Field Effect Transistor

Silicon N Channel MOS Type (L^2-π-MOS III)

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

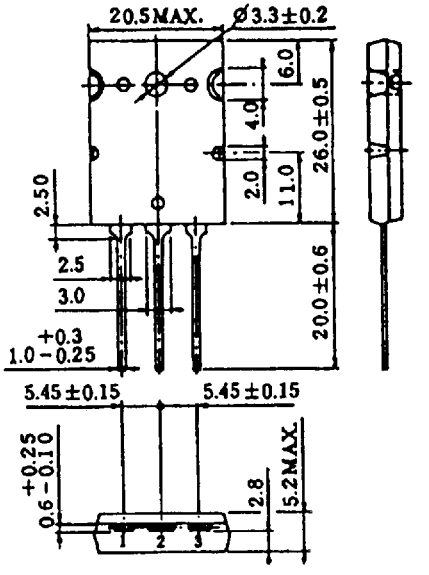
Features

- 4-Volt Gate Drive
- Low Drain-Source ON Resistance
  - $R_{DS(ON)}$ = 6.5Ω (Typ.)
- High Forward Transfer Admittance
  - $|Y_{fs}|$ = 50S (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	60	A
	Pulse	I_{DP}	240	
Drain Power Dissipation (Tc = 25°C)		P_D	200	W
Channel Temperature		T_{ch}	150	°C
Storage Temperature Range		T_{stg}	-55 ~ 150	°C

Unit in mm



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

JEDEC	—
EIAJ	—
TOSHIBA	2-21F1B

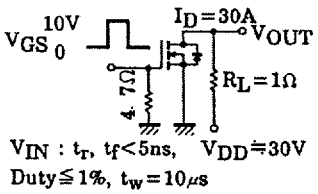
Weight : 9.75g

Thermal Characteristics

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	0.625	°C/W
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	35. 7	°C/W

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

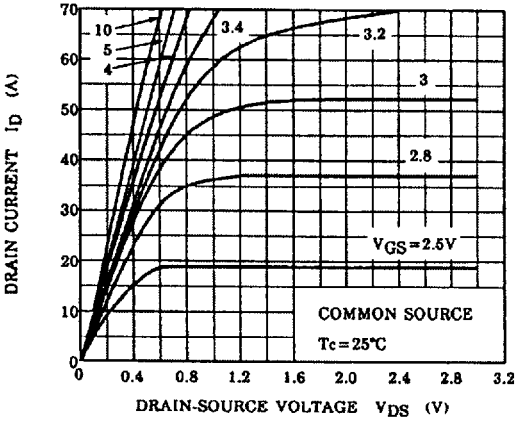
Electrical Characteristics (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V	–	–	±100	nA
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_D = 30A,	–	9	15	Ω
			V_{GS} = 10V, I_D = 30A,	–	6.5	11	
Forward Transfer Admittance		$\|Y_{fs}\|$	V_{DS} = 10V, I_D = 30A	40	50	–	S
Input Capacitance		C_{iss}	V_{DS} = 10V, V_{GS} = 0V, f = 1MHz	–	6200	7100	pF
Reverse Transfer Capacitance		C_{rss}		–	1700	2100	
Output Capacitance		C_{oss}		–	4500	5300	
Switching Time	Rise Time	t_r	 V_{IN} : t_r, t_f<5ns, V_{DD}≒30V Duty≦1%, t_w=10μs	–	30	60	ns
	Turn-on Time	t_{on}		–	70	140	
	Fall Time	t_f		–	190	380	
	Turn-off Time	t_{off}		–	550	900	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	V_{DD} = 48V, V_{GS} = 10V, I_D = 60A	–	300	600	nC
Gate-Source Charge		Q_{gs}		–	200	–	
Gate-Drain ("Miller") Charge		Q_{gd}		–	100	–	

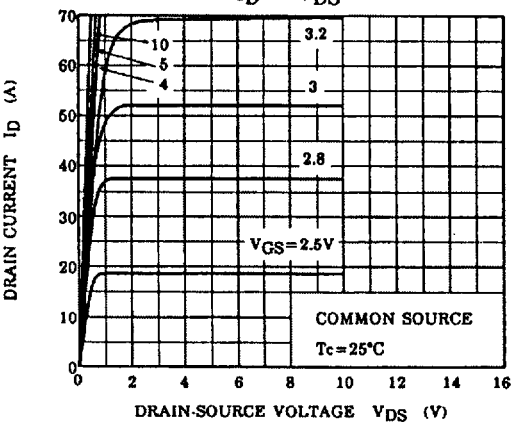
Source-Drain Diode Ratings and Characteristics (Ta = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	–	–	–	60	A
Pulse Drain Reverse Current	I_{DRP}	–	–	–	240	A
Diode Forward Voltage	V_{DSF}	I_{DR} = 60A, V_{GS} = 0V	–	-0.93	-1.6	V
Reverse Recovery Time	t_{rr}	I_{DR} = 60A, V_{GS} = 0V dI_{DR}/dt = 50A/μs	–	350	–	ns
Reverse Recovered Charge	Q_{rr}		–	0.7	–	μC

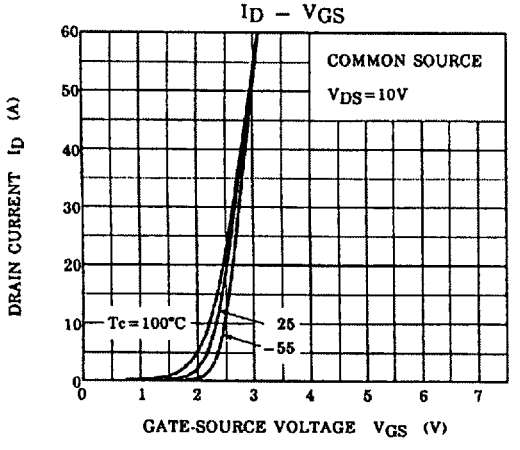
I_D – V_{DS}



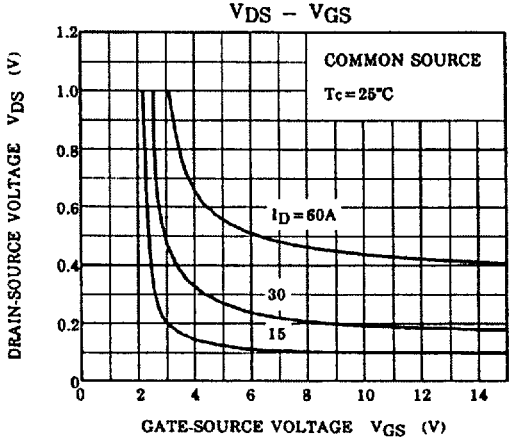
I_D – V_{DS}



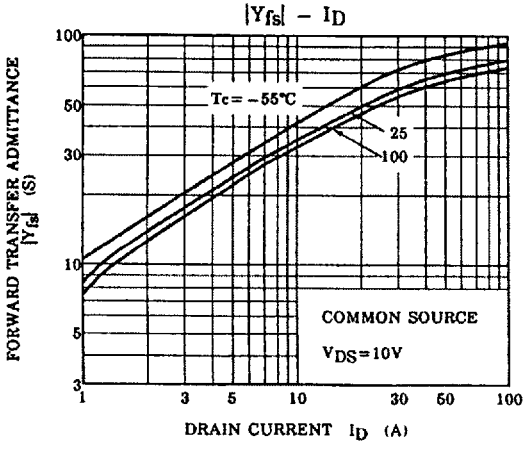
I_D – V_{GS}



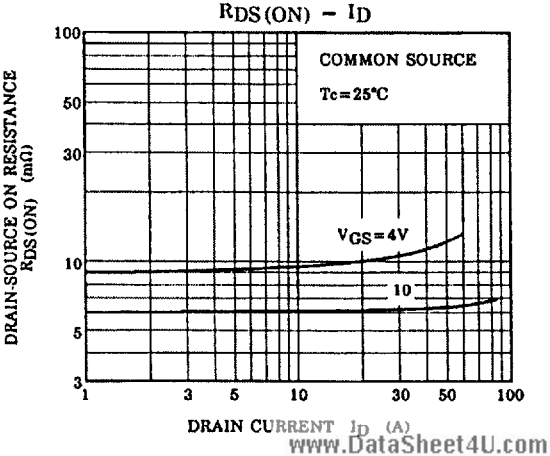
V_{DS} – V_{GS}



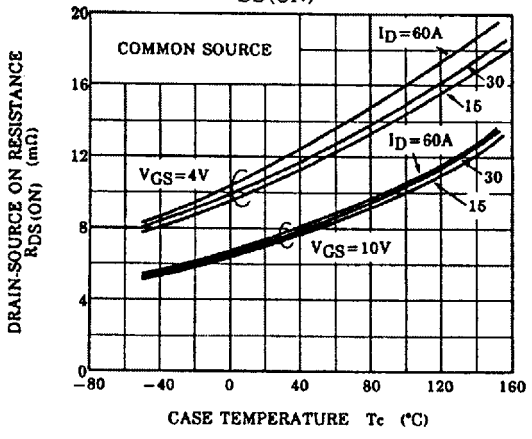
$|Y_{fs}|$ – I_D



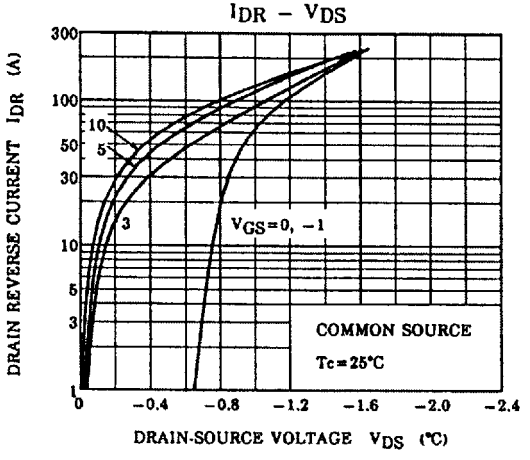
$R_{DS(ON)}$ – I_D



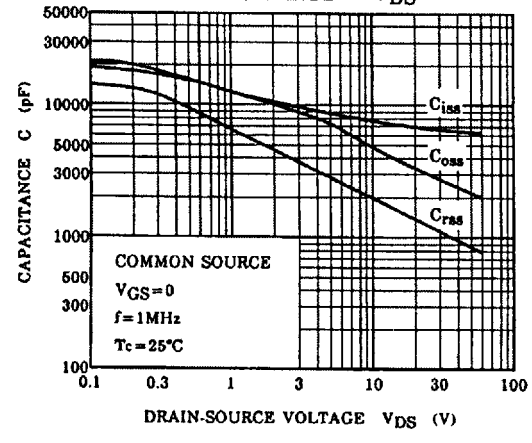
$R_{DS(ON)}$ – Tc



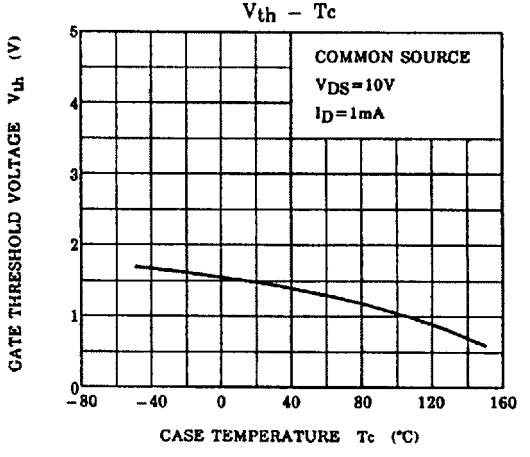
I_{DR} – V_{DS}



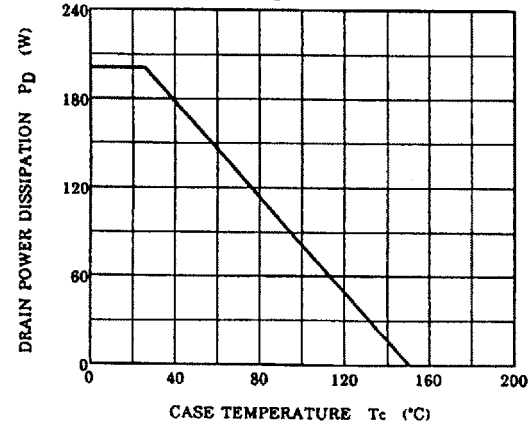
CAPACITANCE – V_{DS}



V_{th} – Tc



P_D – Tc



DYNAMIC INPUT/OUTPUT CHARACTERISTICS