

RoHS Compliant Product  
A suffix of "-C" specifies halogen free

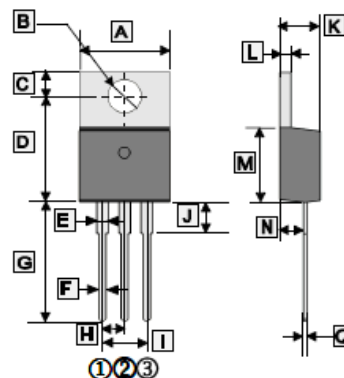
## DESCRIPTION

This advanced high voltage MOSFET is designed to withstand high energy in the avalanche mode and switch efficiently. This new high energy device also offers a drain-to-source diode with fast recovery time. Designed for high voltage, high speed switching applications such as power supplies, converters, power motor control and bridge circuits.

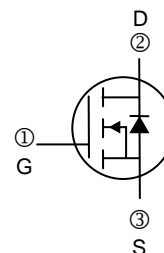
## FEATURES

- High Current Rating
- Low  $R_{DS(ON)}$
- Lower Capacitance
- Lower Total Gate Charge
- Tighter VSD Specifications
- Avalanche Energy Specified

TO-220J



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	10.010	10.350	I	4.980	5.180
B	3.735	3.935	J	3.560	3.960
C	2.590	2.890	K	4.470	4.670
D	12.060	12.460	L	1.200	1.400
E	1.170	1.370	M	8.500	8.900
F	0.710	0.910	N	2.520	2.820
G	13.400	13.800	Q	0.330	0.650
H	2.540 TYP.				



## ABSOLUTE MAXIMUM RATINGS ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	600	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
Continuous Drain Current	$I_D$	4	A
Continuous Drain-Source Diode Forward Current	$I_S$	4	A
Single Pulse Avalanche Energy <sup>1</sup>	$E_{AS}$	260	mJ
Maximum Lead Temperature for Soldering Purposes @ 1/8" from case for 5 seconds	$T_L$	260	$^\circ\text{C}$
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55~150	$^\circ\text{C}$
Thermal Resistance Rating			
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$

**ELECTRICAL CHARACTERISTICS** ( $T_A=25^\circ\text{C}$  unless otherwise noted)

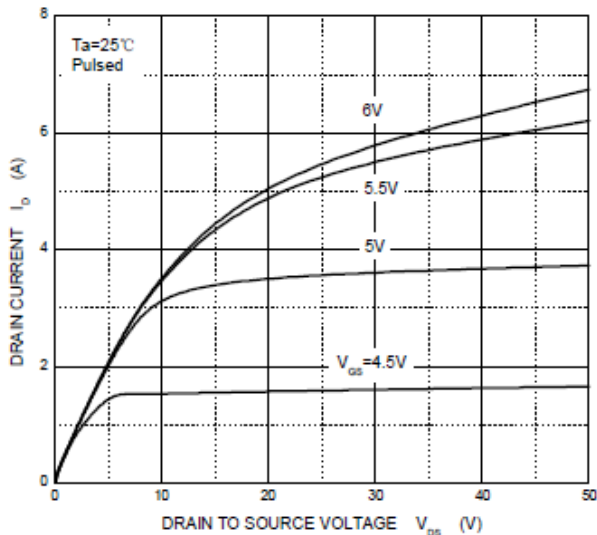
Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	600	-	-	V	$V_{GS}=0, I_D=250\mu\text{A}$
Drain-Source Diode Forward Voltage <sup>2</sup>	$V_{SD}$	-	-	1.5	V	$V_{GS}=0, I_S=4\text{A}$
Drain-Source Leakage Current	$I_{DSS}$	-	-	25	$\mu\text{A}$	$V_{DS}=600\text{V}, V_{GS}=0$
Gate-Source Leakage Forward Current <sup>2</sup>	$I_{GSSF}$	-	-	100	nA	$V_{DS}=0\text{V}, V_{GS}=30\text{V}$
Gate-Source Leakage Reverse Current <sup>2</sup>	$I_{GSSR}$	-	-	-100	nA	$V_{DS}=0\text{V}, V_{GS}=-30\text{V}$
<b>On Characteristics <sup>2</sup></b>						
Gate Threshold Voltage	$V_{GS(th)}$	2	-	4	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	-	2	3	$\Omega$	$V_{GS}=10\text{V}, I_D=2\text{A}$
Forward Transconductance	$g_{fs}$	2	2.6	-	S	$V_{DS}=50\text{V}, I_D=2\text{A}$
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	-	540	-	pF	$V_{DS}=25\text{V}$ $V_{GS}=0$ $f=1\text{MHz}$
Output Capacitance	$C_{oss}$	-	125	-		
Reverse Transfer Capacitance	$C_{rss}$	-	8	-		
<b>Switching Characteristics</b>						
Total Gate Charge	$Q_g$	-	5	-	nC	$V_{DS}=480\text{V}$ $V_{GS}=10\text{V}$ $I_D=4\text{A}$
Gate-Source Charge	$Q_{gs}$	-	2.7	-		
Gate-Drain ("Miller") Charge	$Q_{gd}$	-	2	-		
Turn-on Delay Time	$T_{d(on)}$	-	12	-	nS	$V_{DD}=300\text{V}$ $V_{GS}=10\text{V}$ $R_G=9.1\Omega$ $I_D=4\text{A}$
Rise Time	$T_r$	-	7	-		
Turn-off Delay Time	$T_{d(off)}$	-	19	-		
Fall Time	$T_f$	-	10	-		

Notes:

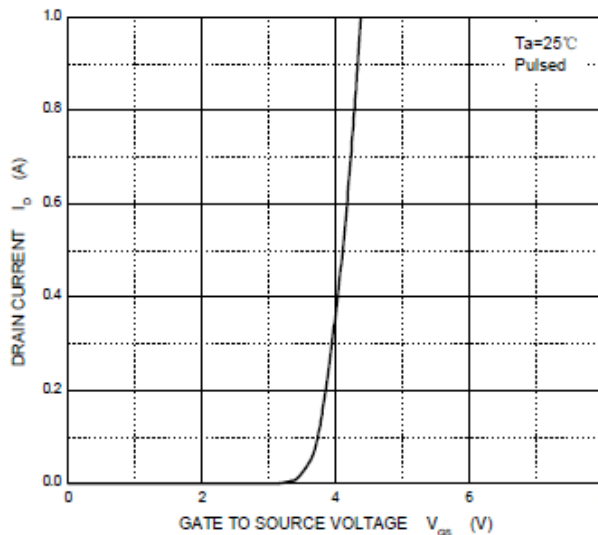
- $E_{AS}$  condition:  $L=30\text{mH}, I_L=4\text{A}, V_{DD}=100\text{V}, V_{GS}=10\text{V}, R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$ .
- Pulse Test : Pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .

**CHARACTERISTICS CURVE**

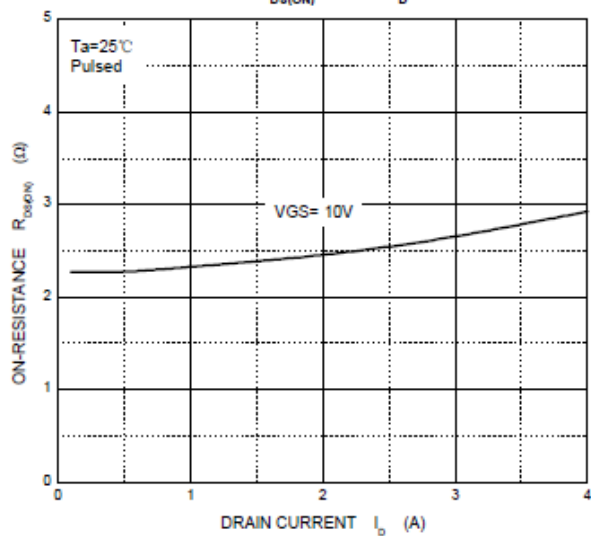
Output Characteristics



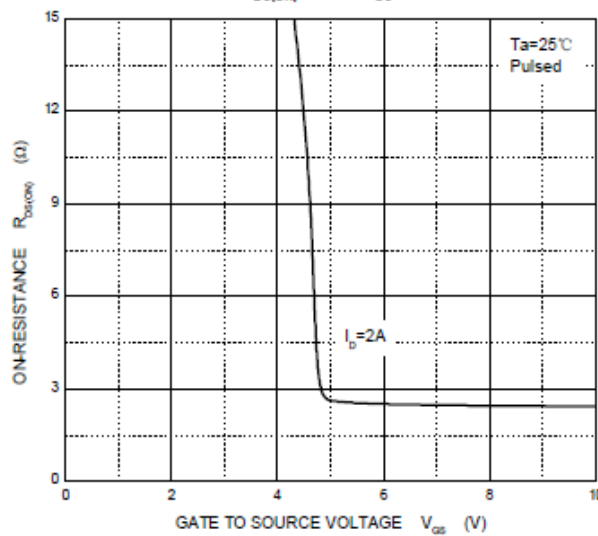
Transfer Characteristics



$R_{DS(ON)}$  —  $I_D$



$R_{DS(ON)}$  —  $V_{GS}$



$I_S$  —  $V_{SD}$

