

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 ($t = 10\text{s}$)		$P_{D^{***}}$	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

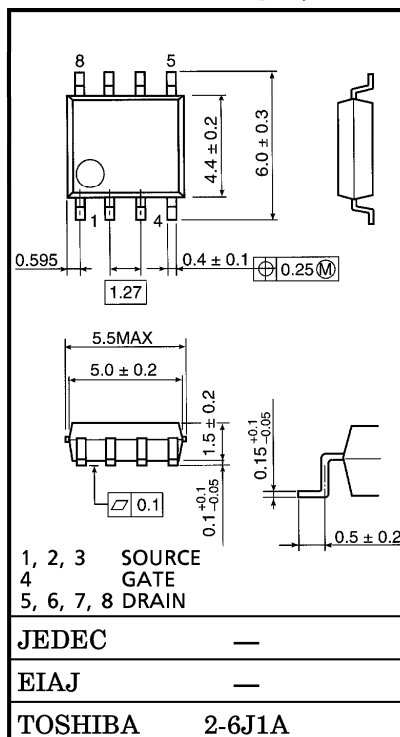
CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	52.1	$^\circ\text{C/W}$

Note ;

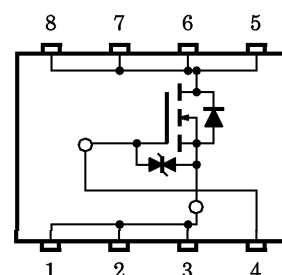
* Repetitive rating ; Pulse Width Limited by Max. Junction Temperature.

** $V_{DD} = 24\text{V}$, Starting $T_{ch} = 25^\circ\text{C}$, $L = 1.0\text{mH}$, $R_G = 25\Omega$, $I_{AR} = 11\text{A}$ *** Drive operation : Mount on glass epoxy board [$1\text{inch}^2 \times 0.8\text{t}$]

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



CIRCUIT CONFIGURATION



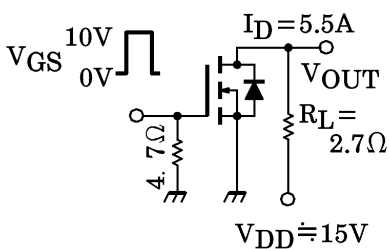
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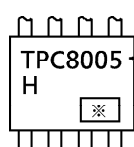
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 16V, V_{DS} = 0V$	—	—	± 10	μA
Drain Cut-Off Current	I_{DSS}	$V_{DS} = 30V, V_{GS} = 0V$	—	—	10	μA
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	$R_{DS(ON)}$	$V_{GS} = 4.5V, I_D = 5.5A$	—	23	27	$m\Omega$
	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 5.5A$	—	13	16	$m\Omega$
Forward Transfer Admittance	$ Y_{fs} $	$V_{DS} = 10V, I_D = 5.5A$	8	16	—	S
Input Capacitance	C_{iss}	$V_{DS} = 10V, V_{GS} = 0V, f = 1MHz$	—	1150	—	pF
Reverse Transfer Capacitance	C_{rss}		—	140	—	
Output Capacitance	C_{oss}		—	400	—	
Switching Time	Rise Time	 $V_{GS} = 10V, 0V$ $I_D = 5.5A$ V_{OUT} $R_L = 2.7\Omega$ $V_{DD} = 15V$	—	4	—	ns
	Turn-On Time		—	12	—	
	Fall Time		—	8	—	
	Turn-Off Time		—	40	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)	Q_g	$V_{DD} = 24V, V_{GS} = 10V, I_D = 11A$	—	20	—	nC
Gate-Source Charge	Q_{gs}		—	15	—	
Gate-Drain ("Miller") Charge	Q_{gd}		—	5	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	11	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	44	A
Diode Forward Voltage	V_{DSF}	$I_{DR} = 11A, V_{GS} = 0V$	—	—	-1.2	V

MARKING



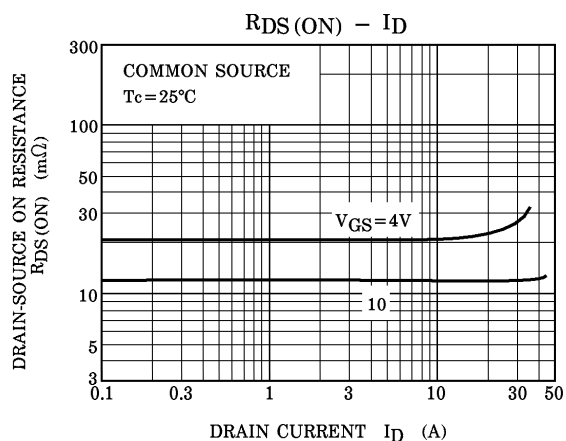
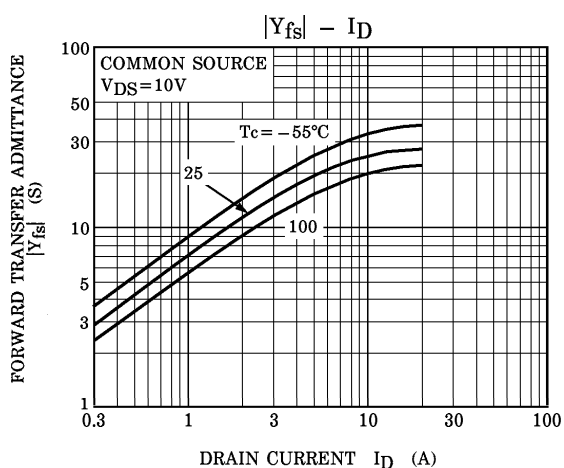
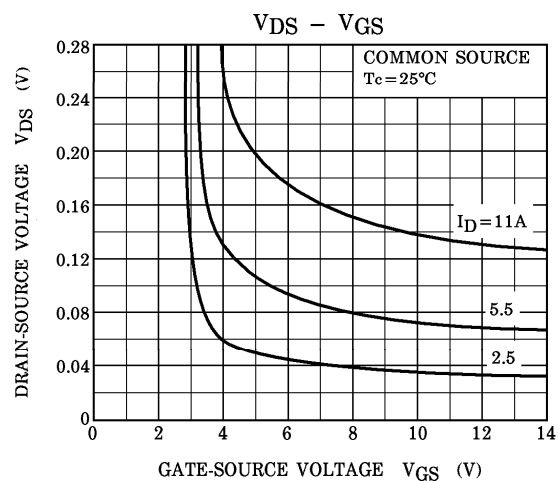
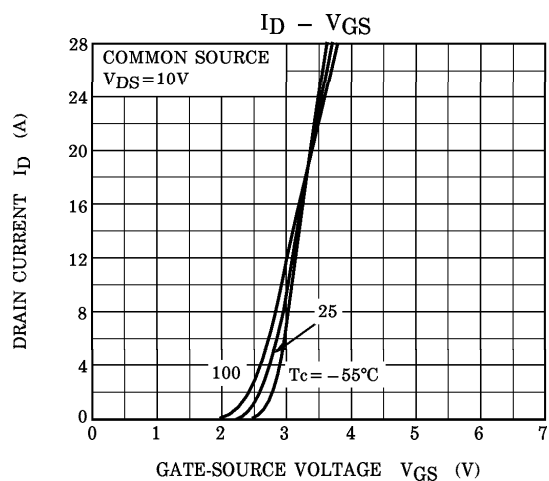
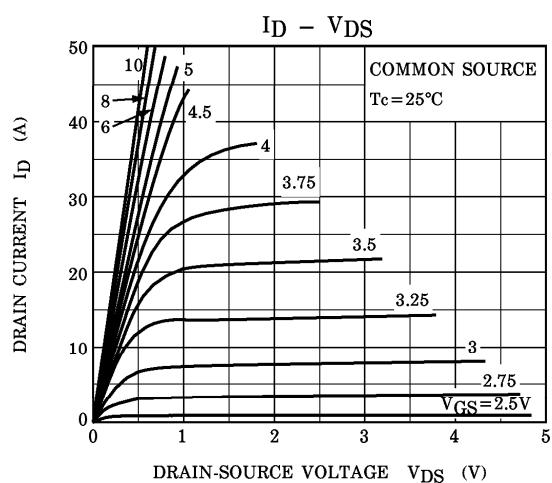
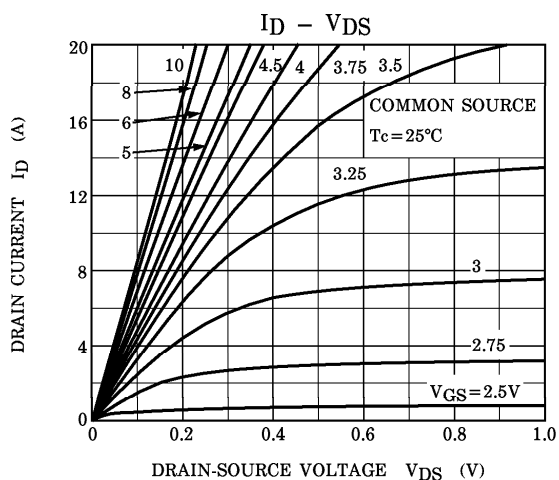
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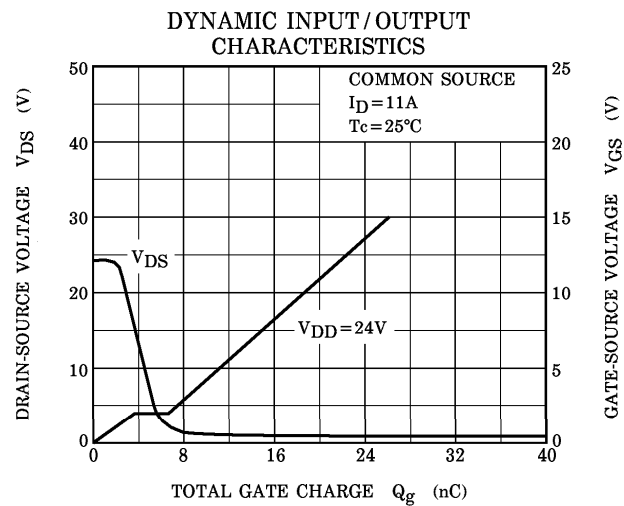
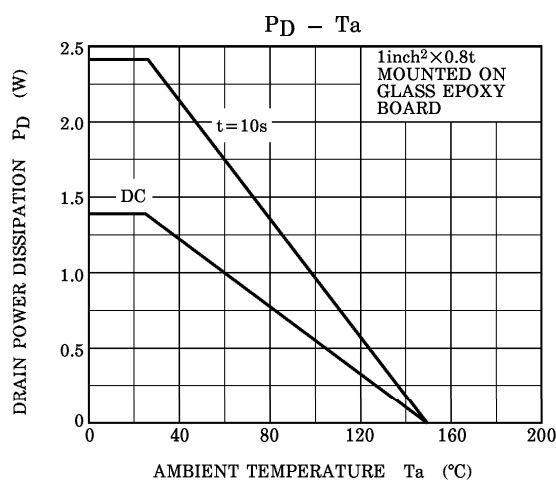
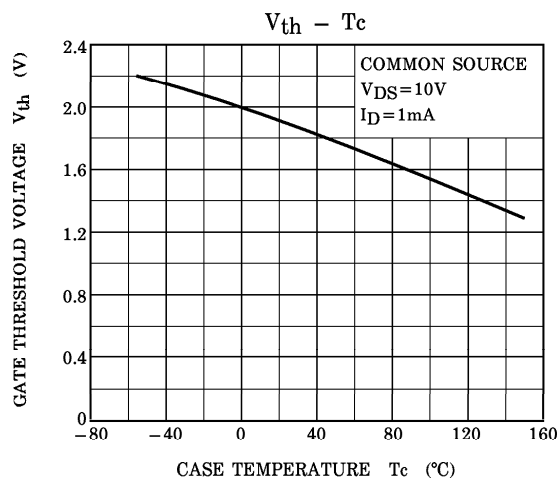
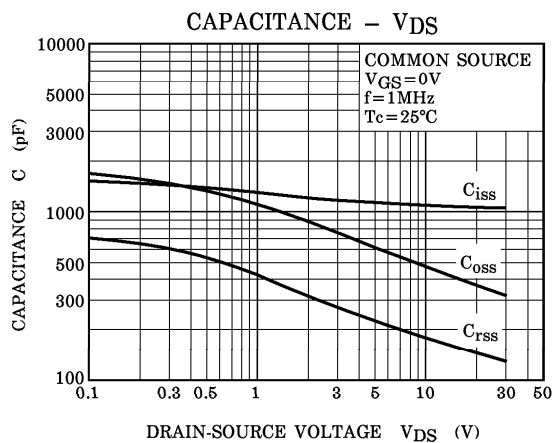
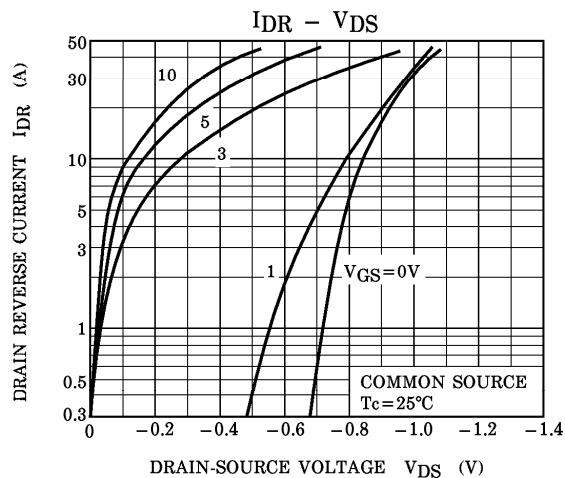
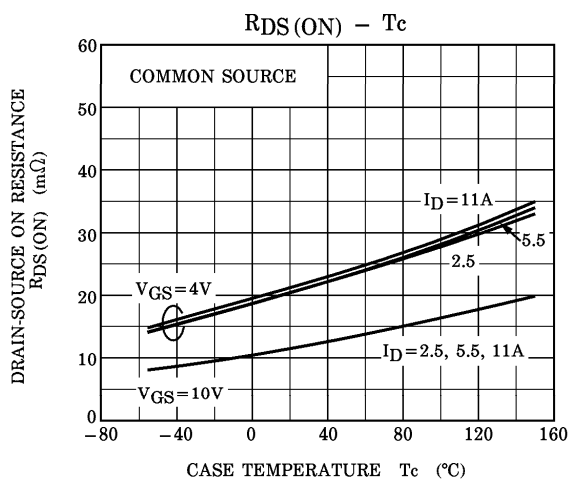


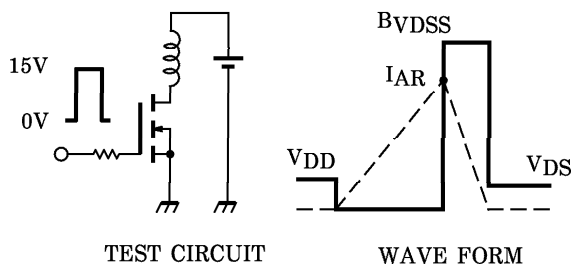
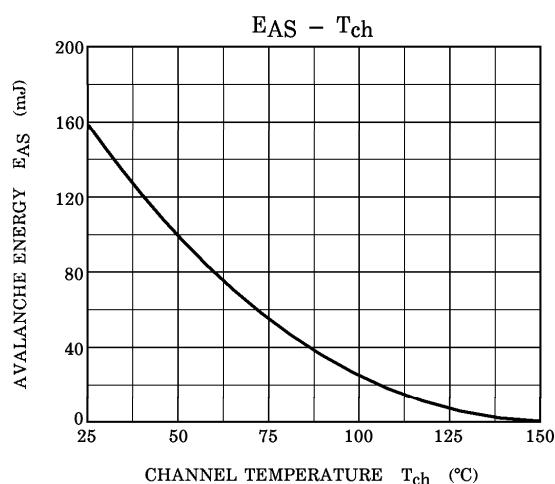
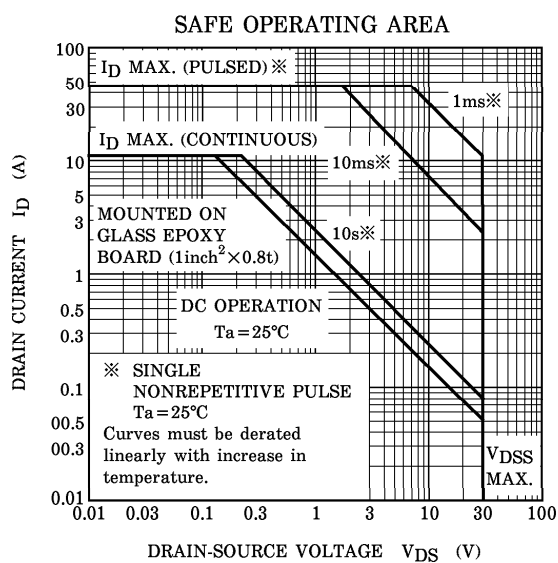
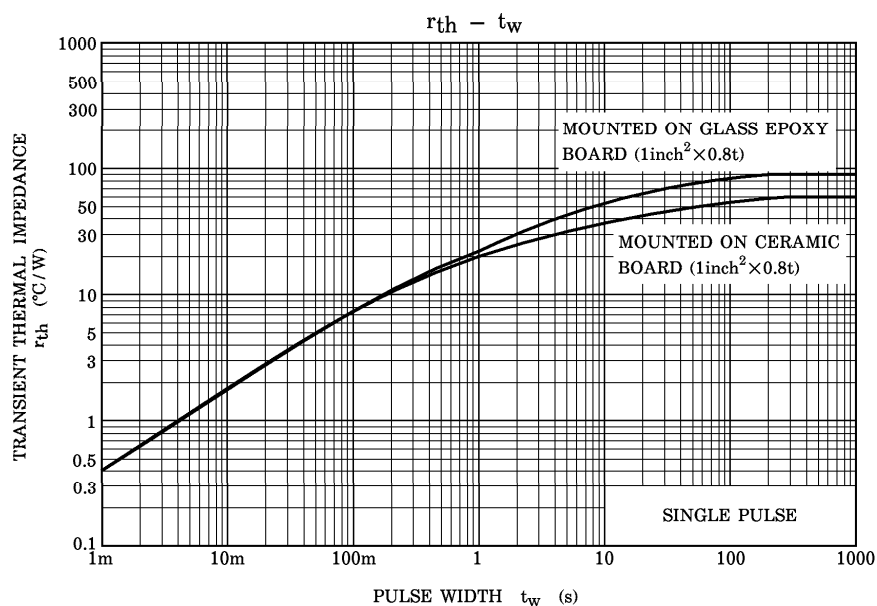
Month (Starting from Alphabet A)



Year (Last Number of the Christian Era)







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

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