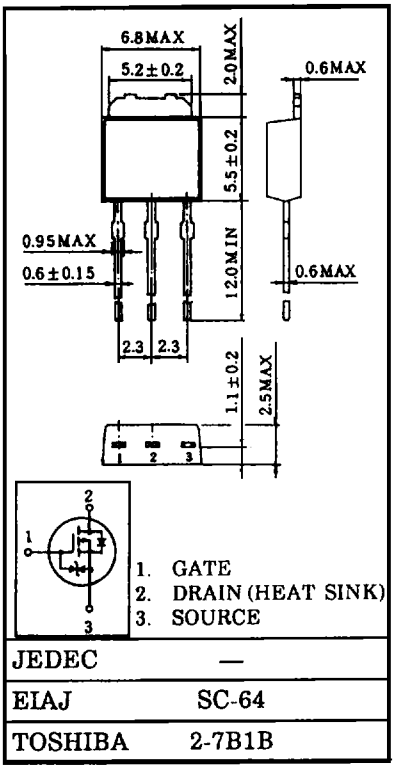
2SJ239

Field Effect Transistor

Silicon P Channel MOS Type (L^2-π-MOS IV)

High Speed, High Current DC-DC Converter, Relay Drive and Motor Drive Applications

Industrial Applications **Unit in mm**



JEDEC	—
EIAJ	SC-64
TOSHIBA	2-7B1B

Weight : 0.35g

Features

- 4-Volt Gate Drive
- Low Drain-Source ON Resistance
  - $R_{DS(ON)}$ = 0.25Ω (Typ.)
- High Forward Transfer Admittance
  - $|Y_{fs}|$ = 2.0S (Typ.)
- Low Leakage Current
  - I_{DSS} = -100μA (Max.) @ V_{DS} = -60V
- Enhancement-Mode
  - V_{th} = -0.8 ~ -2.0V @ V_{DS} = -10V, I_D = -1mA

Absolute Maximum Ratings (Ta = 25°C)

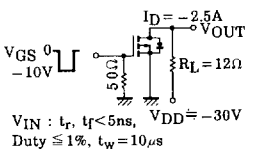
CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	-60	V
Drain-Gate Voltage (R_{GS} = 20kΩ)		V_{DGR}	-60	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	DC	I_D	-5	A
	Pulse	I_{DP}	-20	
Drain Power Dissipation (Tc = 25°C)		P_D	20	W
Channel Temperature		T_{ch}	150	°C
Storage Temperature Range		T_{stg}	-55 ~ 150	°C

Thermal Characteristics

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	6.25	°C/W
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	125	°C/W

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

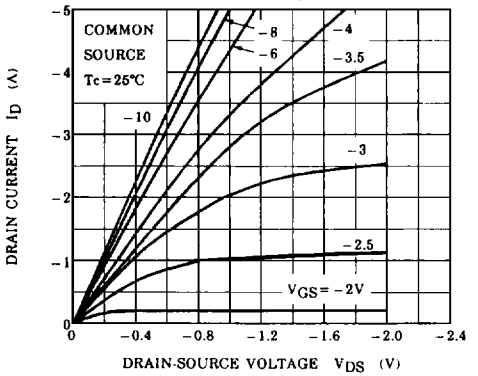
Electrical Characteristics (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	V_{GS} = ±16V, V_{DS} = 0V	–	–	±10	μA
Drain Cut-off Current		I_{DSS}	V_{DS} = -60V, V_{GS} = 0V	–	–	-100	μA
Drain-Source Breakdown Voltage		$V_{(BR)\ DSS}$	I_D = -10mA, V_{GS} = 0V	-60	–	–	V
Gate Threshold Voltage		V_{th}	V_{DS} = -10V, I_D = -1mA	-0.8	–	-2.0	V
Drain-Source ON Resistance		$R_{DS\ (ON)}$	V_{GS} = -4V, I_{DS} = -2.5A	–	0.31	0.40	Ω
			V_{GS} = -10V, I_{DS} = -2.5A	–	0.21	0.25	
Forward Transfer Admittance		$\|Y_{fs}\|$	V_{DS} = -10V, I_{DS} = -2.5A	1.0	2.0	–	S
Input Capacitance		C_{iss}	V_{DS} = -10V, V_{GS} = 0V, f = 1MHz	–	500	720	pF
Reverse Transfer Capacitance		C_{rss}		–	90	150	
Output Capacitance		C_{oss}		–	290	420	
Switching Time	Rise Time	t_r		–	120	240	ns
	Turn-on Time	t_{on}		–	130	260	
	Fall Time	t_f		–	80	160	
	Turn-off Time	t_{off}		–	200	400	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	V_{DD} = -48V, V_{GS} = -10V, I_D = -5A	–	22	45	nC
Gate-Source Charge		Q_{gs}		–	14	–	
Gate-Drain ("Miller") Charge		Q_{gd}		–	8	–	

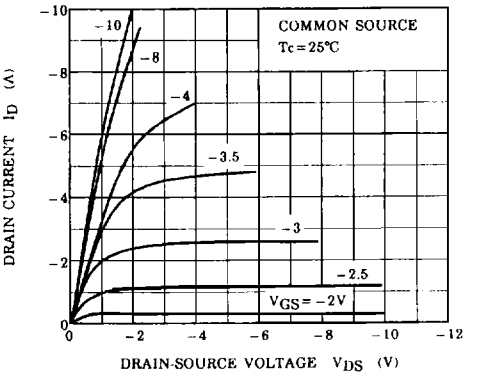
Source-Drain Diode Ratings and Characteristics (Ta = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	–	–	–	-5	A
Pulse Drain Reverse Current	I_{DRP}	–	–	–	-20	A
Diode Forward Voltage	V_{DSF}	I_{DR} = -1A, V_{GS} = 0V	–	–	1.5	V
Reverse Recovery Time	t_{rr}	I_{DR} = -1A, V_{GS} = 0V, dI_{DR}/dt = 50A/μs	–	120	–	ns
Reverse Recovered Charge	Q_{rr}		–	0.24	–	μC

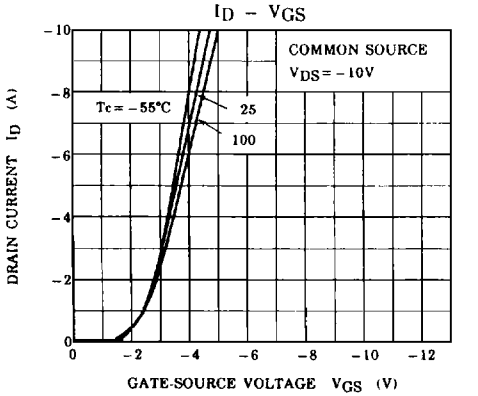
I_D – V_{DS}



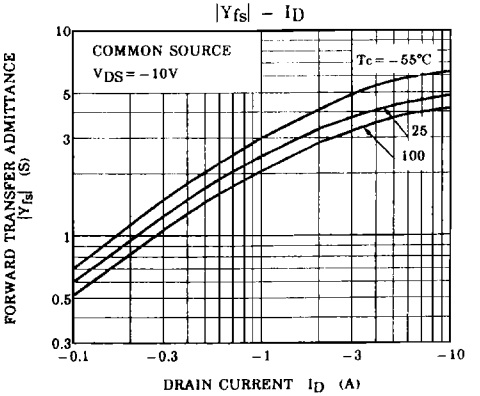
I_D – V_{DS}



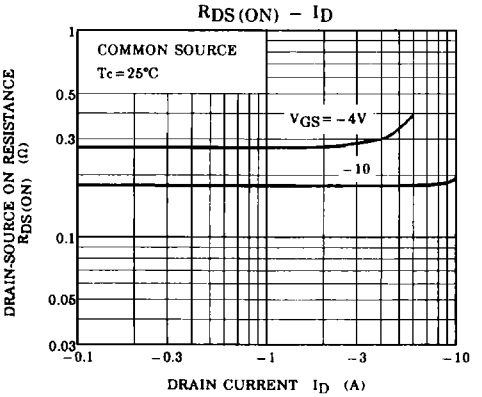
I_D – V_{GS}



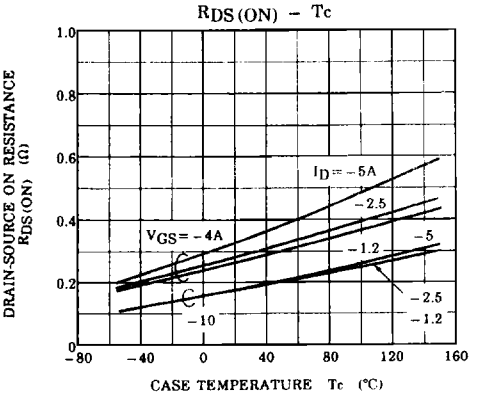
$|Y_{fs}|$ – I_D

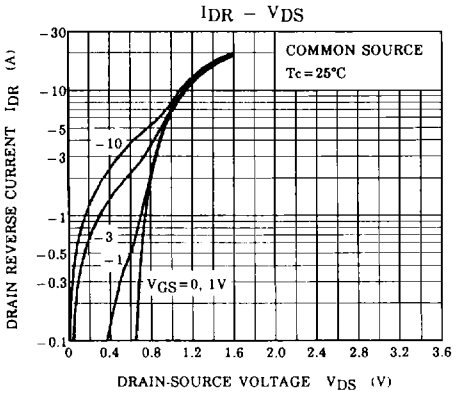


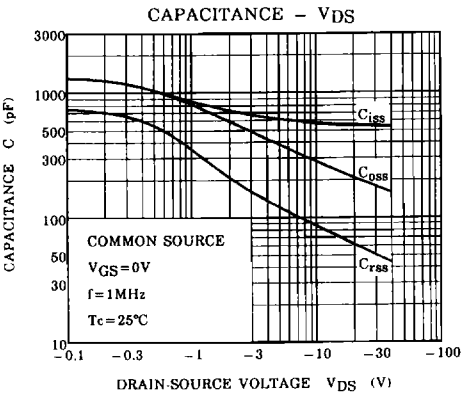
$R_{DS(ON)}$ – I_D

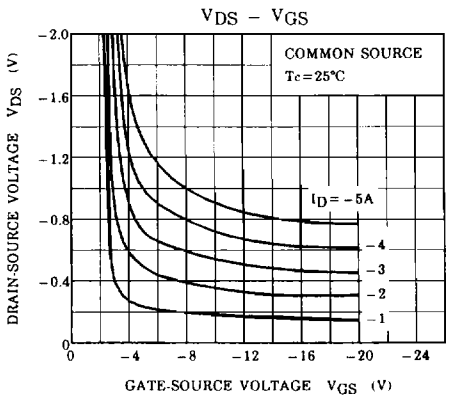


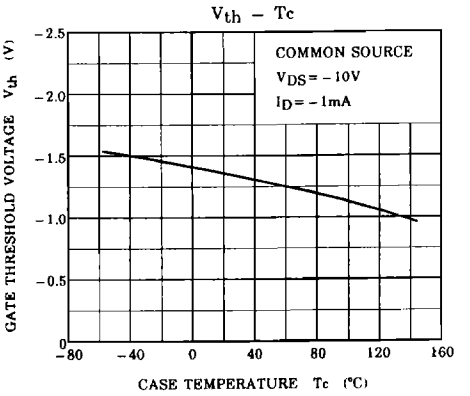
$R_{DS(ON)}$ – Tc

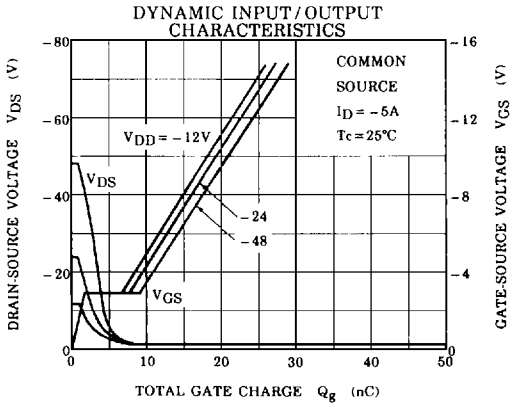


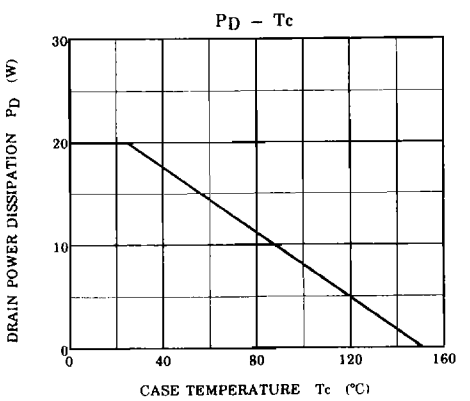

I_{DR} – V_{DS}
COMMON SOURCE
Tc = 25°C
V_{GS} = 0, 1V
DRAIN REVERSE CURRENT I_{DR} (A)
DRAIN-SOURCE VOLTAGE V_{DS} (V)


CAPACITANCE – V_{DS}
C_{iss}
C_{oss}
C_{rss}
COMMON SOURCE
V_{GS} = 0V
f = 1MHz
Tc = 25°C
CAPACITANCE C (pF)
DRAIN-SOURCE VOLTAGE V_{DS} (V)

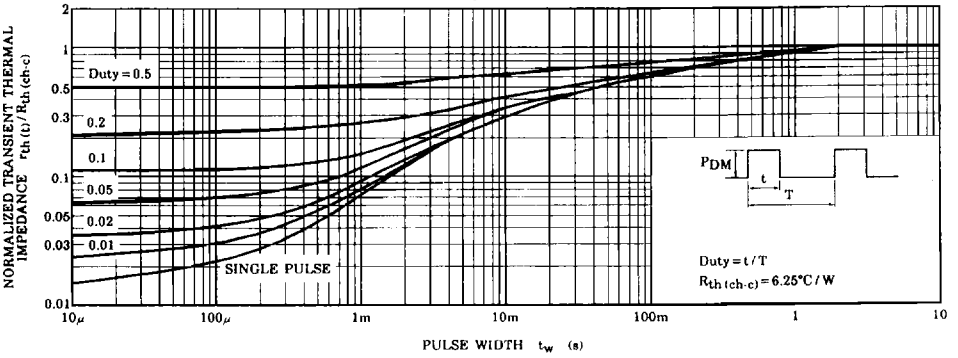

V_{DS} – V_{GS}
COMMON SOURCE
Tc = 25°C
I_D = –5A
DRAIN-SOURCE VOLTAGE V_{DS} (V)
GATE-SOURCE VOLTAGE V_{GS} (V)


V_{th} – Tc
COMMON SOURCE
V_{DS} = –10V
I_D = –1mA
GATE THRESHOLD VOLTAGE V_{th} (V)
CASE TEMPERATURE Tc (°C)


DYNAMIC INPUT / OUTPUT CHARACTERISTICS
COMMON SOURCE
I_D = –5A
Tc = 25°C
V_{DD} = –12V
V_{DS}
V_{GS}
DRAIN-SOURCE VOLTAGE V_{DS} (V)
GATE-SOURCE VOLTAGE V_{GS} (V)
TOTAL GATE CHARGE Q_g (nC)


P_D – Tc
DRAIN POWER DISSIPATION P_D (W)
CASE TEMPERATURE Tc (°C)

$r_{th} - t_w$



SAFE OPERATING AREA