Medium Power Field Effect Transistor

N–Channel Enhancement–Mode Silicon Gate TMOS SOT–223 for Surface Mount

MMFT6661T1

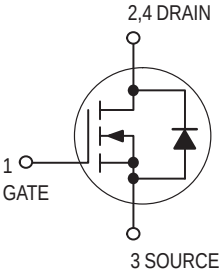
Motorola Preferred Device

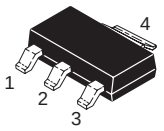
MEDIUM POWER
TMOS FET
500 mA
90 VOLTS
$R_{DS(on)}$ = 4.0 OHM MAX

This TMOS medium power field effect transistor is designed for high speed, low loss power switching applications such as switching regulators, dc–dc converters, solenoid and relay drivers. The device is housed in the SOT–223 package which is designed for medium power surface mount applications.

- Silicon Gate for Fast Switching Speeds
- $R_{DS(on)}$ = 4.0 Ohm Max
- Low Drive Requirement, V_{GS} = 2.0 Volts Max
- The SOT–223 Package can be soldered using wave or reflow. The formed leads absorb thermal stress during soldering eliminating the possibility of damage to the die.
- Available in 12 mm Tape and Reel
  Use MMFT6661T1 to order the 7 inch/1000 unit reel
  Use MMFT6661T3 to order the 13 inch/4000 unit reel

TMOS®





CASE 318E–04, STYLE 3
TO–261AA

MAXIMUM RATINGS (T_C = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Drain–to–Source Voltage	V_{DS}	90	Vdc
Gate–to–Source Voltage — Non–Repetitive	V_{GS}	±30	Vdc
Drain Current	I_D	500	mAdc
Total Power Dissipation @ T_A = 25°C(1) Derate above 25°C	P_D	0.8 6.4	Watts mW/°C
Operating and Storage Temperature Range	T_J, T_{stg}	–65 to 150	°C

DEVICE MARKING

T6661

THERMAL CHARACTERISTICS

Thermal Resistance — Junction–to–Ambient	$R_{\theta JA}$	156	°C/W
Maximum Temperature for Soldering Purposes Time in Solder Bath	T_L	260 10	°C Sec

1. Device mounted on FR–4 glass epoxy printed circuit board using minimum recommended footprint.

Preferred devices are Motorola recommended choices for future use and best overall value.

REV 4

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Drain–to–Source Breakdown Voltage (V_{GS} = 0, I_D = 10 μA)	$V_{(BR)DSS}$	90	—	—	Vdc
Zero Gate Voltage Drain Current (V_{DS} = 90 V, V_{GS} = 0)	I_{DSS}	—	—	10	μAdc
Gate–Body Leakage Current (V_{GS} = 15 Vdc, V_{DS} = 0)	I_{GSS}	—	—	100	nAdc
ON CHARACTERISTICS(2)					
Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 1.0 mAdc)	$V_{GS(th)}$	0.8	—	2.0	Vdc
Static Drain–to–Source On–Resistance (V_{GS} = 10 Vdc, I_D = 1.0 Adc)	$R_{DS(on)}$	—	—	4.0	Ohms
Drain–to–Source On–Voltage (V_{GS} = 10 V, I_D = 1.0 A) (V_{GS} = 5.0 V, I_D = 0.3 A)	$V_{DS(on)}$	— —	— —	4.0 1.6	Vdc
Forward Transconductance (V_{DS} = 25 V, I_D = 0.5 A)	g_{FS}	—	200	—	mmhos
DYNAMIC CHARACTERISTICS					
Input Capacitance	(V_{DS} = 25 V, V_{GS} = 0, f = 1.0 MHz)	C_{iss}	—	36	—	pF
Output Capacitance		C_{oss}	—	16	—	
Transfer Capacitance		C_{rss}	—	6.0	—	
Total Gate Charge	(V_{GS} = 10 V, I_D = 1.0 A, V_{DS} = 72 V)	Q_g	—	1.7	—	nC
Gate–Source Charge		Q_{gs}	—	0.34	—	
Gate–Drain Charge		Q_{gd}	—	0.23	—	

2. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%

TYPICAL ELECTRICAL CHARACTERISTICS

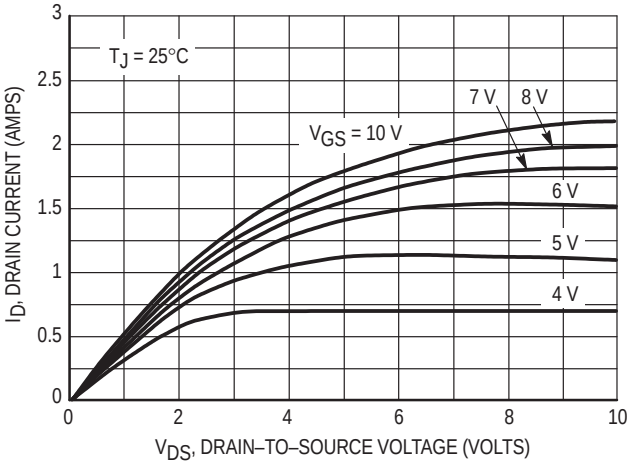


Figure 1. On–Region Characteristics

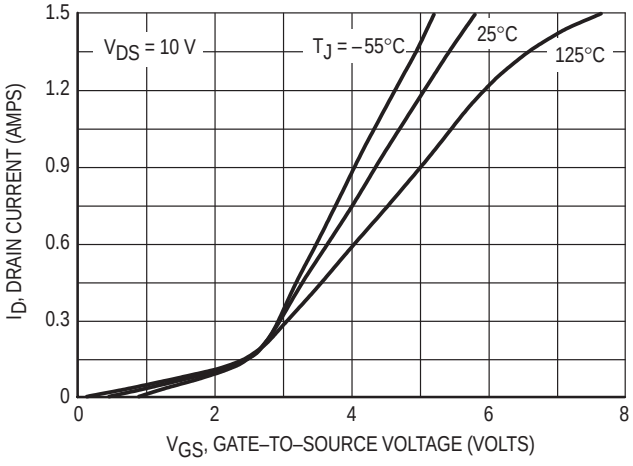


Figure 2. Transfer Characteristics

TYPICAL ELECTRICAL CHARACTERISTICS

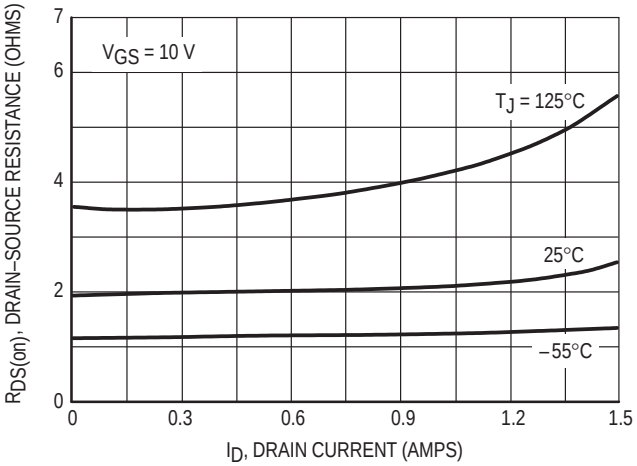


Figure 3. On–Resistance versus Drain Current

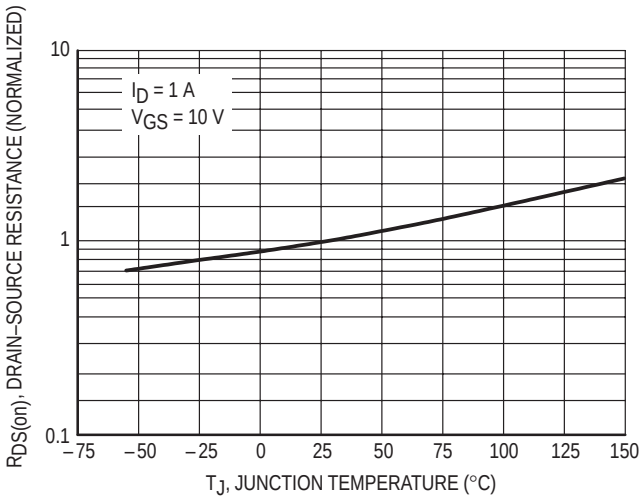


Figure 4. On–Resistance Variation with Temperature

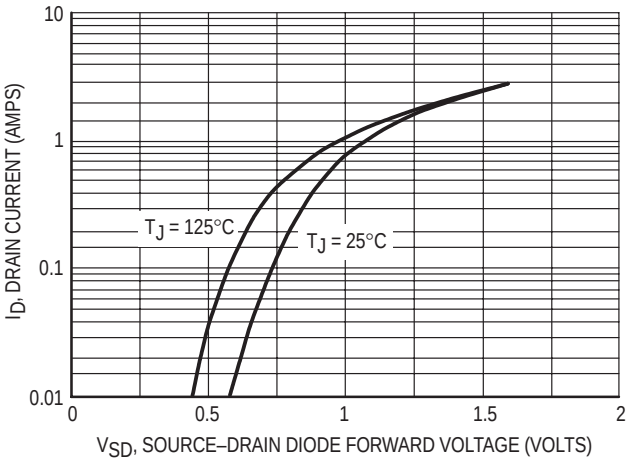


Figure 5. Source–Drain Diode Forward Voltage

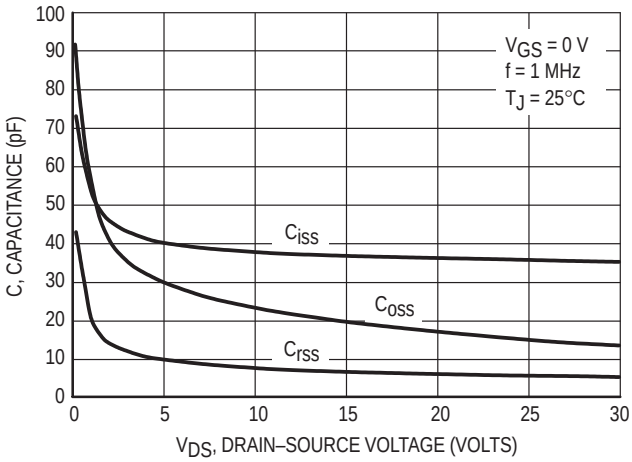


Figure 6. Capacitance versus Drain–Source Voltage

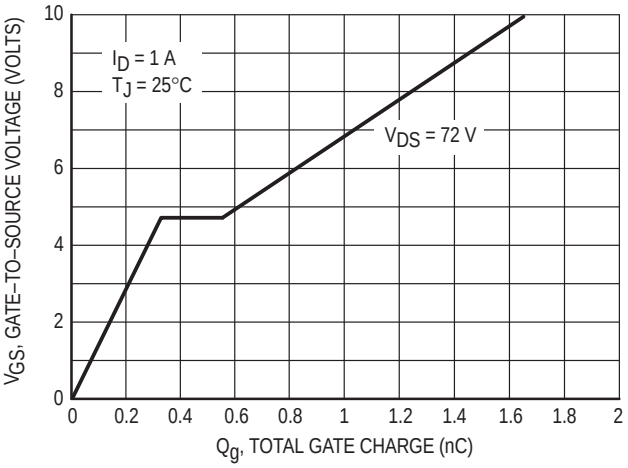


Figure 7. Gate Charge versus Gate–to–Source Voltage

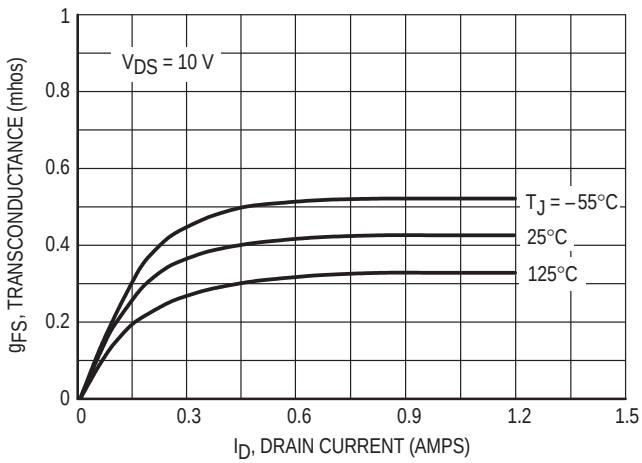


Figure 8. Transconductance