

TOSHIBA FIELD EFFECT TRANSISTOR SILICON P CHANNEL MOS TYPE (π -MOS \bar{V})

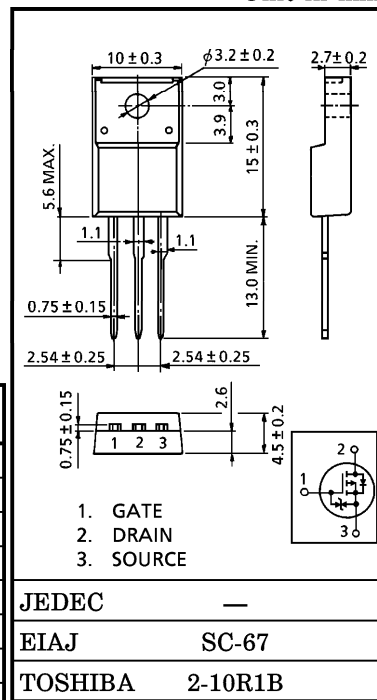
2SJ407

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS
 CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

INDUSTRIAL APPLICATIONS

Unit in mm

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 0.8\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 4.0S$ (Typ.)
- Low Leakage Current : $I_{DSS} = -100\mu A$ (Max.) ($V_{DS} = -200V$)
- Enhancement-Mode : $V_{th} = -1.5 \sim -3.5V$
 ($V_{DS} = -10V, I_D = -1mA$)



Weight : 1.9g

MAXIMUM RATINGS ($T_a = 25^\circ C$)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSS}	-200	V
Drain-Gate Voltage ($R_{GS} = 20k\Omega$)		V_{DGR}	-200	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	DC	I_D	-5	A
	Pulse	I_{DP}	-20	A
Drain Power Dissipation ($T_c = 25^\circ C$)		P_D	30	W
Single Pulse Avalanche Energy**		E_{AS}	195	mJ
Avalanche Current		I_{AR}	-5	A
Repetitive Avalanche Energy*		E_{AR}	3.0	mJ
Chanel Temperature		T_{ch}	150	$^\circ C$
Storage Temperature Range		T_{stg}	-55~150	$^\circ C$

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Chanel To Case	$R_{th(ch-c)}$	4.16	$^\circ C / W$
Thermal Resistance, Chanel to Ambient	$R_{th(ch-a)}$	62.5	$^\circ C / W$

Note ;

* Repetitive rating ; Pulse Width Limited by Max. junction temperature.

** $V_{DD} = -50V$, Starting $T_{ch} = 25^\circ C$, $L = 12.6mH$, $R_G = 25\Omega$, $I_{AR} = -5A$

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

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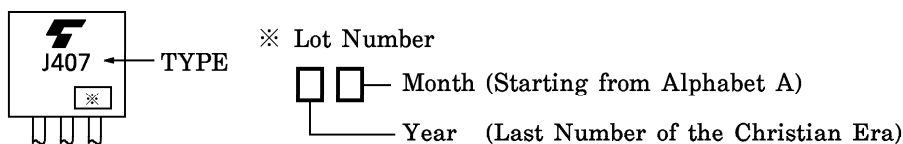
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

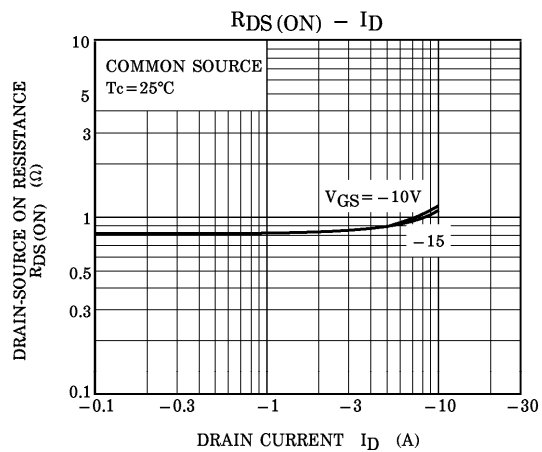
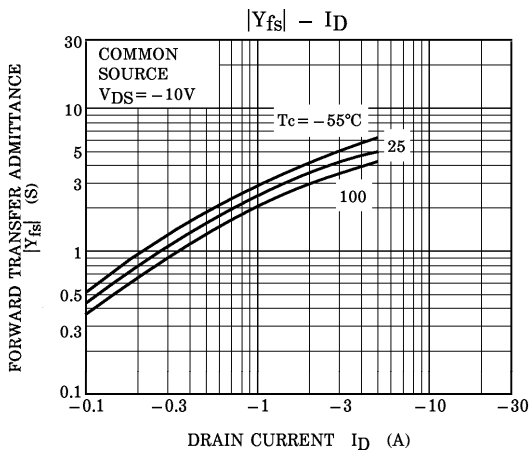
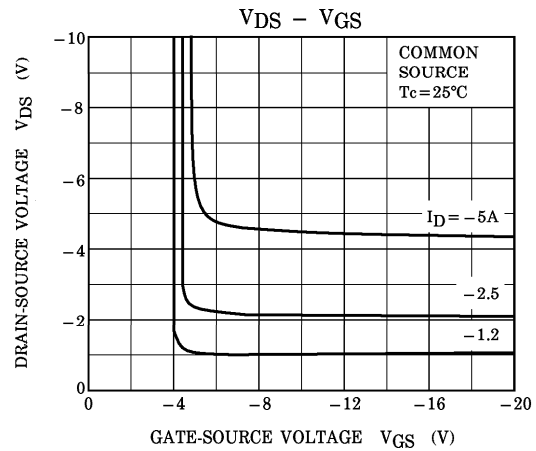
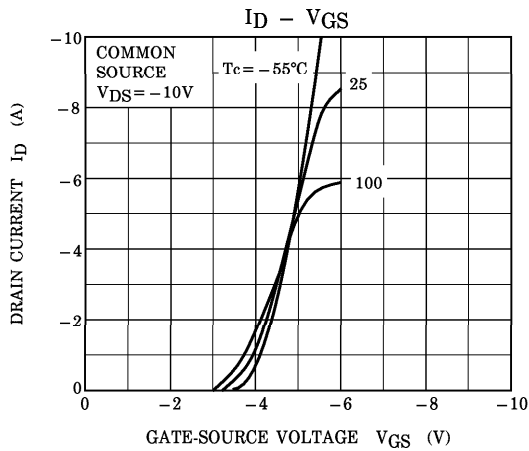
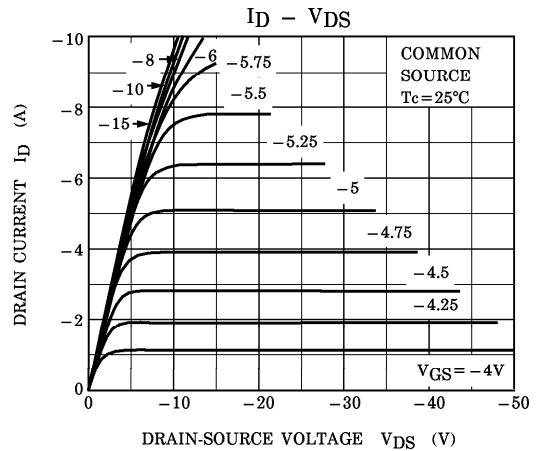
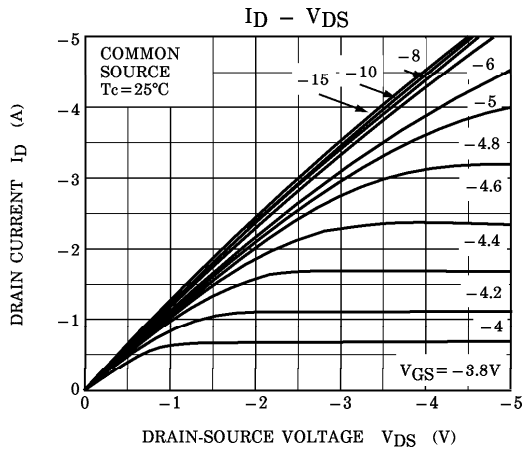
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Gate Leakage Current	I _{GSS}	V _{GS} = ±16V, V _{DS} = 0V	—	—	±10	μA	
Drain Cut-off Current	I _{DSS}	V _{DS} = -200V, V _{GS} = 0V	—	—	-100	μA	
Drain-Source Breakdown Voltage	V _(BR) DSS	I _D = -10mA, V _{GS} = 0V	-200	—	—	V	
Gate Threshold Voltage	V _{th}	V _{DS} = -10V, I _D = -1mA	-1.5	—	-3.5	V	
Drain-Source ON Resistance	R _{DS(ON)}	V _{GS} = -10V, I _D = -2.5A	—	0.8	1.0	Ω	
Forward Transfer Admittance	Y _{fs}	V _{DS} = -10V, I _D = -2.5A	2.0	4.0	—	S	
Input Capacitance	C _{iss}	V _{DS} = -10V, V _{GS} = 0V f = 1MHz	—	800	—	pF	
Reverse Transfer Capacitance	C _{rss}		—	80	—		
Output Capacitance	C _{oss}		—	270	—		
Switching Time	Rise Time	t _r		—	15	—	ns
	Turn-on Time	t _{on}		—	30	—	
	Fall Time	t _f		—	6	—	
	Turn-off Time	t _{off}		V _{IN} : t _r , t _f < 5ns Duty ≤ 1%, t _w = 10μs	—	65	
Total Gate Charge (Gate-Source Plus Gate-Drain)	Q _g	V _{DD} ≐ -160V V _{GS} = -10V	—	20	—	nC	
Gate-Source Charge	Q _{gs}	I _D = -5A	—	13	—		
Gate-Drain ("Miller") Charge	Q _{gd}		—	7	—		

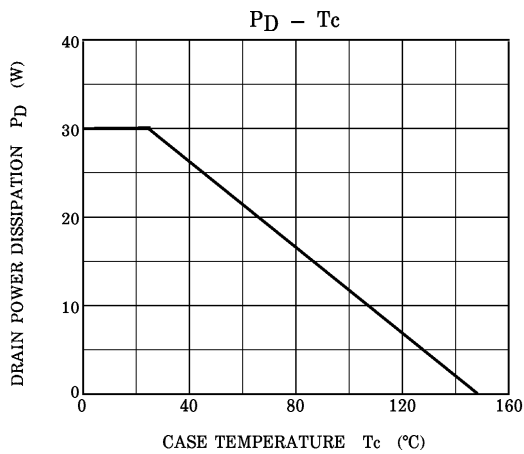
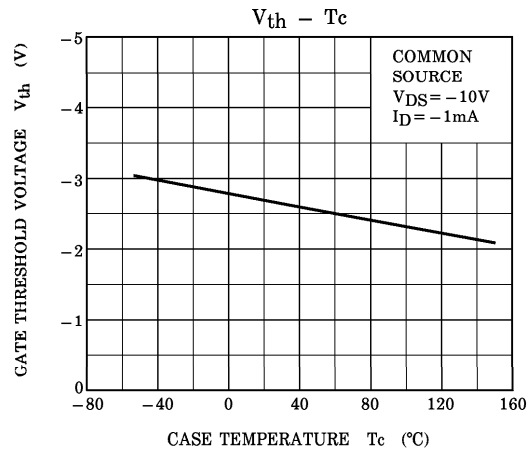
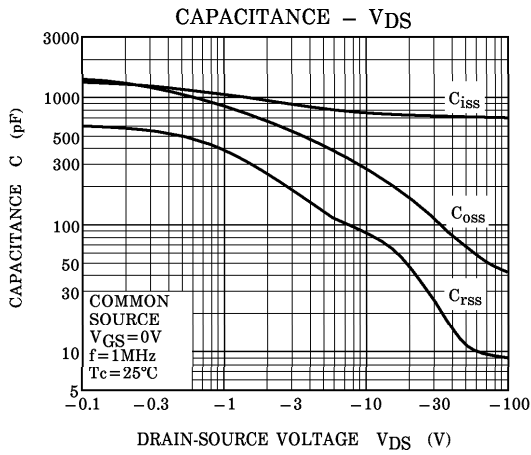
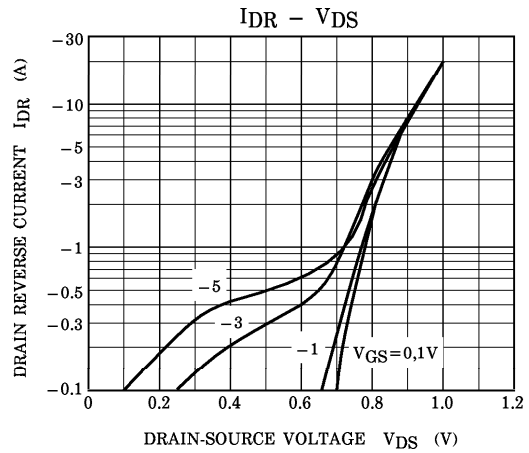
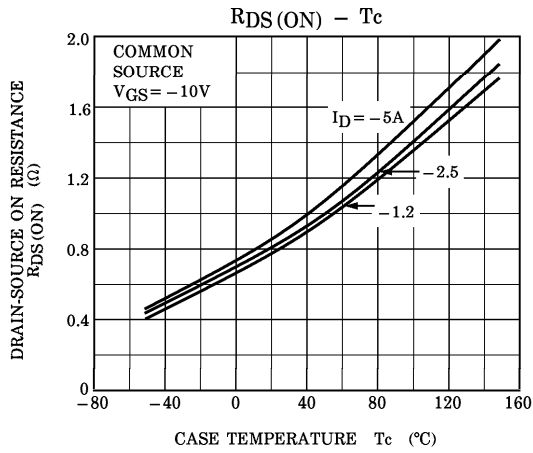
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

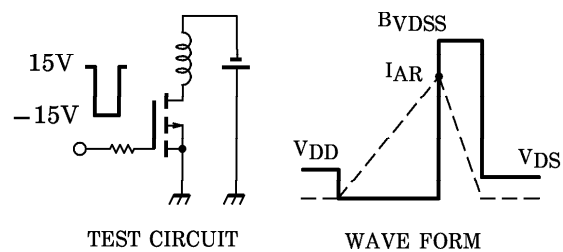
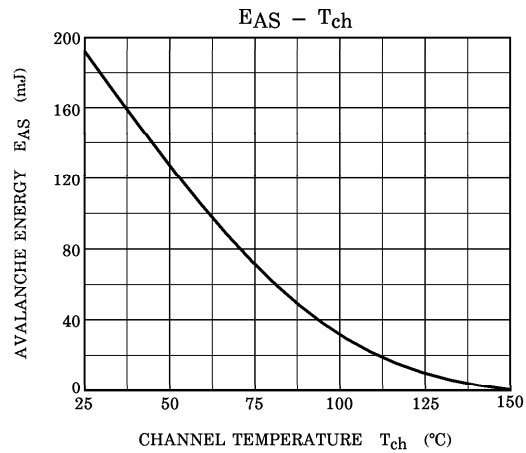
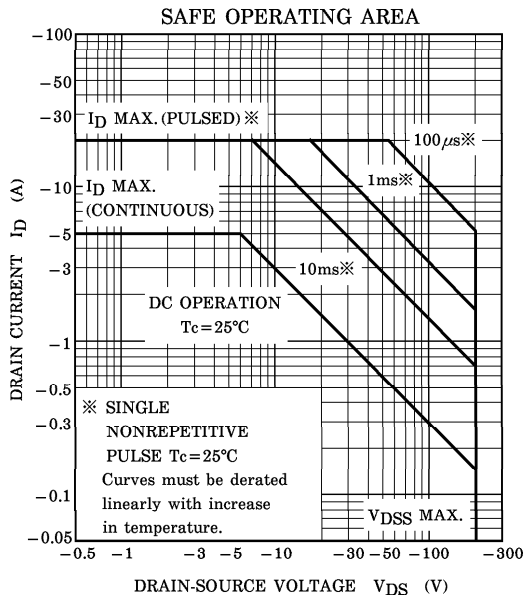
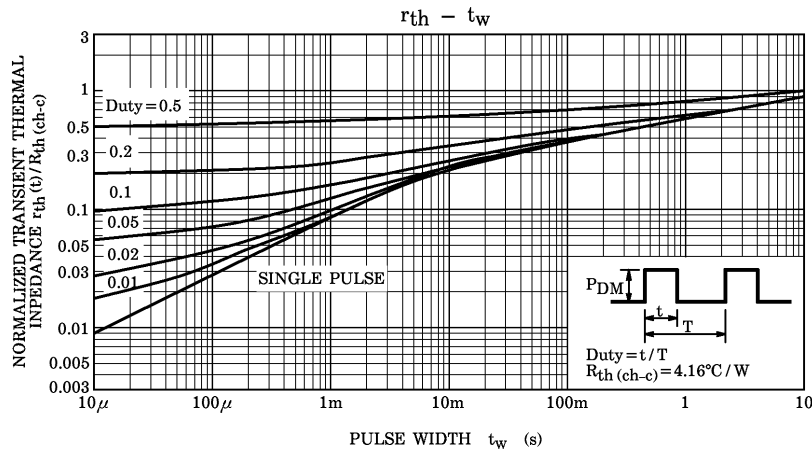
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I _{DR}	—	—	—	-5	A
Pulse Drain Reverse Current	I _{DRP}	—	—	—	-20	A
Diode Forward Voltage	V _{DSSF}	I _{DR} = -5A, V _{GS} = 0V	—	—	2.0	V
Reverse Recovery Time	t _{rr}	I _{DR} = -5A, V _{GS} = 0V	—	210	—	ns
Reverse Recovery Charge	Q _{rr}	dI _{DR} / dt = 100A / μs	—	1.2	—	μC

MARKING









Peak $I_{AR} = -5\text{A}$, $R_G = 25\Omega$
 $V_{DD} = -50\text{V}$, $L = 12.6\text{mH}$

$$E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{BV_{DSS}}{BV_{DSS} - V_{DD}} \right)$$