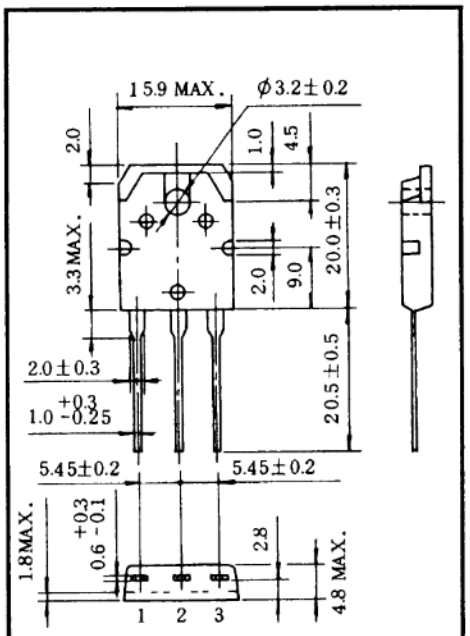
Field Effect Transistor

Silicon N Channel MOS Type (π-MOS II.5)

High Speed, High Current DC-DC Converter,

Relay Drive and Motor Drive Applications

Industrial Applications Unit in mm



1. GATE
2. DRAIN (HEAT SINK)
3. SOURCE

JEDEC	—
EIAJ	SC-65
TOSHIBA	2-16C1B

Weight : 4.6g

Features

- Low Drain-Source ON Resistance
  - $R_{DS(ON)}$ = 1.1Ω (Typ.)
- High Forward Transfer Admittance
  - $|Y_{fs}|$ = 4.0S (Typ.)
- Low Leakage Current
  - I_{DSS} = 300∝A (Max.) @ V_{DS} = 720V
- Enhancement-Mode
  - V_{th} = 1.5 ~ 3.5V @ V_{DS} = 10V, I_D = 1mA

Absolute Maximum Ratings (Ta = 25°C)

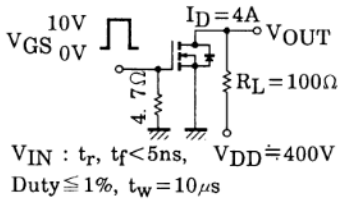
CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	900	V
Drain-Gate Voltage (R_{GS} = 20kΩ)		V_{DGR}	900	V
Gate-Source Voltage		V_{GSS}	±30	V
Drain Current	DC	I_D	9	A
	Pulse	I_{DP}	27	
Drain Power Dissipation (Tc = 25°C)		P_D	150	W
Channel Temperature		T_{ch}	150	°C
Storage Temperature Range		T_{stg}	-55 ~ 150	°C

Thermal Characteristics

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	0.833	°C/W
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	50	°C/W

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

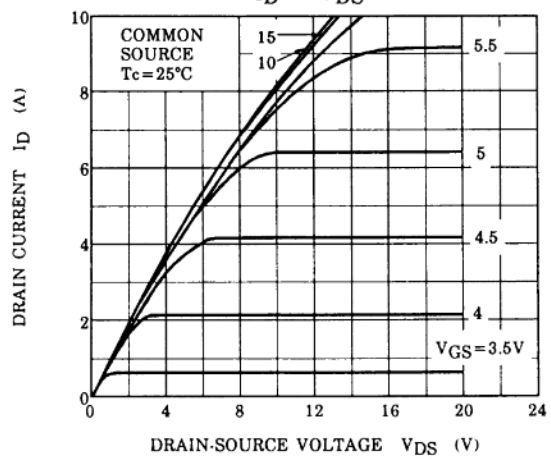
Electrical Characteristics (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	V_{GS} = ±25V, V_{DS} = 0V	–	–	±100	nA
Drain Cut-off Current		I_{DSS}	V_{DS} = 720V, V_{GS} = 0V	–	–	300	∞A
Drain-Source Breakdown Voltage		$V_{(BR)\ DSS}$	I_D = 10mA, V_{GS} = 0V	900	–	–	V
Gate Threshold Voltage		V_{th}	V_{DS} = 10V, I_D = 1mA	1.5	–	3.5	V
Drain-Source ON Resistance		$R_{DS\ (ON)}$	I_D = 4A, V_{GS} = 10V	–	1.1	1.4	Ω
Forward Transfer Admittance		$\|Y_{fs}\|$	V_{DS} = 20V, I_D = 4A	2.0	4.0	–	S
Input Capacitance		C_{iss}	V_{DS} = 25V, V_{GS} = 0V, f = 1MHz	–	1300	1800	pF
Reverse Transfer Capacitance		C_{rss}		–	100	150	
Output Capacitance		C_{oss}		–	180	260	
Switching Time	Rise Time	t_r		–	25	50	ns
	Turn-on Time	t_{on}		–	40	80	
	Fall Time	t_f		–	20	40	
	Turn-off Time	t_{off}		–	100	200	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	V_{DD} = 400V, V_{GS} = 10V, I_D = 9A	–	120	240	nC
Gate-Source Charge		Q_{gs}		–	70	–	
Gate-Drain ("Miller") Charge		Q_{gd}		–	50	–	

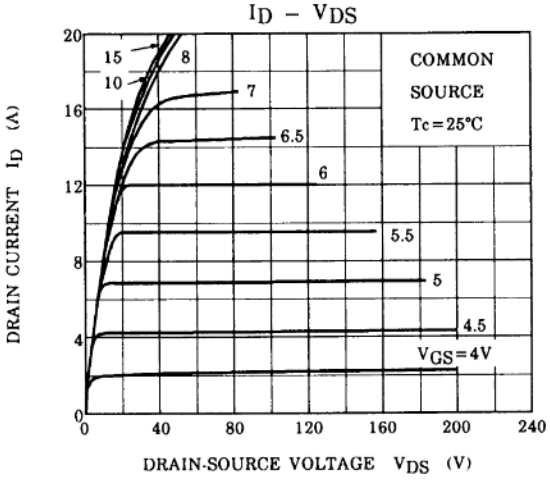
Source-Drain Diode Ratings and Characteristics (Ta = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	–	–	–	9	A
Pulse Drain Reverse Current	I_{DRP}	–	–	–	27	A
Diode Forward Voltage	V_{DSF}	I_{DR} = 9A, V_{GS} = 0V	–	–	-2.0	V

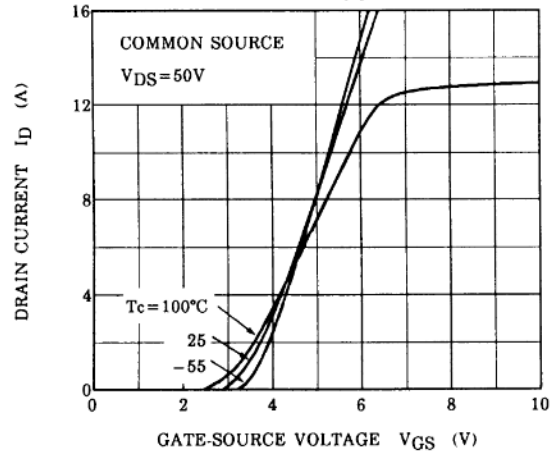
$I_D - V_{DS}$



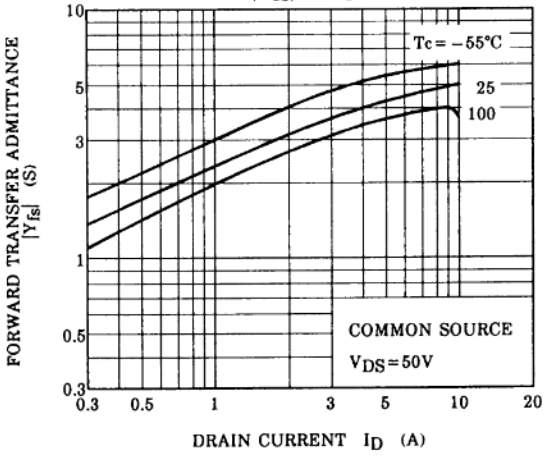
$I_D - V_{DS}$



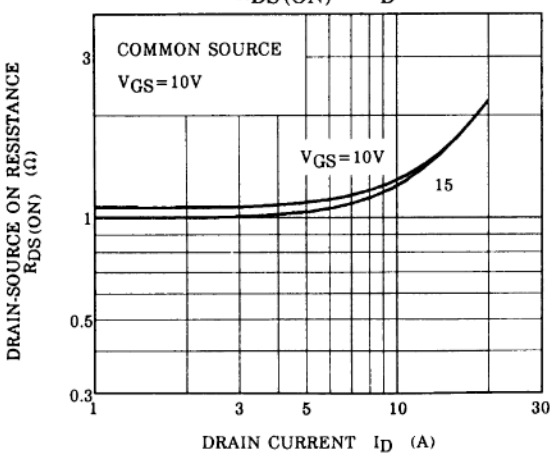
$I_D - V_{GS}$



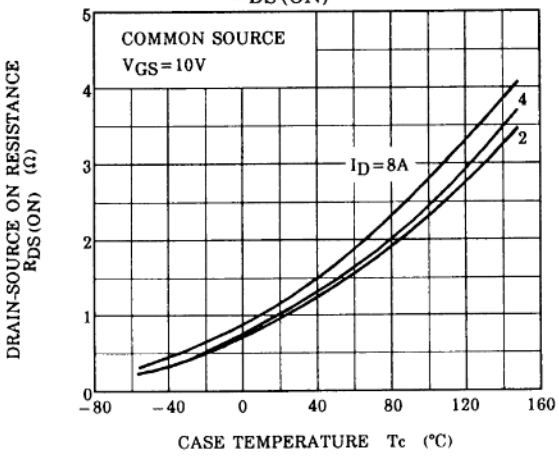
$|Y_{fs}| - I_D$



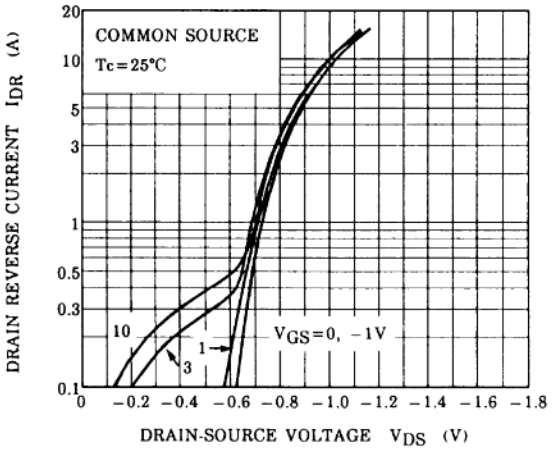
$R_{DS(ON)} - I_D$



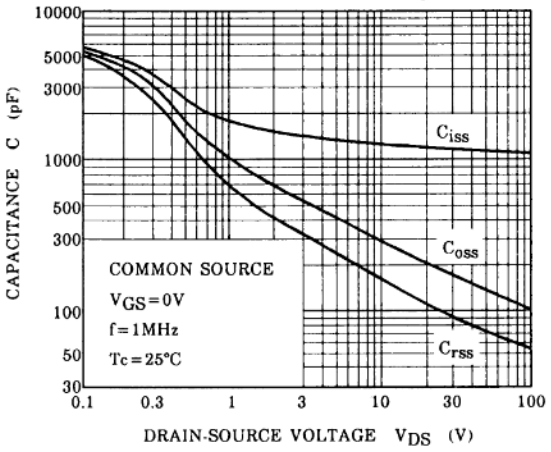
$R_{DS(ON)} - T_c$



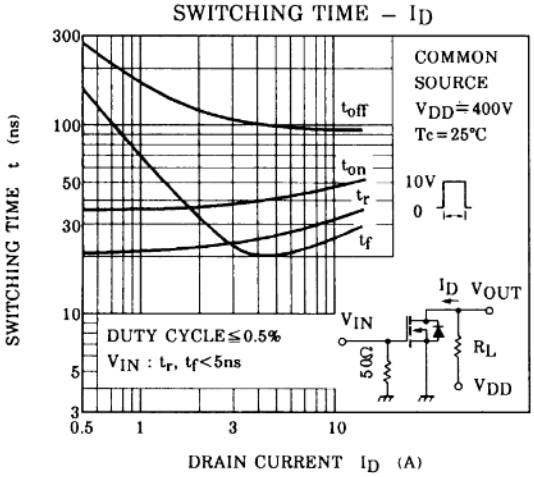
I_{DR} – V_{DS}



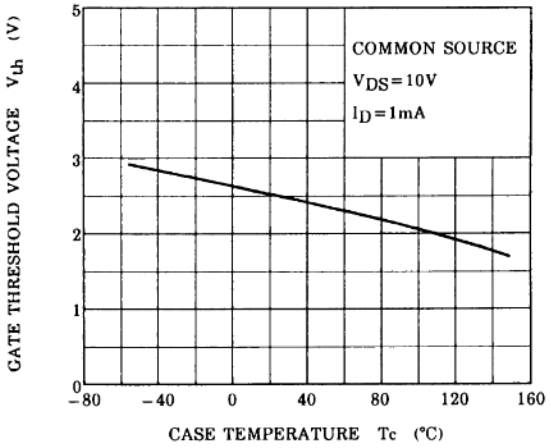
CAPACITANCE – V_{DS}



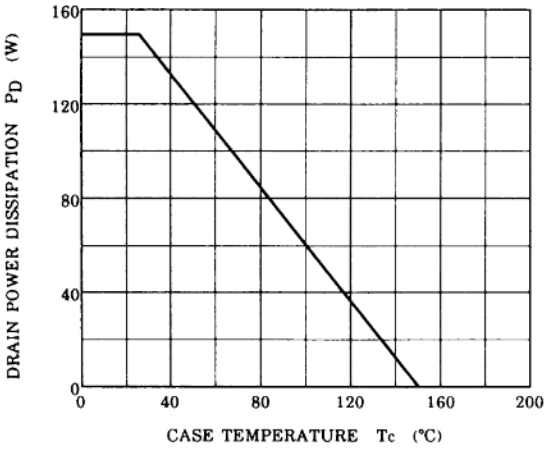
SWITCHING TIME – I_D



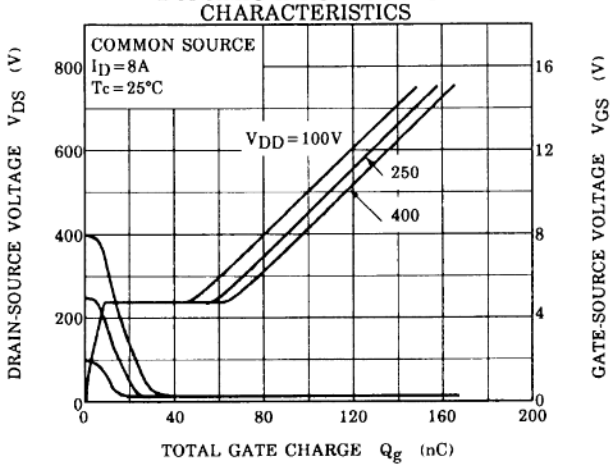
V_{th} – Tc

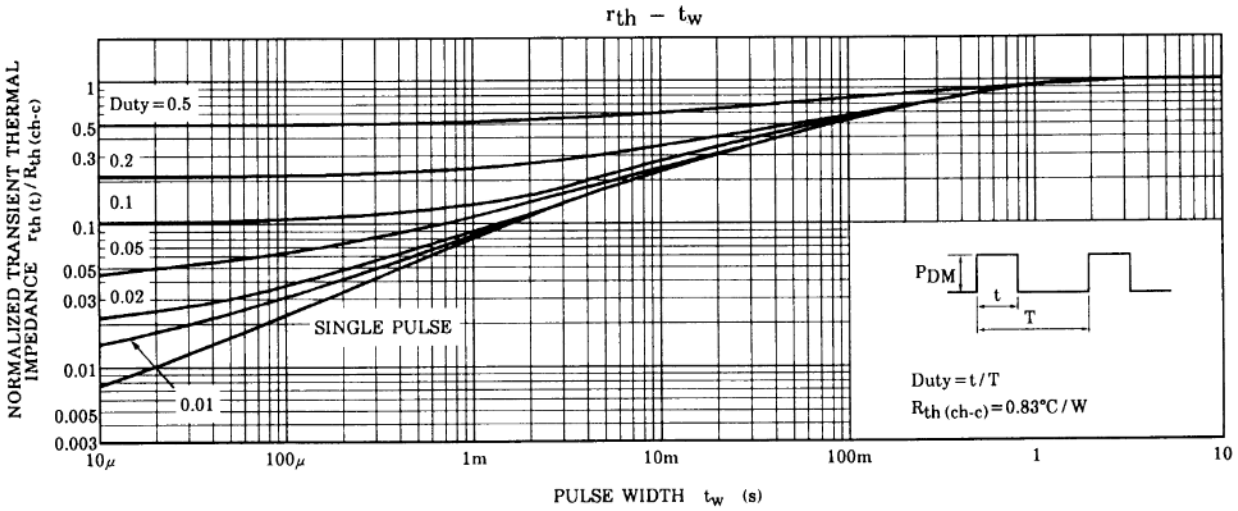


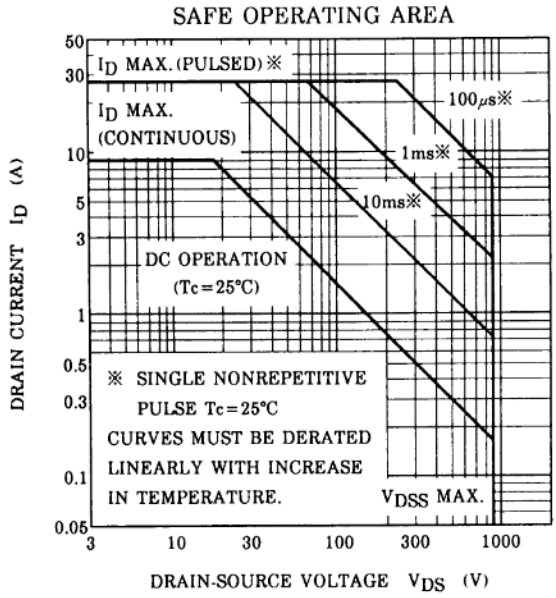
P_D – Tc



DYNAMIC INPUT / OUTPUT CHARACTERISTICS




r_{th} – t_w
NORMALIZED TRANSIENT THERMAL IMPEDANCE $r_{th}(t)/R_{th(ch-c)}$
Duty = 0.5
0.2
0.1
0.05
0.02
SINGLE PULSE
0.01
P_{DM}
t
T
Duty = t/T
$R_{th(ch-c)}$ = 0.83°C/W
PULSE WIDTH t_w (s)


SAFE OPERATING AREA
I_D MAX. (PULSED) ※
100μs※
I_D MAX. (CONTINUOUS)
1ms※
10ms※
DC OPERATION (Tc = 25°C)
※ SINGLE NONREPETITIVE PULSE Tc = 25°C
CURVES MUST BE DERATED LINEARLY WITH INCREASE IN TEMPERATURE.
V_{DSS} MAX.
DRAIN CURRENT I_D (A)
DRAIN-SOURCE VOLTAGE V_{DS} (V)

Notes

The information contained here is subject to change without notice.
The information contained herein is presented only as guide for the applications of our products. No responsibility is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of TOSHIBA or others. These TOSHIBA products are intended for usage in general electronic equipments (office equipment, communication equipment, measuring equipment, domestic electrification, etc.) Please make sure that you consult with us before you use these TOSHIBA products in equipments which require high quality and/or reliability, and in equipments which could have major impact to the welfare of human life (atomic energy control, spaceship, traffic signal, combustion control, all types of safety devices, etc.). TOSHIBA cannot accept liability to any damage which may occur in case these TOSHIBA products were used in the mentioned equipments without prior consultation with TOSHIBA.