

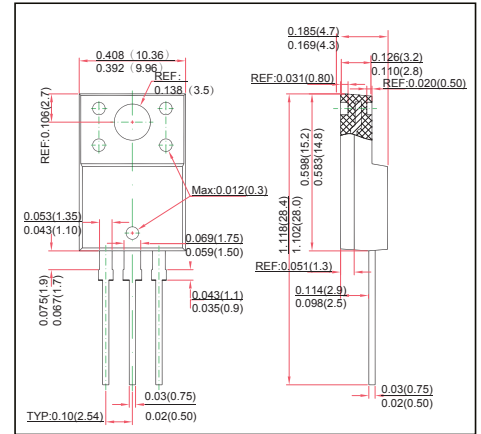
## TO-220F Plastic-Encapsulate MOSFETS

### FEATURE

- High Current Rating
- Lower RDS(on)
- Lower Capacitance
- Lower Total Gate Charge
- Tighter VSD Specifications Avalanche
- Energy Specified Fast Switching
- Capability N-Channel Power MOSFET

### MECHANICAL DATA

- Case style: TO-220F molded plastic
- Mounting position: any



## MAXIMUM RATINGS AND CHARACTERISTICS

@ 25°C Ambient Temperature (unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	650	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
Continuous Drain Current	$I_D$	7.4	A
Pulsed Drain Current	$I_{DM}$	29.6	A
Single Pulsed Avalanche Energy (note1)	$E_{AS}$	245	mJ
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	62.5	°C/W
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 ~ +150	°C
Maximum Lead Temperature for Soldering Purposes , Duration for 5 Seconds	$T_L$	260	°C

## MOSFET ELECTRICAL CHARACTERISTICS $T_A=25^\circ\text{C}$ unless otherwise specified

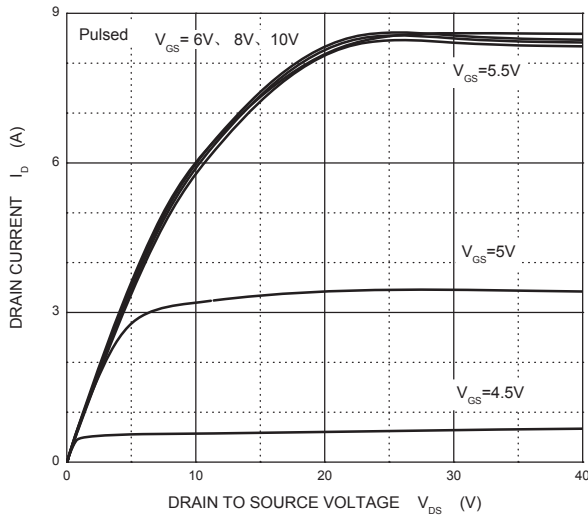
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Off characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	650			V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 650V, V_{GS} = 0V$			10	$\mu A$
Gate-body leakage current	$I_{GSS}$	$V_{DS} = 0V, V_{GS} = \pm 30V$			$\pm 100$	nA
Drain-source diode forward voltage	$V_{SD}$	$V_{GS} = 0, I_S = 7.4A$			1.4	V
<b>On characteristics (note 2)</b>						
Gate-threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	3.5	4	V
Static drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 3.7A$		1.1	1.3	$\Omega$
Forward transconductance	$g_{fs}$	$V_{DS} = 10V, I_D = 3.7A$	5			S
<b>Dynamic characteristics (note 3)</b>						
Input capacitance	$C_{iss}$	$V_{DS} = 25V, V_{GS} = 0V, f = 1MHz$			1400	pF
Output capacitance	$C_{oss}$				180	
Reverse transfer capacitance	$C_{rss}$				21	
<b>Switching characteristics (note 3)</b>						
Total gate charge	$Q_g$	$V_{DS} = 520V, V_{GS} = 10V, I_D = 7.4A$		29	38	nC
Gate-source charge	$Q_{gs}$			7		
Gate-drain charge	$Q_{gd}$			14.5		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 325V, R_G = 25\Omega, I_D = 7.4A$			70	ns
Turn-on rise time	$t_r$				170	
Turn-off delay time	$t_{d(off)}$				140	
Turn-off fall time	$t_f$				130	

### Notes :

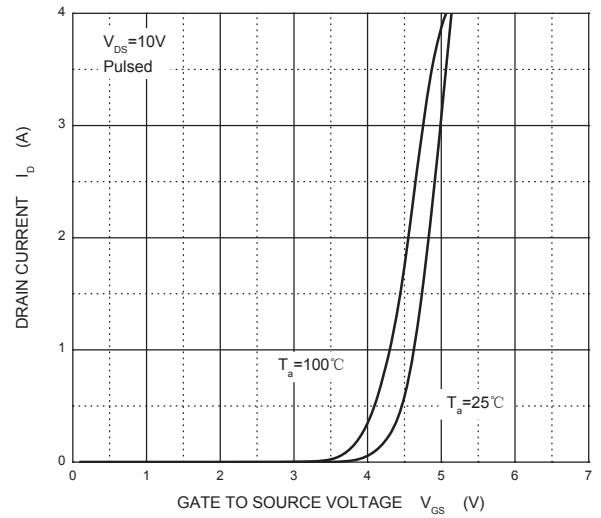
1.  $L = 10mH, I_{AS} = 7A, V_{DD} = 50V, V_{GS} = 10V, R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$ .
2. Pulse Test: Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
3. These parameters have no way to verify.

## RATINGS AND CHARACTERISTIC CURVES

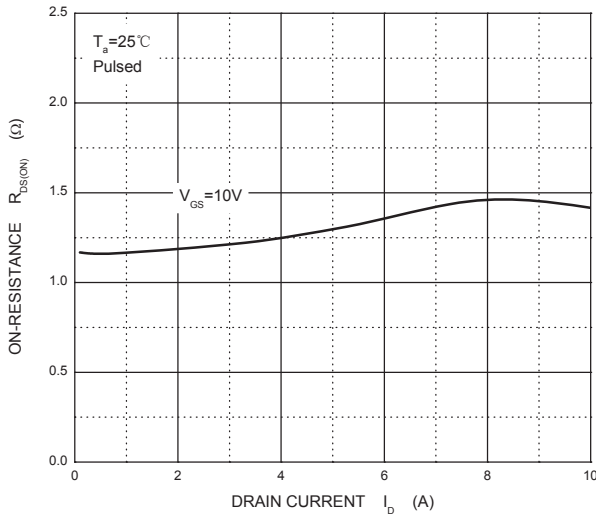
**Output Characteristics**



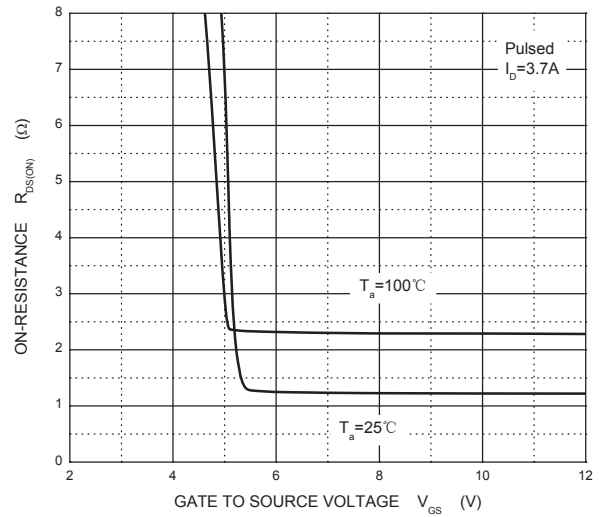
**Transfer Characteristics**



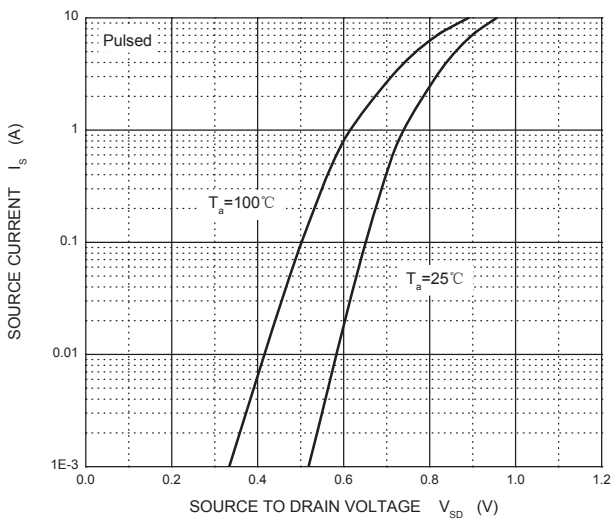
**$R_{DS(ON)}$  —  $I_D$**



**$R_{DS(ON)}$  —  $V_{GS}$**



**$I_S$  —  $V_{SD}$**



**Threshold Voltage**

