFICIENCY DC-DC CONVERTERS
 LITHIUM ION BATTERY APPLICATIONS
 NOTE BOOK PC, PORTABLE EQUIPMENTS APPLICATIONS

INDUSTRIAL APPLICATIONS
 Unit in mm

- High Speed Switching : 60% speed up
 (compare with current type)
- Small Gate Charge : $Q_g = 20 \text{ nC}$ (Typ.)
- Low Drain-Source ON Resistance : $R_{DS(ON)} = 13 \text{ m}\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 16 \text{ S}$ (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	11 A
	Pulse	I_{DP}	44 A
Drain Power Dissipation*** ($T_a = 25^\circ\text{C}$)	P_D	2.4	W
Single Pulse Avalanche Energy**	E_{AS}	157	mJ
Avalanche Current	I_{AR}	11	A
Repetitive Avalanche Energy*	E_{AR}	0.24	mJ
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	$-55 \sim 150$	$^\circ\text{C}$

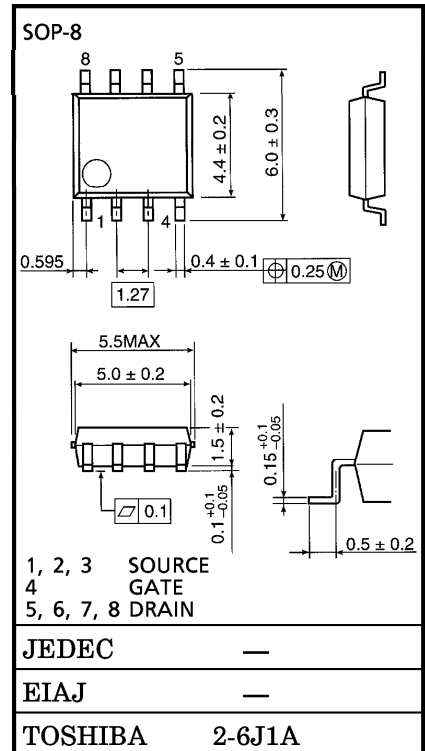
THERMAL CHARACTERISTICS

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

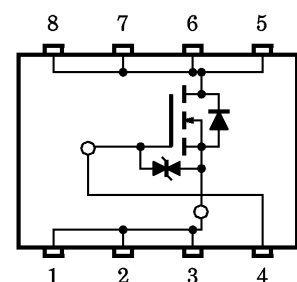
Note ;

- * Repetitive rating ; Pulse Width Limited by Max. Junction Temperature.
- ** $V_{DD} = 24 \text{ V}, T_{ch} = 25^\circ\text{C}$ (initial), $L = 1.0 \text{ mH}, R_G = 25 \Omega, I_{AR} = 11 \text{ A}$
- *** 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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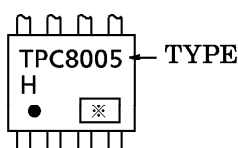
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

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	—	—	V	
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 = 5.5 A	—	23	27	mΩ	
	RDS(ON)	VGS = 10 V, ID = 5.5 A	—	13	16	mΩ	
Forward Transfer Admittance	Yfs	VDS = 10 V, ID = 5.5 A	8	16	—	S	
Input Capacitance	Ciss	VDS = 10 V, VGS = 0 V, f = 1 MHz	—	1150	—	pF	
Reverse Transfer Capacitance	Crss		—	140	—		
Output Capacitance	Coss		—	400	—		
Switching Time	Rise Time	tr		—	4	—	ns
	Turn-On Time	ton		—	12	—	
	Fall Time	tf		—	8	—	
	Turn-Off Time	toff		VIN : tr, tf < 5 ns Duty ≤ 1%, tw = 10 μs	—	40	
Total Gate Charge (Gate-Source Plus Gate-Drain)	Qg	VDD ≐ 24 V, VGS = 10 V, ID = 11 A	—	20	—	nC	
Gate-Source Charge	Qgs		—	15	—		
Gate-Drain ("Miller") Charge	Qgd		—	5	—		

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	IDR	—	—	—	11	A
Pulse Drain Reverse Current	IDRP	—	—	—	44	A
Diode Forward Voltage	VDSF	IDR = 11 A, VGS = 0 V	—	—	-1.2	V

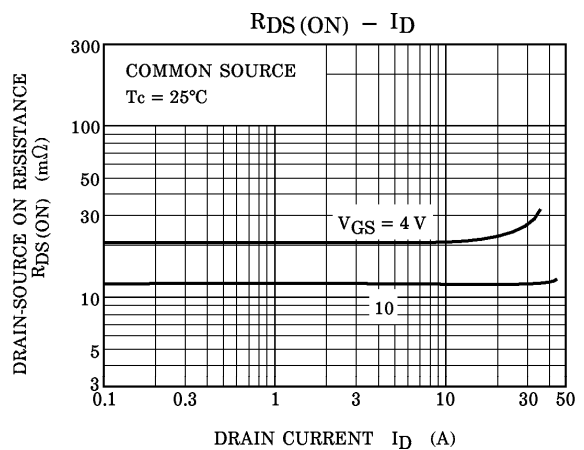
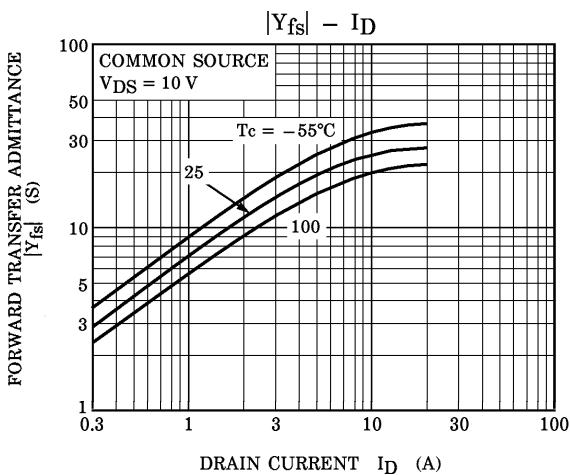
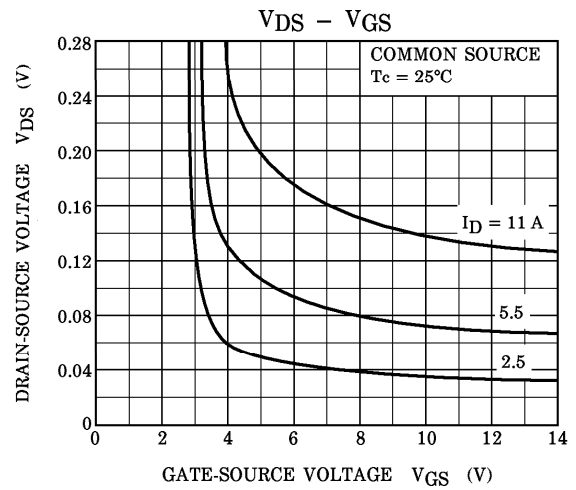
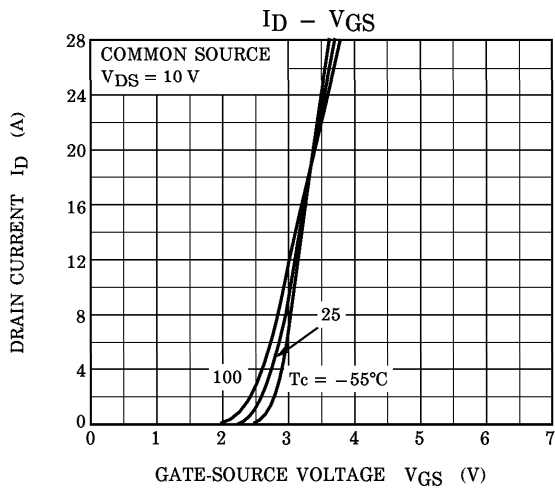
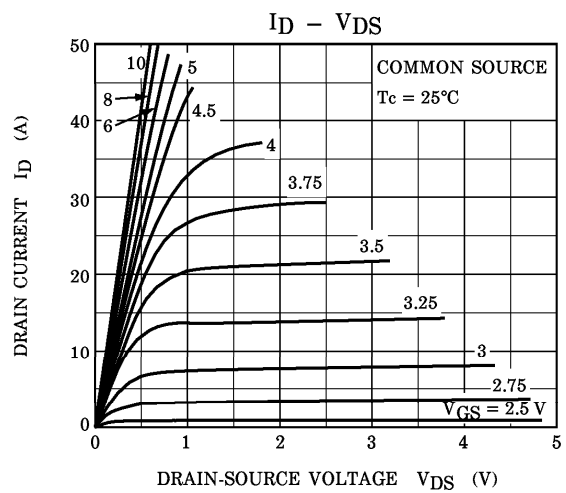
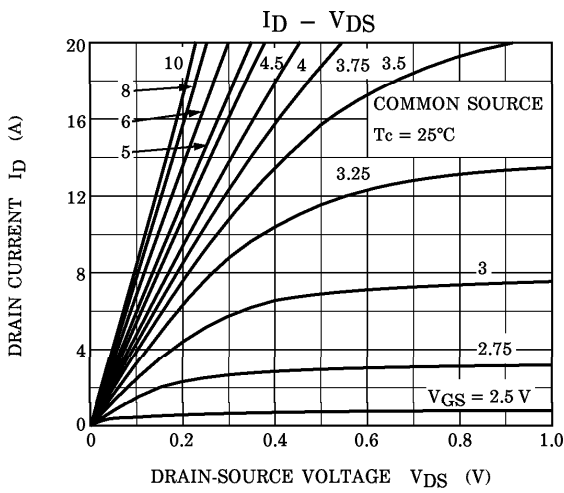
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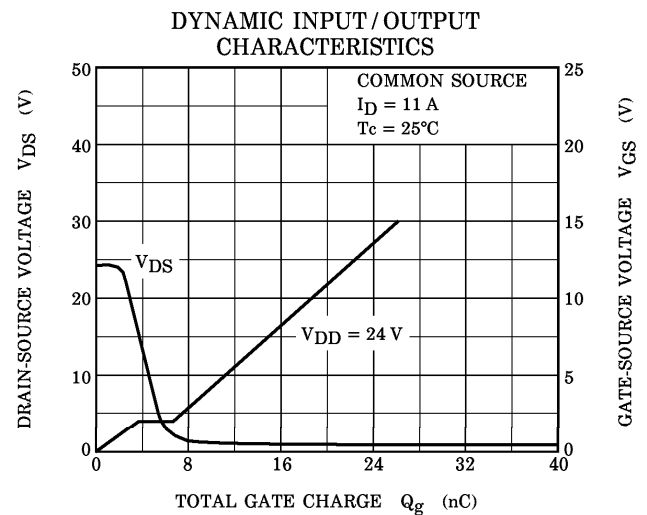
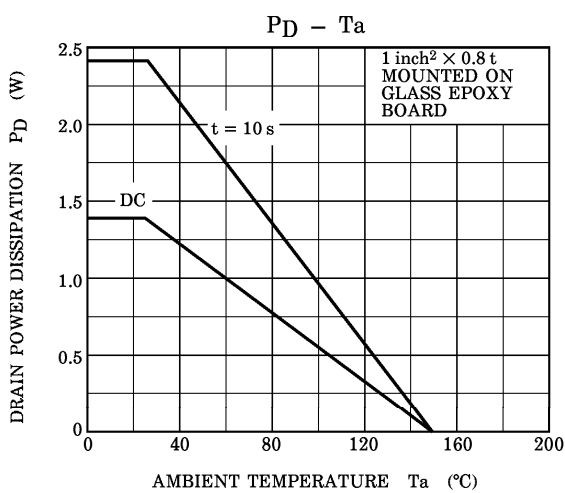
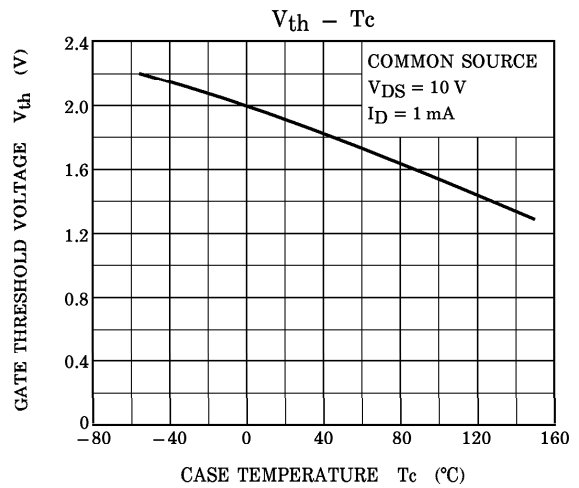
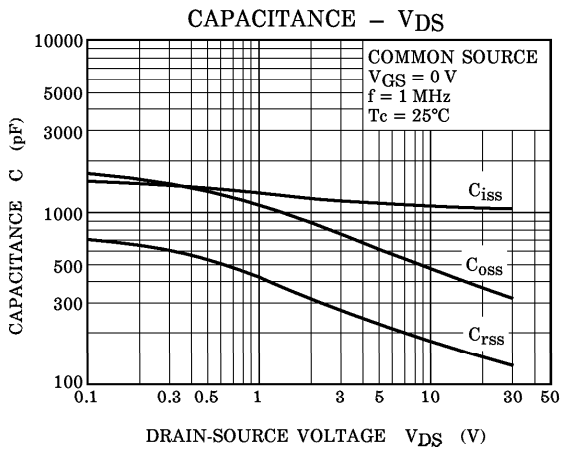
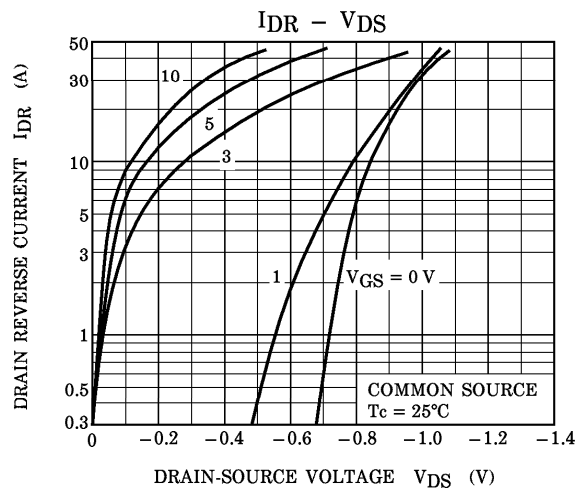
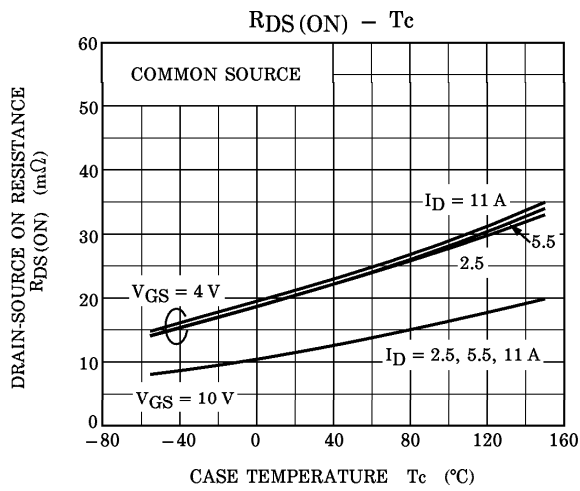


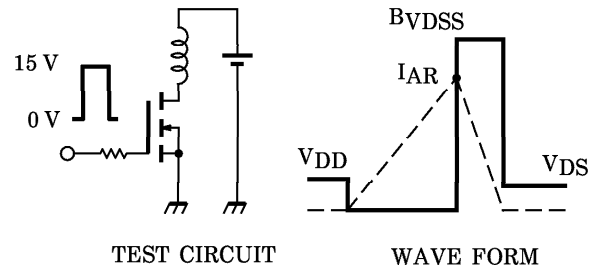
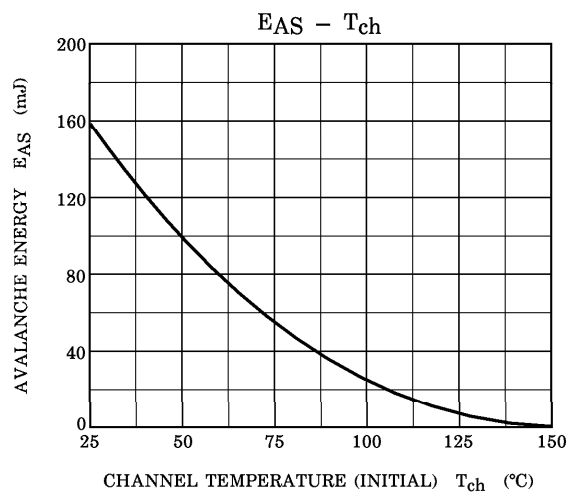
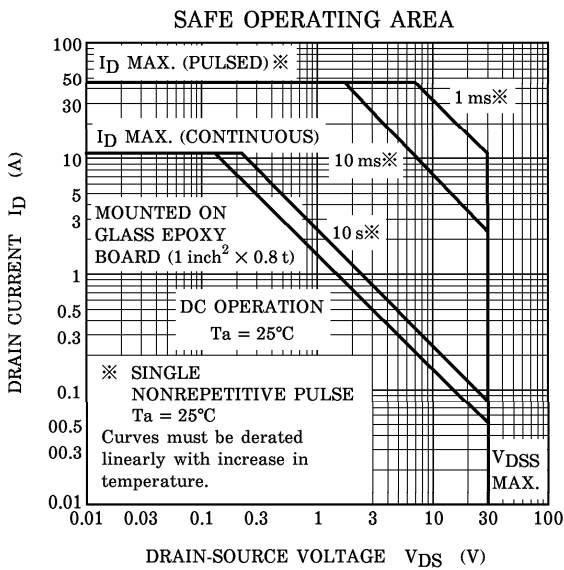
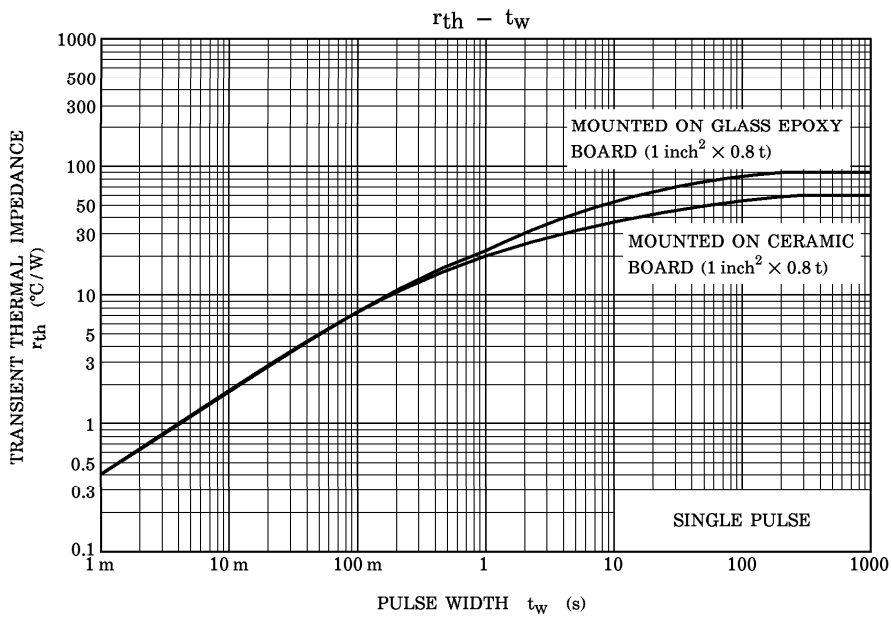
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







Peak $I_{AR} = 11 \text{ A}$, $R_G = 25 \Omega$
 $V_{DD} = 24 \text{ V}$, $L = 1.0 \text{ mH}$

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