

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (π -MOSIII)

2SK3017

HIGH SPEED, HIGH VOLTAGE SWITCHING APPLICATIONS

DC-DC CONVERTER, RELAY DRIVE AND MOTOR DRIVE APPLICATIONS

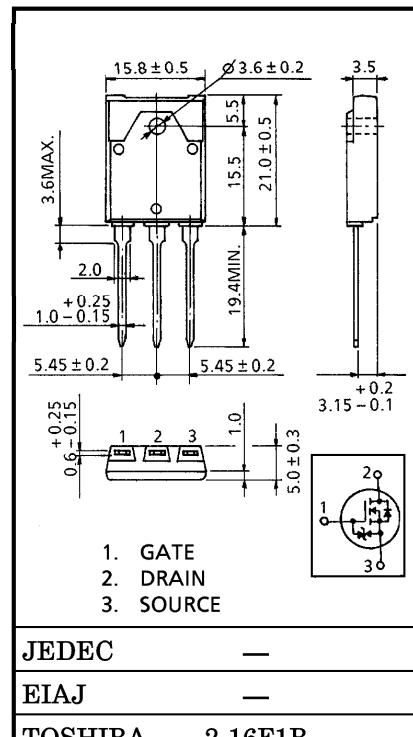
- Low Drain-Source ON Resistance : $R_{DS(ON)} = 1.05 \Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 7.0 \text{ S}$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100 \mu\text{A}$ (Max.) ($V_{DS} = 720 \text{ V}$)
- Enhancement-Mode : $V_{th} = 2.0 \sim 4.0 \text{ V}$ ($V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$)

MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	V_{DSS}	900	V
Drain-Gate Voltage ($R_{GS} = 20 \text{ k}\Omega$)	V_{DGR}	900	V
Gate-Source Voltage	V_{GSS}	± 30	V
Drain Current	DC	I_D	A
	Pulse	I_{DP}	A
Drain Power Dissipation ($T_c = 25^\circ\text{C}$)	P_D	90	W
Single Pulse Avalanche Energy**	E_{AS}	966	mJ
Avalanche Current	I_{AR}	8.5	A
Repetitive Avalanche Energy*	E_{AR}	9	mJ
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	$-55 \sim 150$	$^\circ\text{C}$

INDUSTRIAL APPLICATIONS

Unit in mm



JEDEC —

EIAJ —

TOSHIBA 2-16F1B

Weight : 5.8 g (Typ.)

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th}(ch-c)$	1.39	$^\circ\text{C}/\text{W}$
Thermal Resistance, Channel to Ambient	$R_{th}(ch-a)$	41.6	$^\circ\text{C}/\text{W}$

Note :

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

** $V_{DD} = 90 \text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 24.5 \text{ mH}$, $R_G = 25 \Omega$, $I_{AR} = 8.5 \text{ A}$

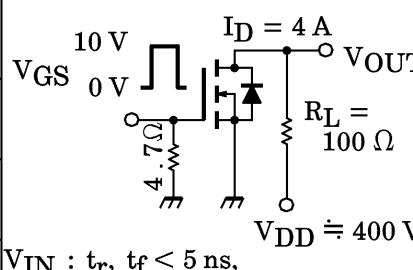
This transistor is an electrostatic sensitive device.

Please handle with caution.

000707EAA2

- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

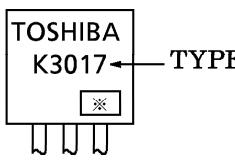
ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 30\text{ V}$, $V_{DS} = 0\text{ V}$	—	—	± 10	μA
Gate-Source Breakdown Voltage	$V_{(\text{BR})\text{GSS}}$	$I_G = \pm 10\text{ }\mu\text{A}$, $V_{DS} = 0\text{ V}$	± 30	—	—	V
Drain Cut-off Current	I_{DSS}	$V_{DS} = 720\text{ V}$, $V_{GS} = 0\text{ V}$	—	—	100	μA
Drain-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$I_D = 10\text{ mA}$, $V_{GS} = 0\text{ V}$	900	—	—	V
Gate Threshold Voltage	V_{th}	$V_{DS} = 10\text{ V}$, $I_D = 1\text{ mA}$	2.0	—	4.0	V
Drain-Source ON Resistance	$R_{DS(\text{ON})}$	$V_{GS} = 10\text{ V}$, $I_D = 4\text{ A}$	—	1.05	1.25	Ω
Forward Transfer Admittance	$ Y_{fs} $	$V_{DS} = 15\text{ V}$, $I_D = 4\text{ A}$	3.5	7.0	—	S
Input Capacitance	C_{iss}	$V_{DS} = 25\text{ V}$, $V_{GS} = 0\text{ V}$ $f = 1\text{ MHz}$	—	2150	—	pF
Reverse Transfer Capacitance	C_{rss}		—	35	—	
Output Capacitance	C_{oss}		—	220	—	
Switching Time	Rise Time	t_r	 V_{GS} 10 V 0 V $V_{DD} \doteq 400\text{ V}$ $I_D = 4\text{ A}$ $R_L = 100\text{ }\Omega$ $V_{DD} \doteq 400\text{ V}$ $V_{GS} = 10\text{ V}$ $I_D = 8\text{ A}$	—	25	—
	Turn-on Time	t_{on}		—	60	—
	Fall Time	t_f		—	25	—
	Turn-off Time	t_{off}		—	120	—
Total Gate Charge (Gate-Source Plus Gate-Drain)	Q_g	$V_{DD} \doteq 400\text{ V}$, $V_{GS} = 10\text{ V}$ $I_D = 8\text{ A}$	—	70	—	nC
Gate-Source Charge	Q_{gs}		—	37	—	
Gate-Drain ("Miller") Charge	Q_{gd}		—	33	—	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	—	—	—	8.5	A
Pulse Drain Reverse Current	I_{DRP}	—	—	—	25.5	A
Diode Forward Voltage	V_{DSF}	$I_{DR} = 8.5\text{ A}$, $V_{GS} = 0\text{ V}$	—	—	-1.9	V
Reverse Recovery Time	t_{rr}	$I_{DR} = 8.5\text{ A}$, $V_{GS} = 0\text{ V}$	—	1300	—	ns
Reverse Recovery Charge	Q_{rr}	$dI_{DR}/dt = 100\text{ A}/\mu\text{s}$	—	14.5	—	μC

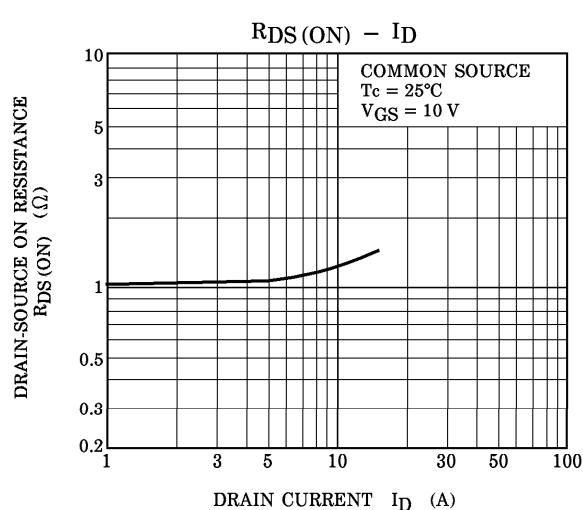
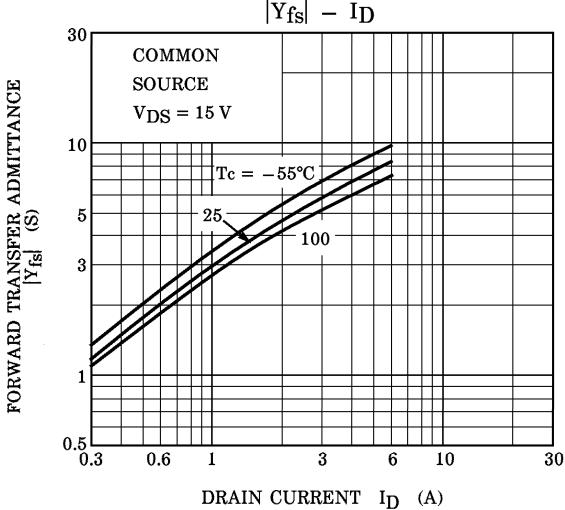
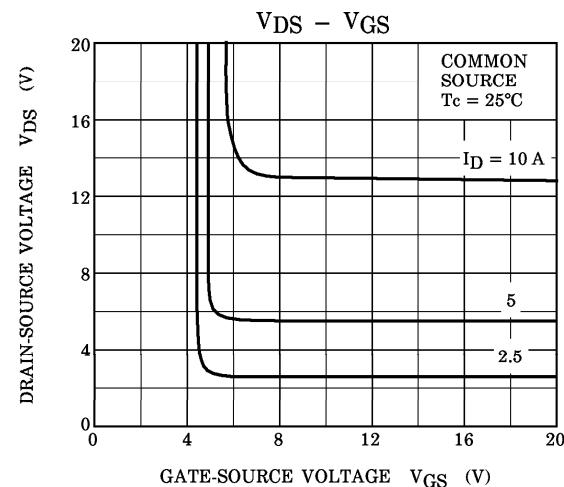
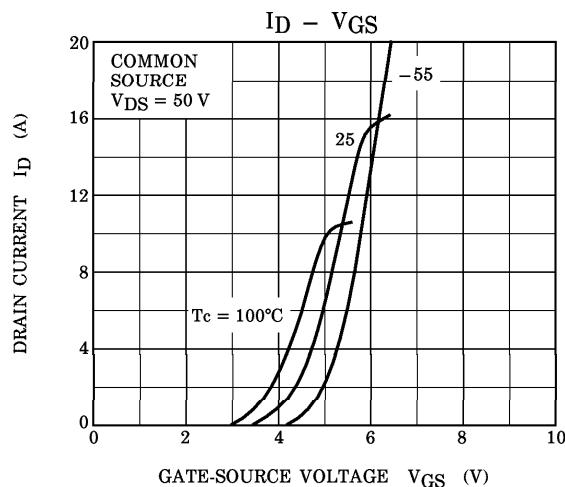
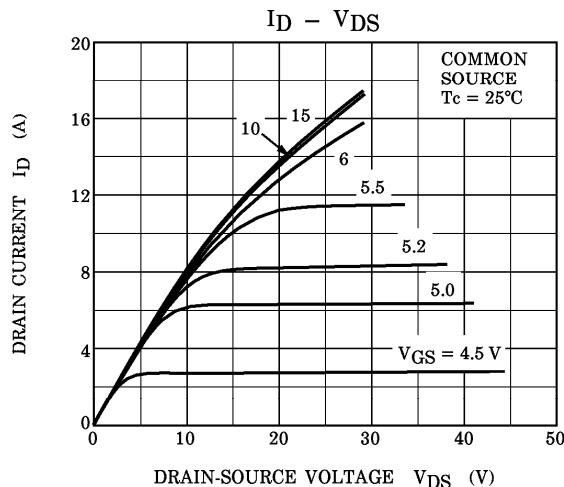
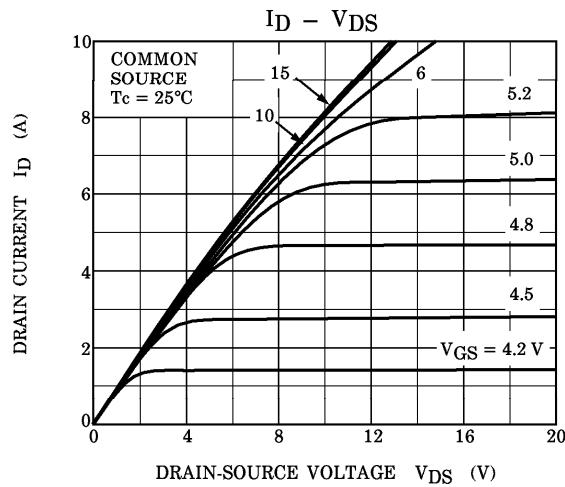
MARKING

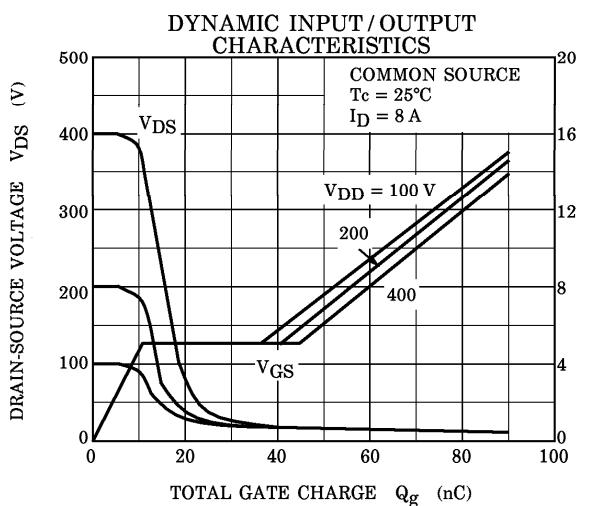
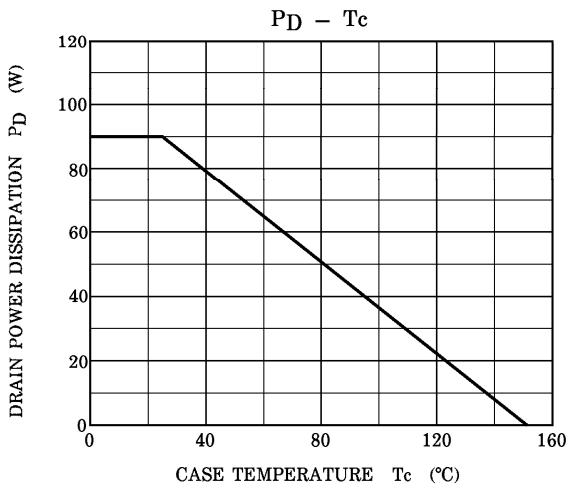
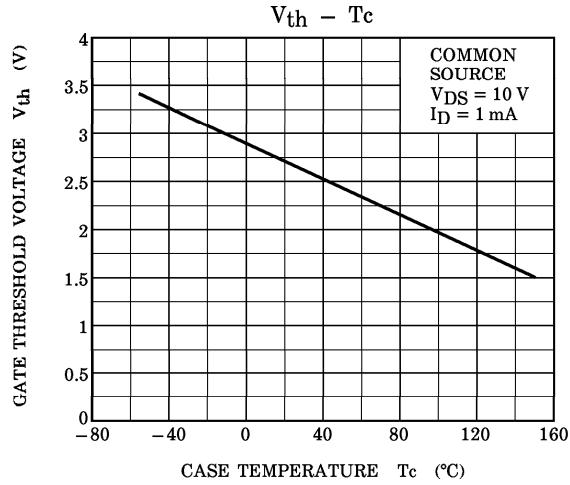
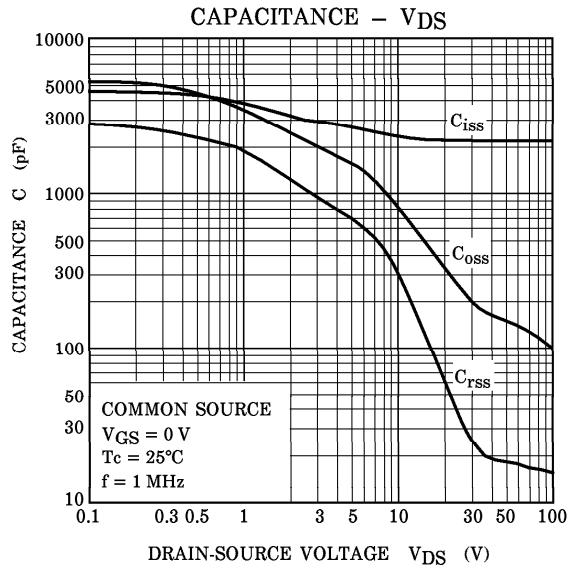
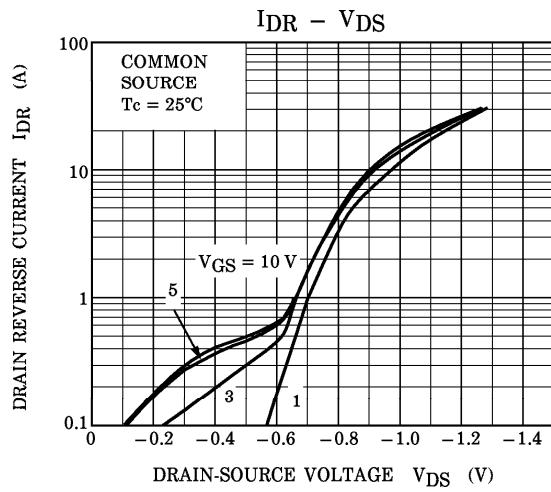
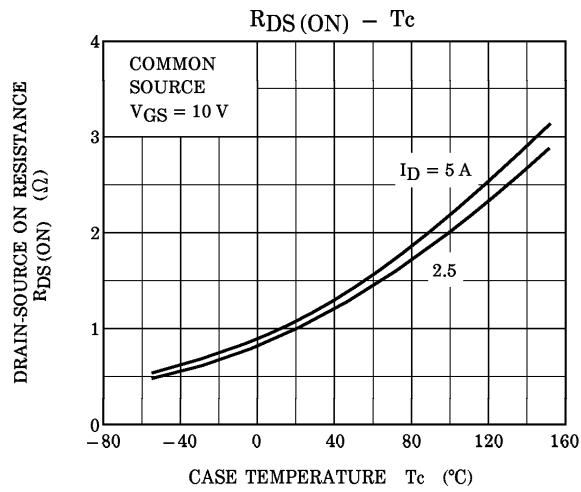


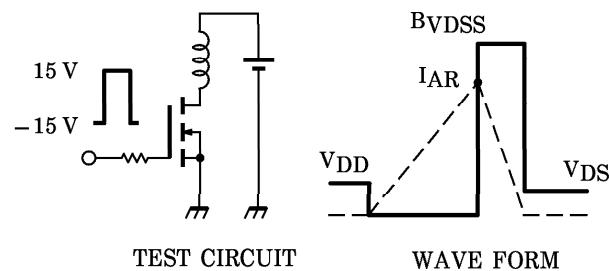
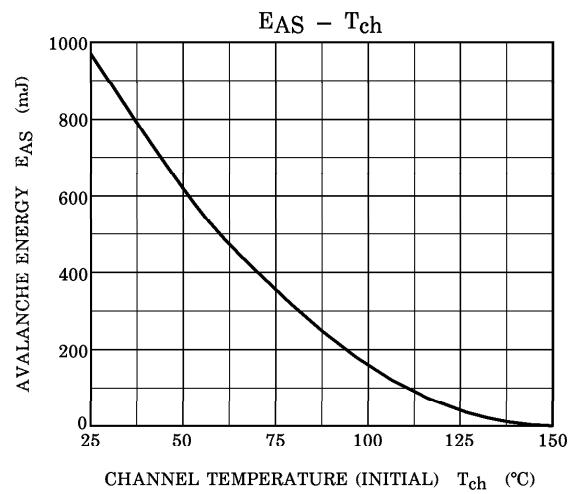
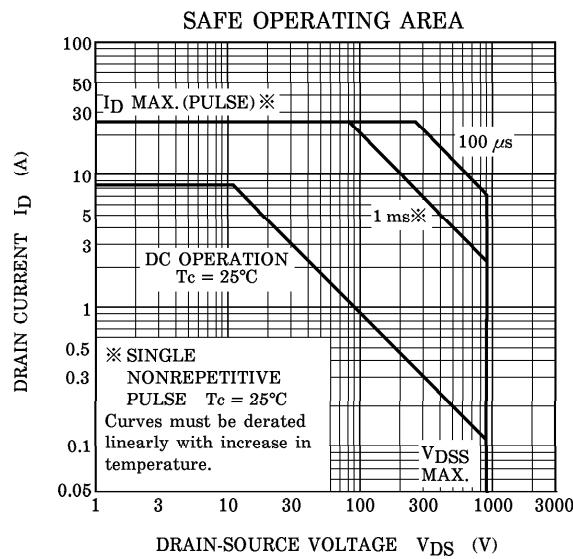
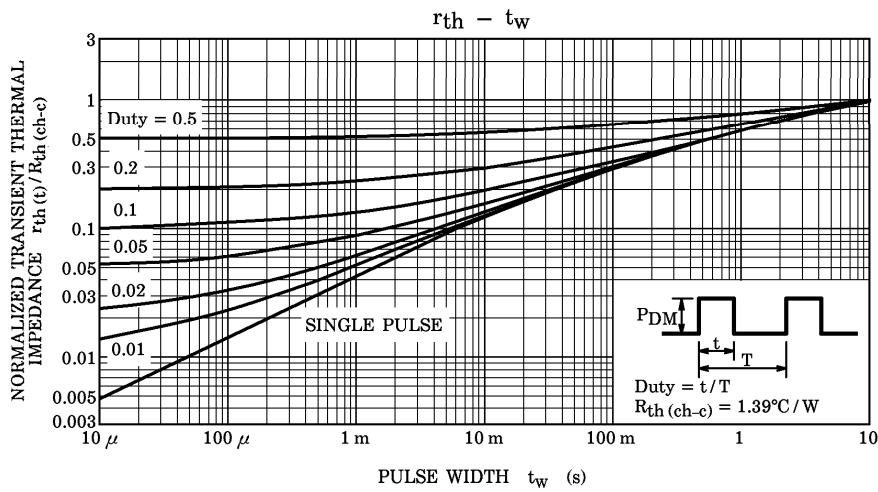
※ Lot Number

□ □ Month (Starting from Alphabet A)

□ □ Year (Last Number of the Christian Era)







$$\text{Peak IAR} = 8.5 \text{ A}, R_G = 25 \Omega \quad E_{AS} = \frac{1}{2} L \cdot I^2 \cdot \left(\frac{BVDSS}{BVDSS - V_{DD}} \right)$$

$$V_{DD} = 90 \text{ V}, L = 24.5 \text{ mH}$$