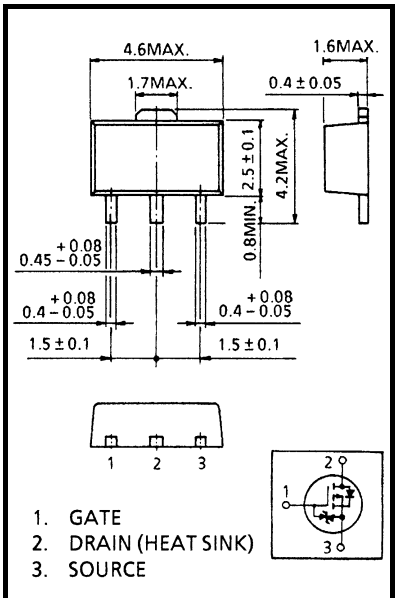
TOSHIBA Field Effect Transistor Silicon P Channel MOS Type (L^2−π−MOSV)

2SJ465

DC−DC Converter, Relay Drive and Motor Drive Applications

- 2.5-V gate drive
- Low drain−source ON-resistance : $R_{DS\ (ON)}$ = 0.54 Ω (typ.)
- High forward transfer admittance : $|Y_{fs}|$ = 1.7 S (typ.)
- Low leakage current : I_{DSS} = −100 μA (max) (V_{DS} = −16 V)
- Enhancement mode : V_{th} = −0.5 to −1.1 V (V_{DS} = −10 V, I_D = −200 μA)

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	2−5K1B

Weight: 0.05 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain−source voltage		V_{DSS}	−16	V
Drain−gate voltage (R_{GS} = 20 kΩ)		V_{DGR}	−16	V
Gate−source voltage		V_{GSS}	±8	V
Drain current	DC (Note 1)	I_D	−2	A
	Pulse (Note 1)	I_{DP}	−6	
Drain power dissipation		P_D	0.5	W
Drain power dissipation (Note 2)		P_D	1.5	W
Channel temperature		T_{ch}	150	°C
Storage temperature range		T_{stg}	−55 to 150	°C

Note 1: Ensure that the channel temperature does not exceed 150°C.

Note 2: Mounted on a ceramic substrate (25.4 mm × 25.4 mm × 0.8 mm)

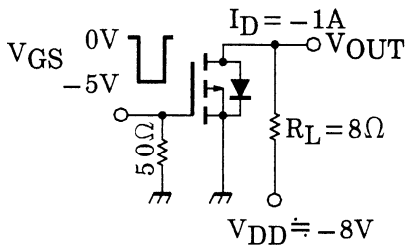
Note 3: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings. Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/“Derating Concept and Methods”) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to ambient	$R_{th\ (ch-a)}$	250	°C / W

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

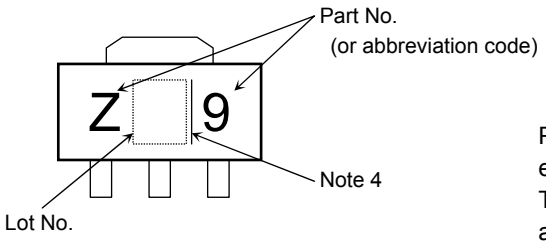
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	V_{GS} = ±6.5 V, V_{DS} = 0 V	—	—	±10	μA
Drain cut−off current		I_{DSS}	V_{DS} = −16 V, V_{GS} = 0 V	—	—	−100	μA
Drain−source breakdown voltage		$V_{(BR)\ DSS}$	I_D = −10 mA, V_{GS} = 0 V	−16	—	—	V
Gate threshold voltage		V_{th}	V_{DS} = −10 V, I_D = −200 μA	−0.5	—	−1.1	V
Drain−source ON-resistance		$R_{DS\ (ON)}$	V_{GS} = −2.5 V, I_D = −0.5 A	—	0.82	1.0	Ω
			V_{GS} = −4 V, I_D = −1 A	—	0.54	0.71	
Forward transfer admittance		$\|Y_{fs}\|$	V_{DS} = −10 V, I_D = −1 A	0.8	1.7	—	S
Input capacitance		C_{iss}	V_{DS} = −10 V, V_{GS} = 0 V, f = 1 MHz	—	270	—	pF
Reverse transfer capacitance		C_{rss}		—	25	—	
Output capacitance		C_{oss}		—	115	—	
Switching time	Rise time	t_r		—	200	—	ns
	Turn−on time	t_{on}		—	250	—	
	Fall time	t_f		—	200	—	
	Turn−off time	t_{off}		—	500	—	
Total gate charge (Gate−source plus gate−drain)		Q_g	V_{DD} ≈ −16 V, V_{GS} = −5 V, I_D = −2 A	—	5	—	nC
Gate−source charge		Q_{gs}		—	3.2	—	
Gate−drain (“miller”) charge		Q_{gd}		—	1.8	—	

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

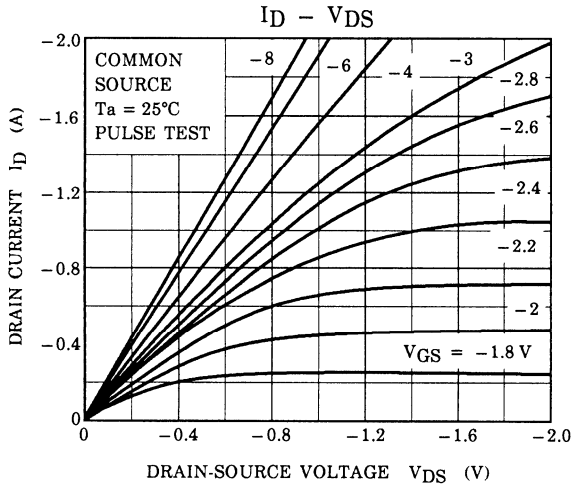
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	−2	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	−6	A
Forward voltage (diode)	V_{DSF}	I_{DR} = −2 A, V_{GS} = 0 V	—	—	1.7	V
Reverse recovery time	t_{rr}	I_{DR} = −2 A, V_{GS} = 0 V dI_{DR} / dt = 50 A / μs	—	130	—	ns
Reverse recovery charge	Q_{rr}		—	0.13	—	μC

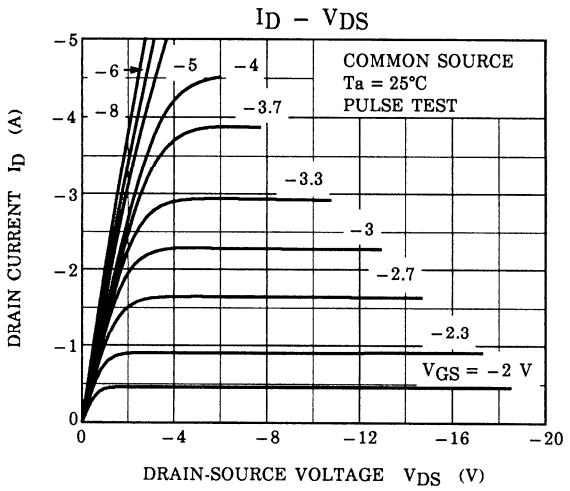
Marking

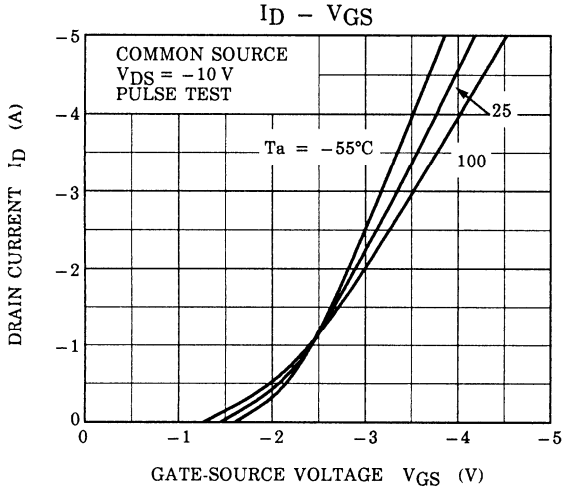


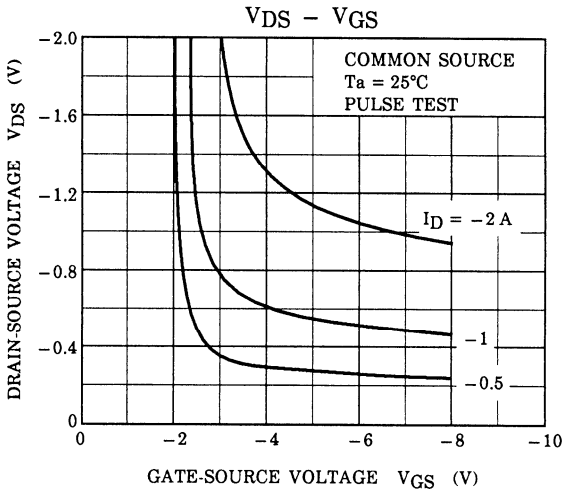
Note 4: A line to the right of a Lot No. identifies the indication of product Labels.
Without a line: [[Pb]]/INCLUDES > MCV
With a line: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

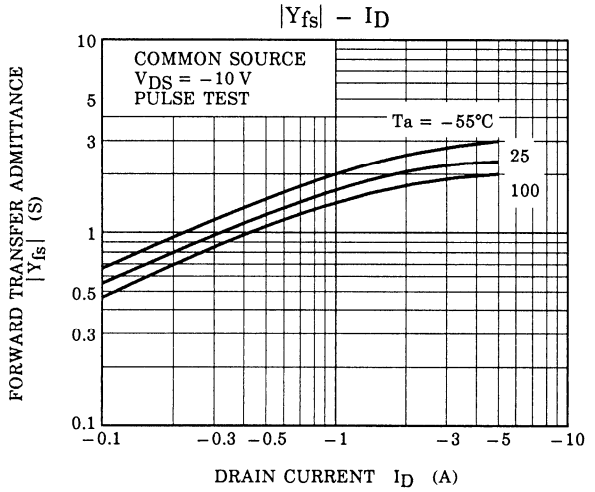
Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

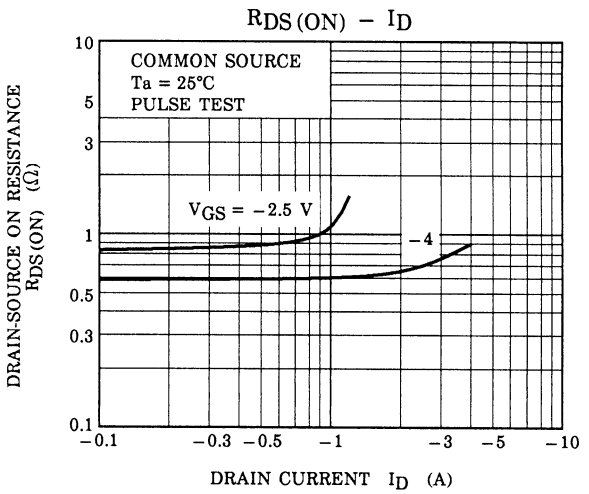

I_D – V_{DS}
COMMON SOURCE
Ta = 25°C
PULSE TEST
−8
−6
−4
−3
−2.8
−2.6
−2.4
−2.2
−2
V_{GS} = −1.8 V
DRAIN CURRENT I_D (A)
DRAIN-SOURCE VOLTAGE V_{DS} (V)


I_D – V_{DS}
COMMON SOURCE
Ta = 25°C
PULSE TEST
−6
−5
−4
−8
−3.7
−3.3
−3
−2.7
−2.3
V_{GS} = −2 V
DRAIN CURRENT I_D (A)
DRAIN-SOURCE VOLTAGE V_{DS} (V)

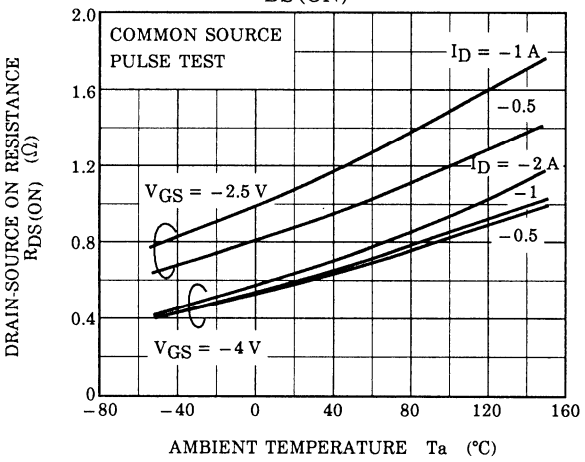

I_D – V_{GS}
COMMON SOURCE
V_{DS} = −10 V
PULSE TEST
Ta = −55°C
25
100
DRAIN CURRENT I_D (A)
GATE-SOURCE VOLTAGE V_{GS} (V)


V_{DS} – V_{GS}
COMMON SOURCE
Ta = 25°C
PULSE TEST
I_D = −2 A
−1
−0.5
DRAIN-SOURCE VOLTAGE V_{DS} (V)
GATE-SOURCE VOLTAGE V_{GS} (V)

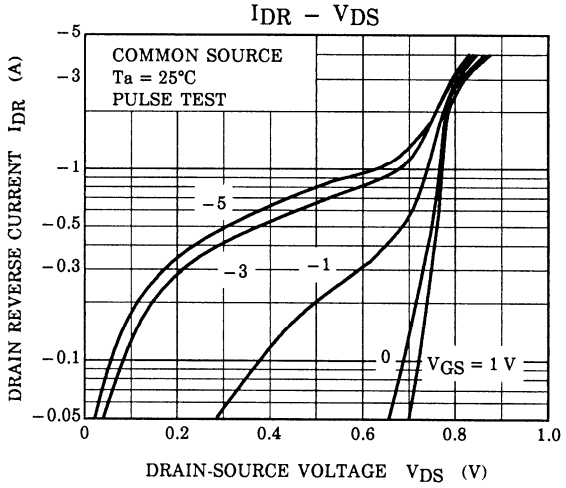

$|Y_{fs}|$ – I_D
COMMON SOURCE
V_{DS} = −10 V
PULSE TEST
Ta = −55°C
25
100
FORWARD TRANSFER ADMITTANCE $|Y_{fs}|$ (S)
DRAIN CURRENT I_D (A)


$R_{DS\,(ON)}$ – I_D
COMMON SOURCE
Ta = 25°C
PULSE TEST
V_{GS} = −2.5 V
−4
DRAIN-SOURCE ON RESISTANCE $R_{DS\,(ON)}$ (Ω)
DRAIN CURRENT I_D (A)

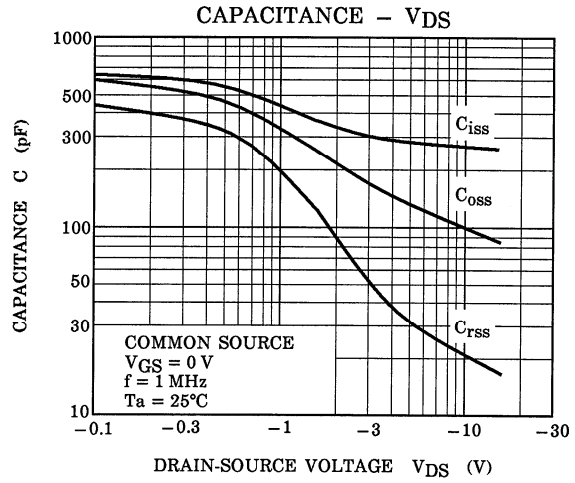
$R_{DS\,(ON)}$ – Ta



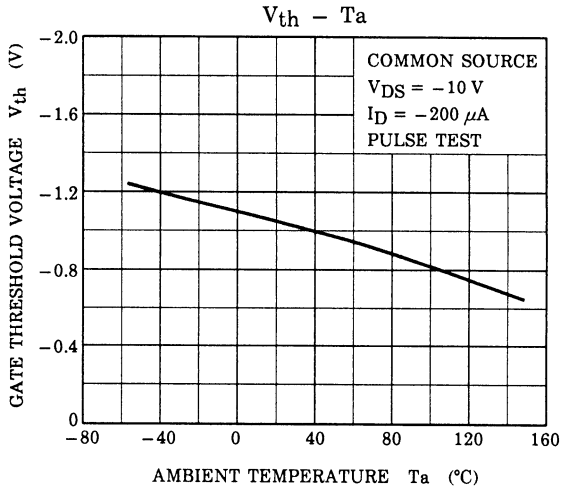
I_{DR} – V_{DS}



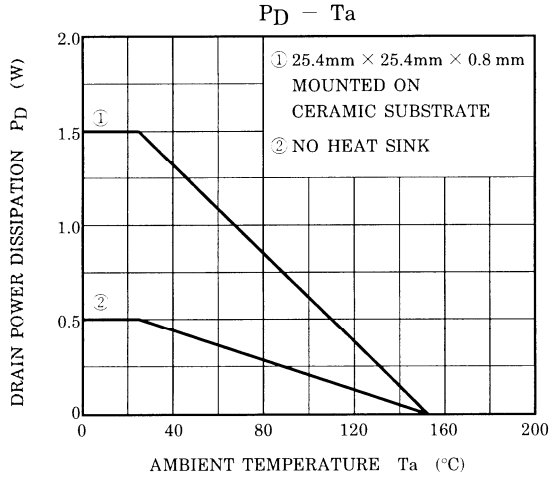
CAPACITANCE – V_{DS}

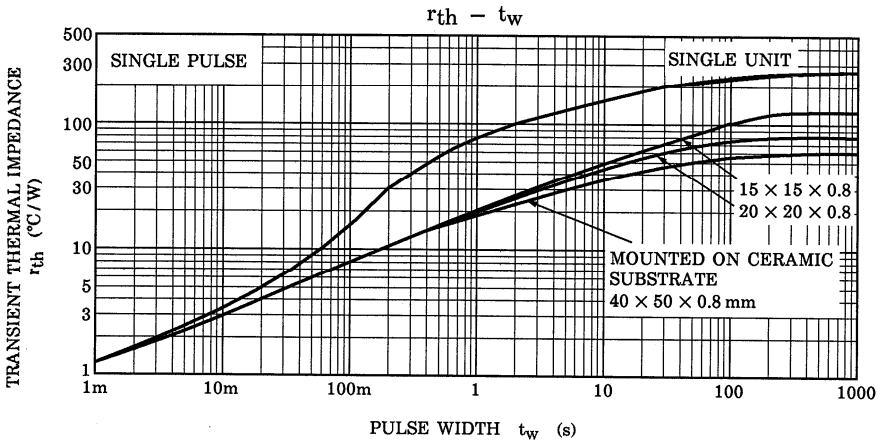


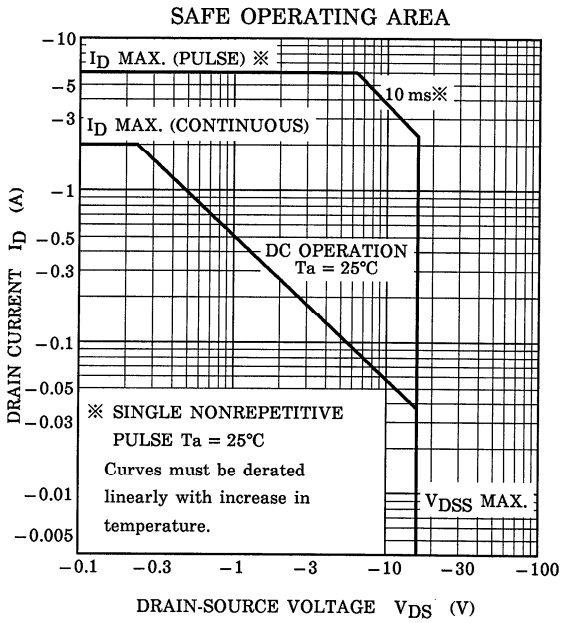
V_{th} – Ta



P_D – Ta




r_{th} – t_w
TRANSIENT THERMAL IMPEDANCE r_{th} (°C/W)
500
300
100
50
30
10
5
3
1
SINGLE PULSE
SINGLE UNIT
15 × 15 × 0.8
20 × 20 × 0.8
MOUNTED ON CERAMIC SUBSTRATE
40 × 50 × 0.8 mm
1m
10m
100m
1
10
100
1000
PULSE WIDTH t_w (s)


SAFE OPERATING AREA
DRAIN CURRENT I_D (A)
−10
−5
−3
−1
−0.5
−0.3
−0.1
−0.05
−0.03
−0.01
−0.005
I_D MAX. (PULSE) ※
10 ms※
I_D MAX. (CONTINUOUS)
DC OPERATION
Ta = 25°C
※ SINGLE NONREPETITIVE PULSE Ta = 25°C
Curves must be derated linearly with increase in temperature.
V_{DSS} MAX.
−0.1
−0.3
−1
−3
−10
−30
−100
DRAIN-SOURCE VOLTAGE V_{DS} (V)

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