

TOSHIBA FIELD EFFECT TRANSISTOR SILICON P CHANNEL MOS TYPE (L²-π-MOSV)

2SJ438

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS

DC-DC CONVERTER, RELAY DRIVE AND MOTOR DRIVE APPLICATIONS

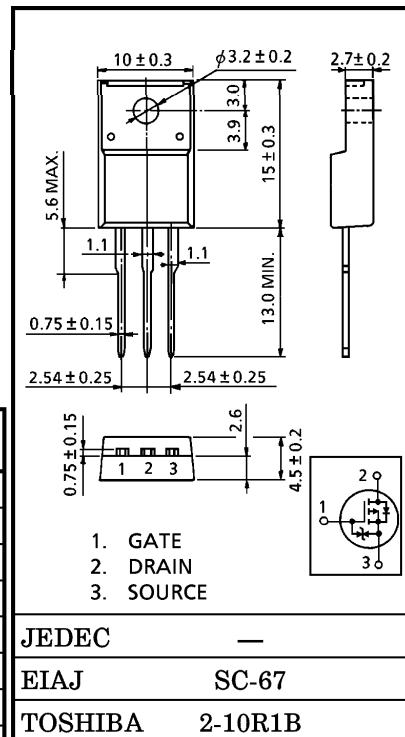
INDUSTRIAL APPLICATIONS

Unit in mm

- 4V Gate Drive
- Low Drain-Source ON Resistance : $R_{DS(ON)} = 0.16\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 4.0S$ (Typ.)
- Low Leakage Current : $I_{DSS} = -100\mu A$ (Max.) ($V_{DS} = -60V$)
- Enhancement-Mode : $V_{th} = -0.8 \sim 2.0V$ ($V_{DS} = -10V, I_D = -1mA$)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	V_{DSS}	-60	V
Drain-Gate Voltage ($R_{GS} = 20k\Omega$)	V_{DGR}	-60	V
Gate-Source Voltage	V_{GSS}	± 20	V
Drain Current	DC	I_D	-5 A
	Pulse	I_{DP}	-20 A
Drain Power Dissipation (Tc = 25°C)	P_D	25	W
Single Pulse Avalanche Energy**	E_{AS}	273	mJ
Avalanche Current	I_{AR}	-5	A
Repetitive Avalanche Energy*	E_{AR}	2	mJ
Channel Temperature	T_{ch}	150	°C
Storage Temperature Range	T_{stg}	-55~150	°C



JEDEC —

EIAJ SC-67

TOSHIBA 2-10R1B

Weight : 1.9g

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	5.0	°C/W
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	62.5	°C/W

Note ;

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

** $V_{DD} = 25V$, Starting $T_{ch} = 25°C$, $L = 14.84mH$, $R_G = 25\Omega$, $I_{AR} = -5A$

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

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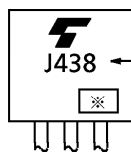
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Gate Leakage Current	IGSS	VGS = ±16V, VDS = 0V	—	—	±10	μA	
Drain Cut-off Current	IDSS	VDS = -60V, VGS = 0V	—	—	-100	μA	
Drain-Source Breakdown Voltage	V(BR)DSS	ID = -10mA, VGS = 0V	-60	—	—	V	
Gate Threshold Voltage	Vth	VDS = -10V, ID = -1mA	-0.8	—	-2.0	V	
Drain-Source ON Resistance	RDS(ON)	VGS = -4V, ID = -2.5A	—	0.24	0.28	Ω	
		VGS = -10V, ID = -2.5A	—	0.16	0.19		
Forward Transfer Admittance	Yfs	VDS = -10V, ID = -2.5A	2.0	4.0	—	S	
Input Capacitance	Ciss	VDS = -10V, VGS = 0V, f = 1MHz	—	630	—	pF	
Reverse Transfer Capacitance	Crss		—	95	—		
Output Capacitance	Coss		—	290	—		
Switching Time	Rise Time	tr		—	25	—	ns
	Turn-on Time	ton		—	45	—	
	Fall Time	tf		—	55	—	
	Turn-off Time	toff		VIN : tr, tf < 5ns, Duty ≤ 1%, tw = 10μs	—	200	
Total Gate Charge (Gate-Source Plus Gate-Drain)	Qg	VDD = -48V, VGS = -10V, ID = -5A	—	22	—	nC	
Gate-Source Charge	Qgs		—	16	—		
Gate-Drain ("Miller") Charge	Qgd		—	6	—		

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	IDR	—	—	—	-5	A
Pulse Drain Reverse Current	IDRP	—	—	—	-20	A
Diode Forward Voltage	VDSF	IDR = -5A, VGS = 0V	—	—	1.7	V
Reverse Recovery Time	trr	IDR = -5A, VGS = 0V	—	80	—	ns
Reverse Recovery Charge	Qrr	dIDR / dt = 50A / μs	—	0.1	—	μC

MARKING

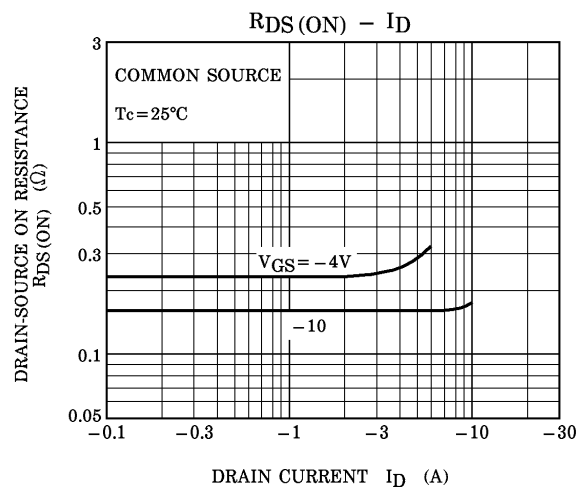
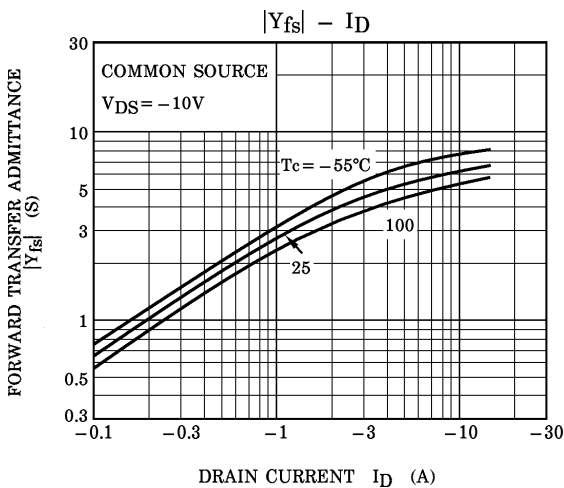
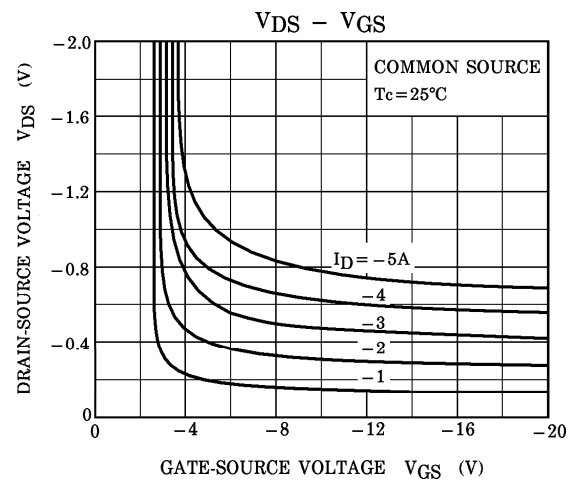
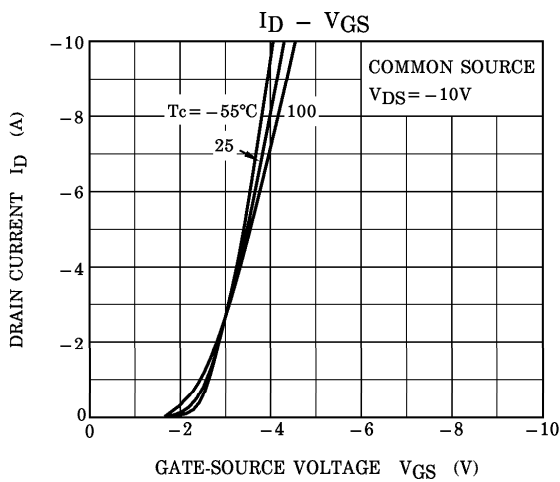
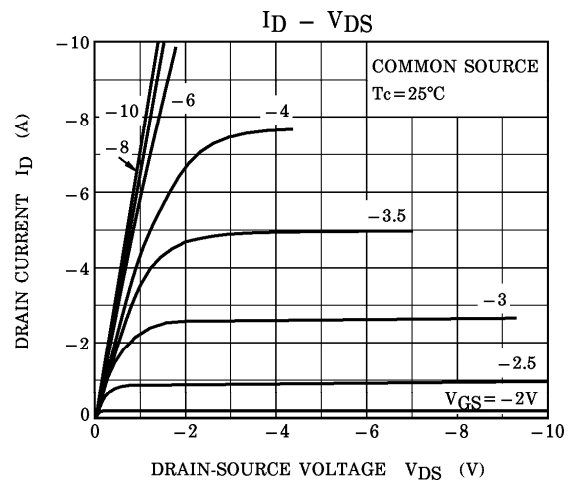
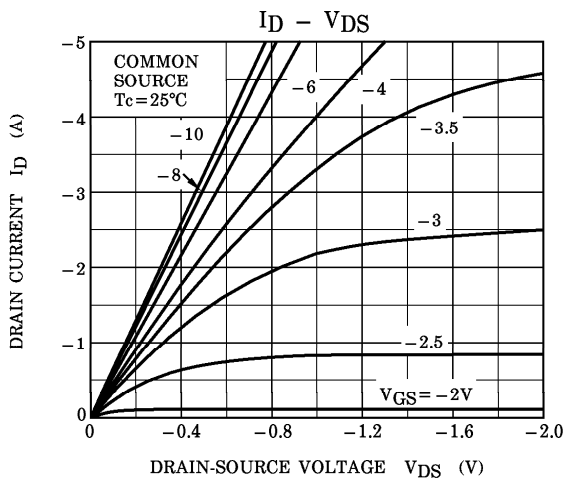


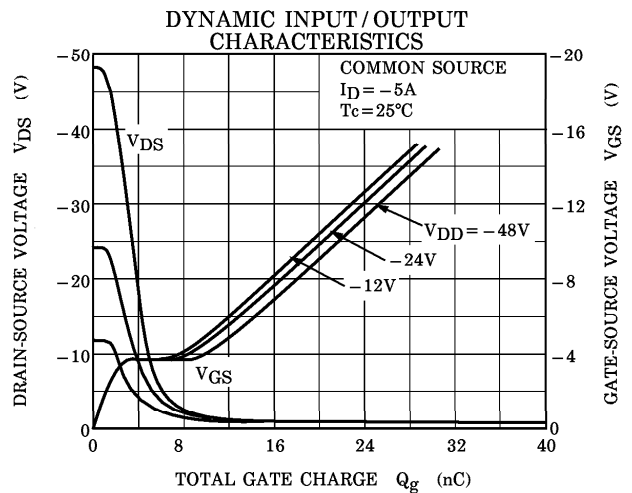
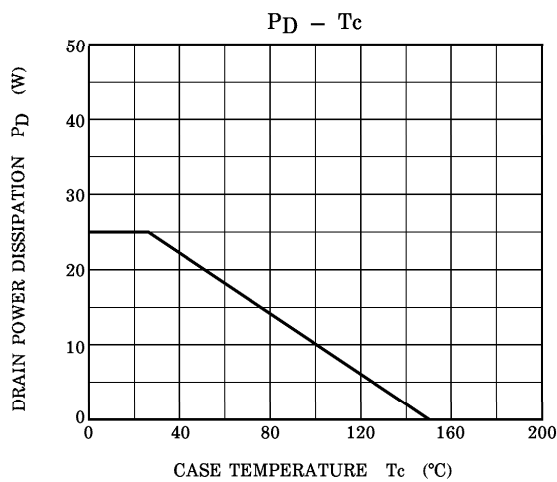
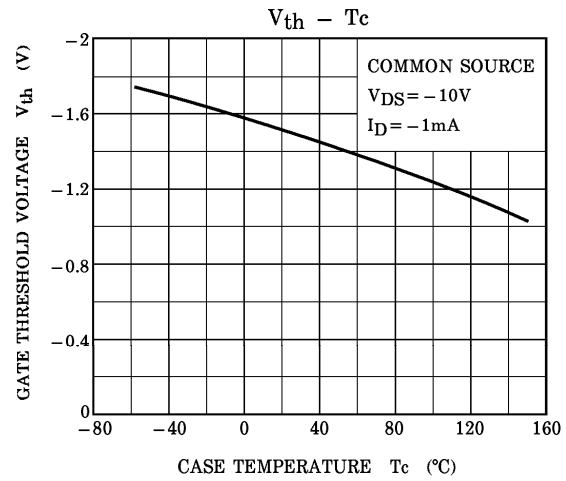
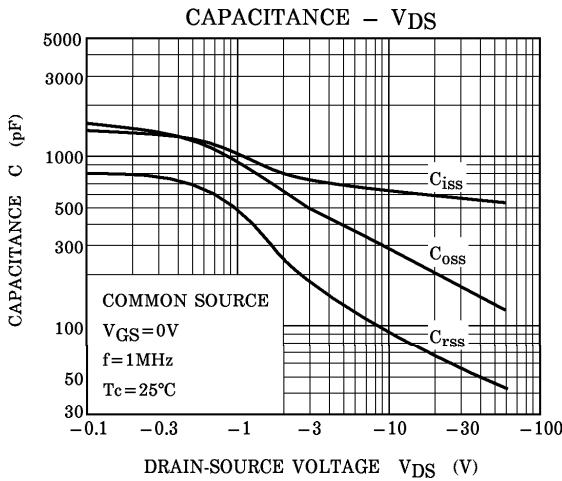
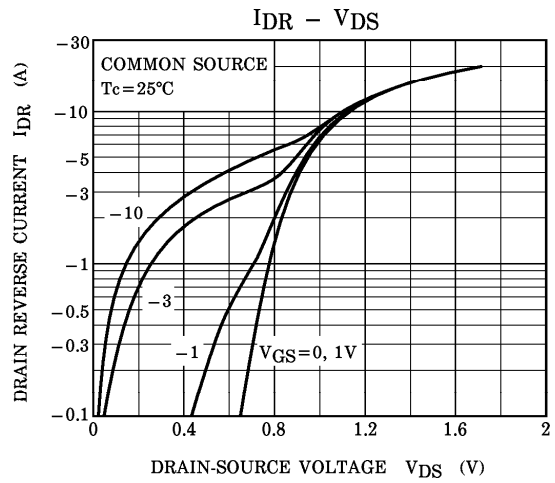
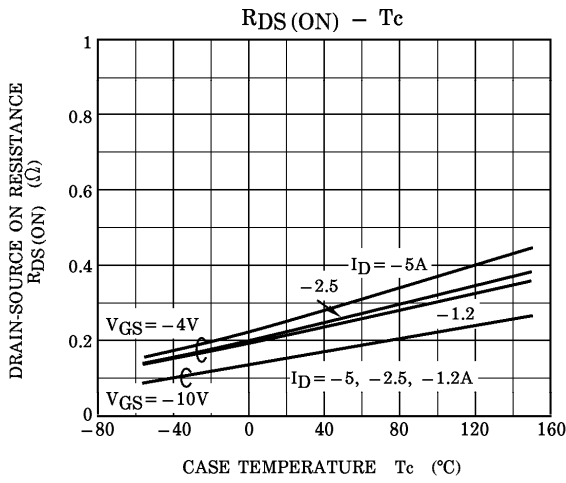
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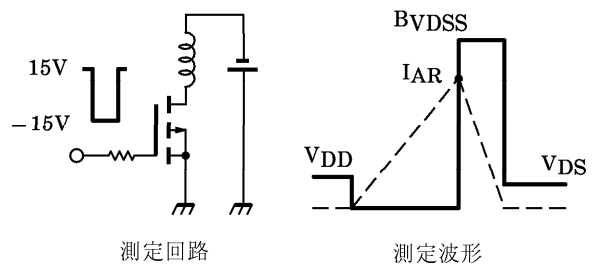
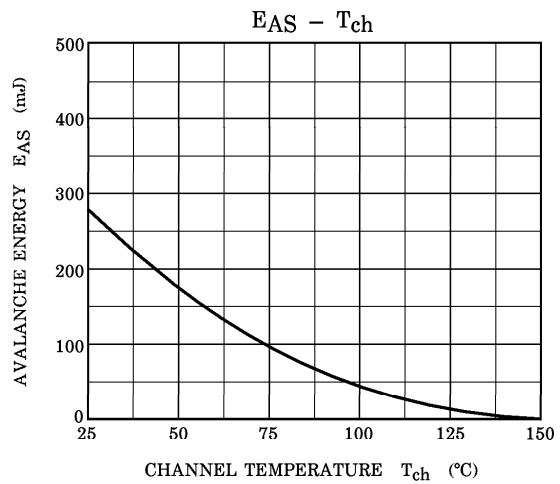
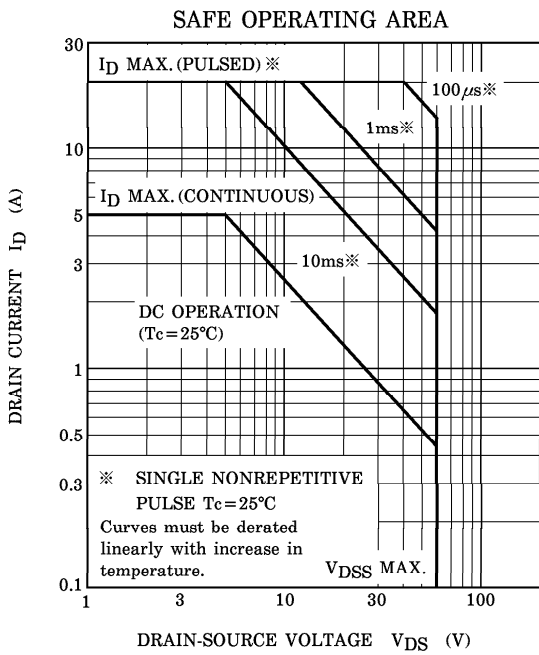
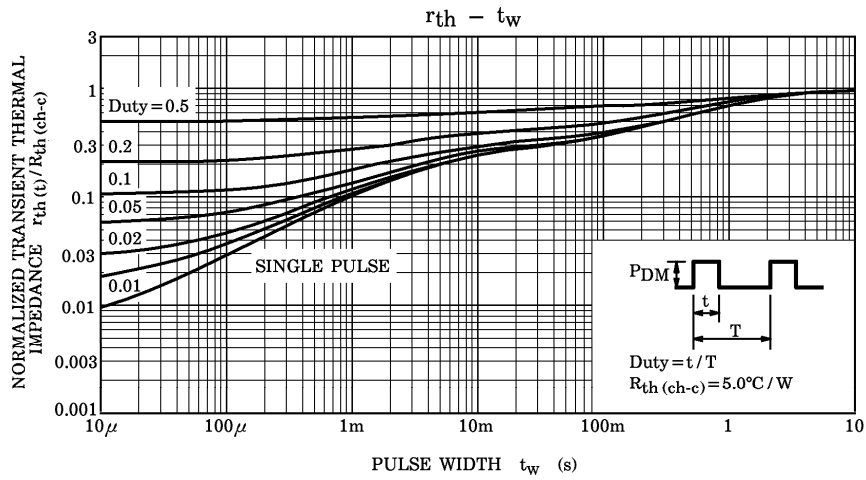
※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)







Peak $I_{AR} = -5A$, $R_G = 25\Omega$
 $V_{DD} = -25V$, $L = 14.84mH$

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