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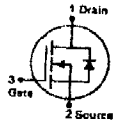
2N6659 thru 2N6661 MPF6659 thru MPF6661

2N6659,60,61

TO-39 (TO-205AD)



TO-92 (TO-226AE)

TMOS SWITCHING FET TRANSISTORS

N-CHANNEL — ENHANCEMENT

MAXIMUM RATINGS

Rating	Symbol	2N6659 MPF6659	2N6660 MPF6660	2N6661 MPF6661	Unit
Drain-Source Voltage	V_{DS}	35	60	90	Vdc
Drain-Gate Voltage	V_{DG}	35	60	90	Vdc
Gate-Source Voltage	V_{GS}	± 30			Vdc
Drain Current — Continuous (1)	I_D	2.0			Adc
Pulsed (2)	I_{DM}	3.0			
		2N6659 2N6660 2N6661		MPF6659 MPF6660 MPF6661	
Total Device Dissipation @ T_C = 25°C	P_D	6.25		2.5	Watts
Derate above 25°C		50		20	mW/°C
Total Device Dissipation @ T_A = 25°C	P_D	—		1.0	Watts
Derate above 25°C		—		8.0	mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−55 to +150			°C

(1) The Power Dissipation of the package may result in a lower continuous drain current.
(2) Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

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

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Zero-Gate-Voltage Drain Current (V_{DS} = Maximum Rating, V_{GS} = 0)		I_{DSS}	—	—	10	μAdc
Gate-Body Leakage Current (V_{GS} = 15 V, V_{DS} = 0)		I_{GSS}	—	—	100	nAdc
Drain-Source Breakdown Voltage (V_{GS} = 0, I_D = 10 μA)	2N6659, MPF6659	$V_{(BR)DSX}$	35	—	—	Vdc
	2N6660, MPF6660		60	—	—	
	2N6661, MPF6661		90	—	—	
ON CHARACTERISTICS(1)						
Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 1.0 mA)		$V_{GS(Th)}$	0.8	1.4	2.0	Vdc
Drain-Source On-Voltage (V_{GS} = 10 V, I_D = 1.0 A)	2N6659, MPF6659	$V_{DS(on)}$	—	—	1.8	Vdc
	2N6660, MPF6660		—	—	3.0	
	2N6661, MPF6661		—	—	4.0	
(V_{GS} = 5.0 V, I_D = 0.3 A)	2N6659, MPF6659		—	0.8	1.5	
	2N6660, MPF6660		—	0.9	1.5	
	2N6661, MPF6661		—	0.9	1.6	
Static Drain-Source On Resistance (V_{GS} = 10 Vdc, I_D = 1.0 Adc)	2N6659, MPF6659	$r_{DS(on)}$	—	—	1.8	Ohms
	2N6660, MPF6660		—	—	3.0	
	2N6661, MPF6661		—	—	4.0	
On-State Drain Current (V_{DS} = 25 V, V_{GS} = 10 V)		$I_{D(on)}$	1.0	2.0	—	Amps
SMALL-SIGNAL CHARACTERISTICS						
Input Capacitance (V_{DS} = 25 V, V_{GS} = 0, f = 1.0 MHz)		C_{iss}	—	30	50	pF
Reverse Transfer Capacitance (V_{DS} = 25 V, V_{GS} = 0, f = 1.0 MHz)		C_{rss}	—	3.6	10	pF
Output Capacitance (V_{DS} = 25 V, V_{GS} = 0, f = 1.0 MHz)		C_{oss}	—	20	40	pF
Forward Transconductance (V_{DS} = 25 V, I_D = 0.5 A)		g_{fs}	170	—	—	mmhos

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

Characteristic	Symbol	Min	Typ	Max	Unit
SWITCHING CHARACTERISTICS(1)					
Rise Time	t_r	—	—	5.0	ns
Fall Time	t_f	—	—	5.0	ns
Turn-On Time	t_{on}	—	—	5.0	ns
Turn-Off Time	t_{off}	—	—	5.0	ns

(1) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

RESISTIVE SWITCHING

FIGURE 1 — SWITCHING TEST CIRCUIT

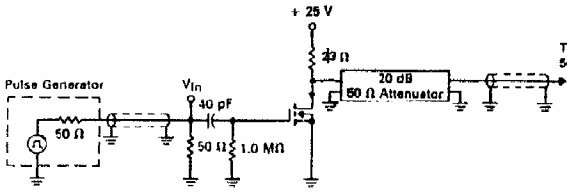


FIGURE 2 — SWITCHING WAVEFORMS

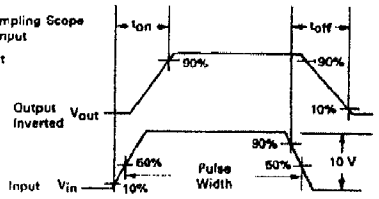


FIGURE 3 — $V_{GS(th)}$ NORMALIZED versus TEMPERATURE

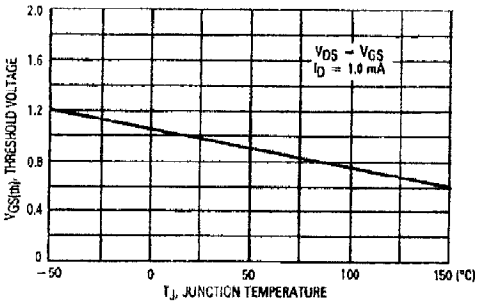


FIGURE 4 — ON-REGION CHARACTERISTICS

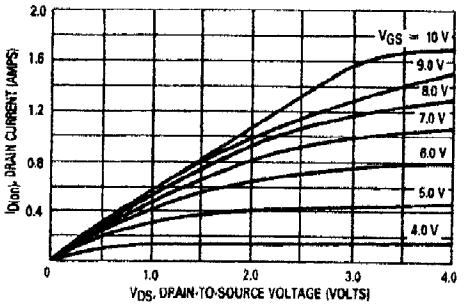


FIGURE 5 — OUTPUT CHARACTERISTICS

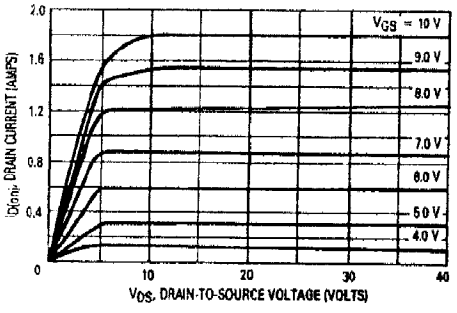


FIGURE 6 — CAPACITANCE versus DRAIN-TO-SOURCE VOLTAGE