## **Field Effect Transistor**

Silicon N Channel MOS Type ( $\pi$ -MOS III.5) High Speed, High Current DC-DC Converter,

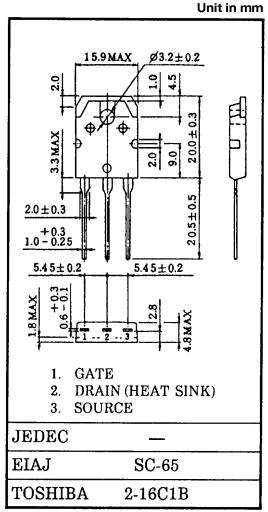
# **Relay Drive and Motor Drive Applications**

### **Features**

- Low Drain-Source ON Resistance
  - $R_{DS(ON)} = 0.75\Omega$  (Typ.)
- High Forward Transfer Admittance
  - $|Y_{fs}| = 4.9S$  (Typ.)
- Low Leakage Current
  - $I_{DSS} = 300 \mu A$  (Max.) @  $V_{DS} = 500 V$
- Enhancement-Mode
  - $V_{th} = 2.0 \sim 4.0 V @ V_{DS} = 10 V$ ,  $I_D = 1 mA$

## Absolute Maximum Ratings (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V <sub>DSS</sub>	500	V
Drain-Gate Voltage ( $R_{GS} = 20k\Omega$ )		$V_{DGR}$	500	V
Gate-Source Voltage		V <sub>GSS</sub>	±30	V
Drain Current	DC	I <sub>D</sub>	10	Α
	Pulse	I <sub>DP</sub>	40	
Drain Power Dissipation (Tc = 25°C)		P <sub>D</sub>	125	W
Channel Temperature		T <sub>ch</sub>	150	°C
Storage Temperature Range		T <sub>stg</sub>	-55 ~ 150	°C



Weight: 4.6g

#### **Thermal Characteristics**

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	R <sub>th(ch-c)</sub>	1.0	°C/W
Thermal Resistance, Channel to Ambient	R <sub>th(ch-a)</sub>	50	°C/W

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

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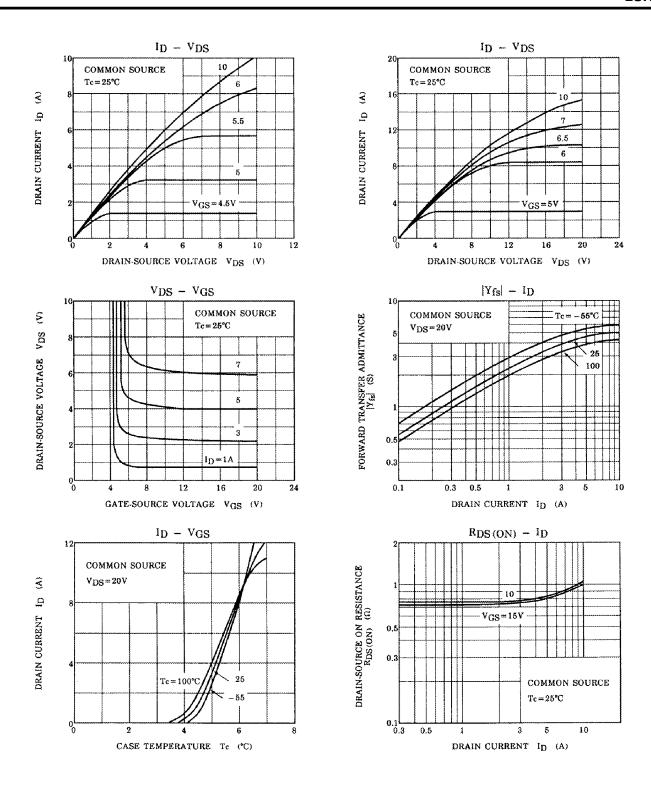
# Electrical Characteristics (Ta = 25°C)

CHAR	ACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage C	Current	I <sub>GSS</sub>	$V_{GS} = \pm 30V, V_{DS} = 0V$		-	±100	nA
Drain Cut-off C	urrent	I <sub>DSS</sub>	V <sub>DS</sub> = 500V, V <sub>GS</sub> = 0V	_	-	300	μА
Drain-Source B	Breakdown Voltage	V <sub>(BR) DSS</sub>	I <sub>D</sub> = 10mA, V <sub>GS</sub> = 0V	500	-	-	V
Gate Threshold	Voltage	V <sub>th</sub>	$V_{DS} = 10V$ , $I_D = 1 \text{ mA}$	2.0	-	4.0	V
Drain-Source C	N Resistance	R <sub>DS (ON)</sub>	$I_D = 5A, V_{GS} = 10V$	-	0.75	1.0	Ω
Forward Transf	er Admittance	Y <sub>fs</sub>	$V_{DS} = 10V, I_{D} = 5A$	3.0	4.9		S
Input Capacitar	nce	C <sub>iss</sub>		-	870	1100	
Reverse Transfer Capacitance Output Capacitance		C <sub>rss</sub>	$V_{DS} = 10V$ , $V_{GS} = 0V$ , $f = 1MHz$	_	75	250	pF
		C <sub>oss</sub>		_	210	300	
Time Fall Time	Rise Time	t <sub>r</sub>	ID=5A VOUT	-	30	90	
	Turn-on Time	t <sub>on</sub>		-	60	140	
	Fall Time	t <sub>f</sub>		_	35	130	ns
	Turn-off Time	t <sub>off</sub>	V <sub>GS</sub> R <sub>L</sub> =40Ω	-	100	300	
			$V_{IN}: t_r, t_r < 5 \text{ns}, V_{DD} = 200V$ $Duty \le 1\%, t_w = 10 \mu \text{s}$				
Total Gate Charge (Gate-Source Plus Gate-Drain)  Gate-Source Charge  Gate-Drain ("Miller") Charge		Qg	V <sub>DD</sub> = 400V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 10A	-	40	85	
		$Q_{gs}$		_	16	-	nC
		$Q_{\mathrm{gd}}$	1	_	24	-	

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

CHARACTERISTICS	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I <sub>DR</sub>	-	-	-	10	Α
Pulse Drain Reverse Current	I <sub>DRP</sub>	-	-	-	40	Α
Diode Forward Voltage	V <sub>DSF</sub>	$I_{DR} = 10A$ , $V_{GS} = 0V$	-	-	-2.0	٧
Reverse Recovery Time	t <sub>rr</sub>	I <sub>DR</sub> = 10A, V <sub>GS</sub> = 0V	-	360	-	ns
Reverse Recovered Charge	Q <sub>rr</sub>	$dI_{DR}/dt = 100A/\mu s$	-	3.0	-	μC

2/6 TOSHIBA CORPORATION



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3000

1000 (pF)

500

300

100

30

101..

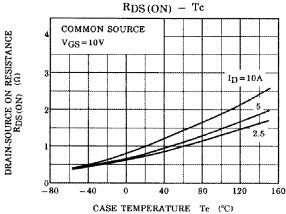
COMMON SOURCE  $V_{GS} = 10V$ 

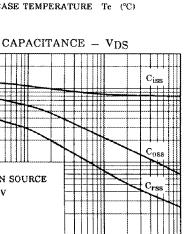
f = 1 MHz $Tc \approx 25$ °C

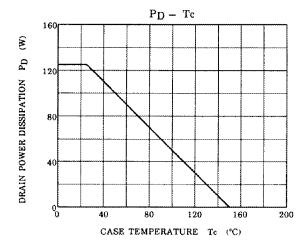
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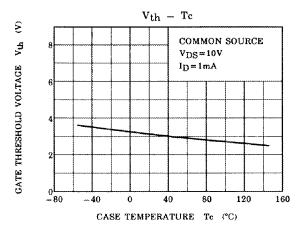
CAPACITANCE

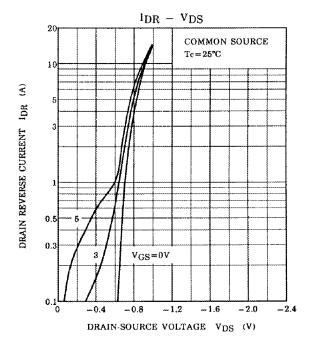




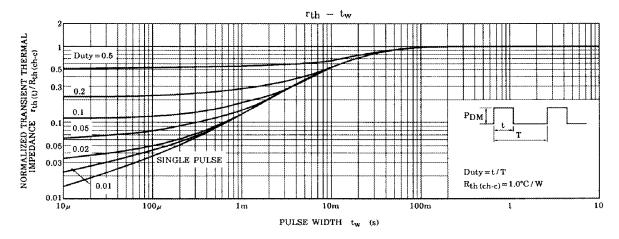


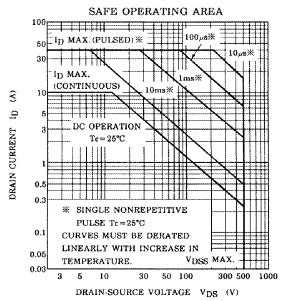
DRAIN-SOURCE VOLTAGE VDS (V)





4/6 TOSHIBA CORPORATION





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