

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

**DESCRIPTION**

These miniature surface mount MOSFETs utilize a High Cell Density trench process to provide low  $R_{DS(on)}$  and to ensure minimal power loss and heat dissipation.

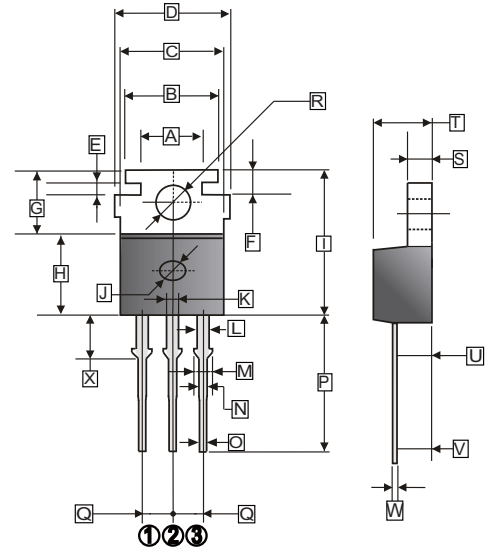
**FEATURES**

- Low  $R_{DS(on)}$  Provides Higher Efficiency and Extends Battery Life.
- Low Thermal impedance copper leadframe TO-220P saves board space.
- Fast Switch speed.
- High performance trench technology.

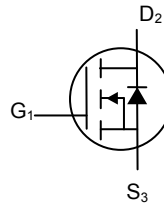
**APPLICATION**

DC-DC converters and power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

**TO-220P**



N-Channel



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	7.90	8.10	N	0.75	0.95
B	9.45	9.65	O	0.66	0.86
C	9.87	10.47	P	13.50	14.50
D	-	11.50	Q	2.44	3.44
E	1.06	1.46	R	3.50	3.70
F	2.60	3.00	S	1.15	1.45
G	6.30	6.70	T	4.30	4.70
H	8.35	8.75	U	-	2.7
J	1.60	Typ.	V	1.89	3.09
K	1.10	1.30	W	0.40	0.60
L	1.17	1.37	X	2.60	3.60
M	-	1.50			

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

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>1</sup>	$I_D$	90	A
$T_C = 25^\circ\text{C}$			
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	240	A
Continuous Source Current (Diode Conduction) <sup>a</sup>	$I_S$	90	A
Power Dissipation <sup>1</sup>	$P_D$	120	W
$T_C = 25^\circ\text{C}$			
Operating Junction and Storage Temperature Range	$T_j, T_{stg}$	-55~175	$^\circ\text{C}$
<b>Thermal Resistance Rating</b>			
Maximum Junction to Ambient <sup>1</sup>	$R_{\theta JA}$	62.5	$^\circ\text{C} / \text{W}$
Maximum Junction to Case	$R_{\theta JC}$	1.25	

Notes

- 1 Package Limited.
- 2 Pulse width limited by maximum junction temperature.

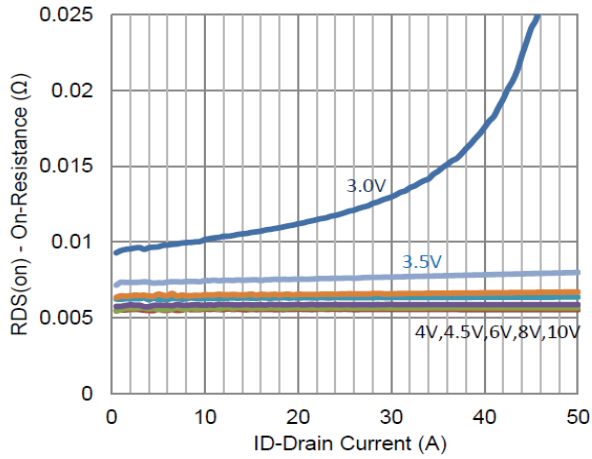
**ELECTRICAL CHARACTERISTICS** ( $T_A=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
<b>Static</b>						
Gate-Threshold Voltage	$V_{GS(th)}$	1	-	3.5	V	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$
Gate-Body Leakage	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{DS}=0$ , $V_{GS}=20\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$	-	-	1	$\mu\text{A}$	$V_{DS}=48\text{V}$ , $V_{GS}=0$
		-	-	25		$V_{DS}=48\text{V}$ , $V_{GS}=0$ , $T_J=55^\circ\text{C}$
On-State Drain Current <sup>1</sup>	$I_{D(on)}$	120	-	-	A	$V_{DS}=5\text{V}$ , $V_{GS}=10\text{V}$
Drain-Source On-Resistance <sup>1</sup>	$R_{DS(ON)}$	-	-	9.9	m $\Omega$	$V_{GS}=10\text{V}$ , $I_D=30\text{A}$
		-	-	13		$V_{GS}=4.5\text{V}$ , $I_D=20\text{A}$
Forward Transconductance <sup>1</sup>	$g_{fs}$	-	30	-	S	$V_{DS}=15\text{V}$ , $I_D=20\text{A}$
Diode Forward Voltage	$V_{SD}$	-	0.8	-	V	$I_S=20\text{A}$ , $V_{GS}=0$
<b>Dynamic <sup>2</sup></b>						
Input Capacitance	$C_{iss}$	-	5887	-	pF	$V_{DS}=15\text{V}$ , $V_{GS}=0$ , $f=1\text{MHz}$
Output Capacitance	$C_{oss}$	-	567	-		
Reverse Transfer Capacitance	$C_{rss}$	-	352	-		
Total Gate Charge	$Q_g$	-	77	-	nC	$V_{DS}=30\text{V}$ , $V_{GS}=4.5\text{V}$ , $I_D=20\text{A}$
Gate-Source Charge	$Q_{gs}$	-	21	-		
Gate-Drain Charge	$Q_{gd}$	-	40	-		
Turn-on Delay Time	$T_{d(on)}$	-	23	-	nS	$V_{DD}=30\text{V}$ , $V_{GEN}=10\text{V}$ , $R_L=1.5\Omega$ , $I_D=20\text{A}$ , $R_{GEN}=6\Omega$
Rise Time	$T_r$	-	80	-		
Turn-off Delay Time	$T_{d(off)}$	-	226	-		
Fall Time	$T_f$	-	99	-		

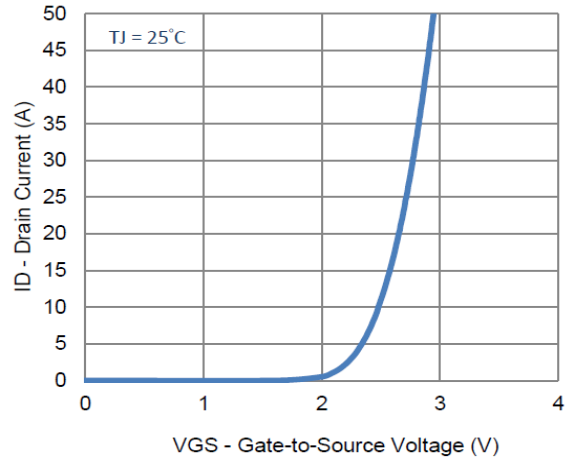
Notes:

- 1 Pulse test :  $PW \leq 300 \mu\text{s}$  duty cycle  $\leq 2\%$ .
- 2 Guaranteed by design, not subject to production testing.

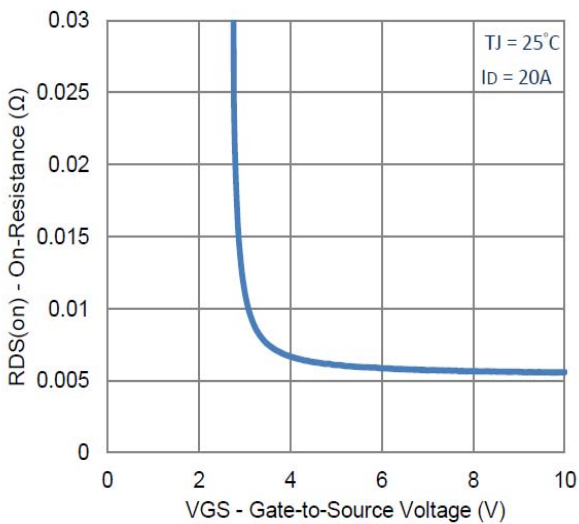
**CHARACTERISTIC CURVES**



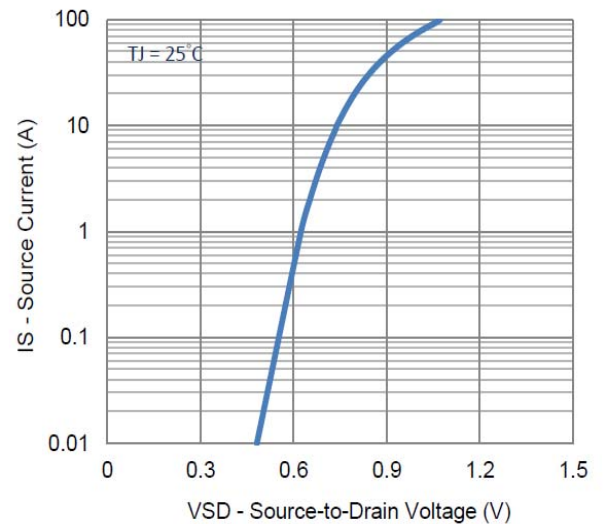
**1. On-Resistance vs. Drain Current**



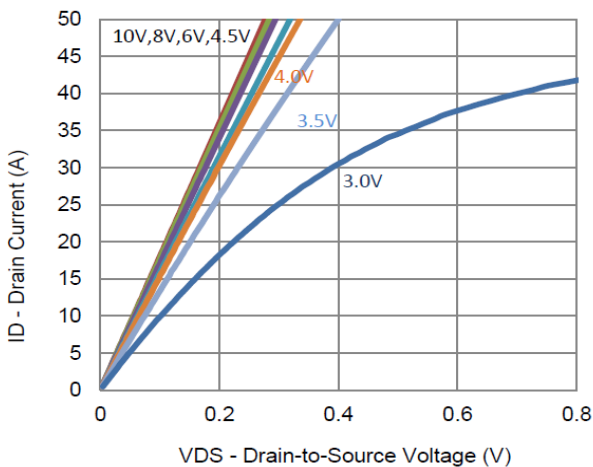
**2. Transfer Characteristics**



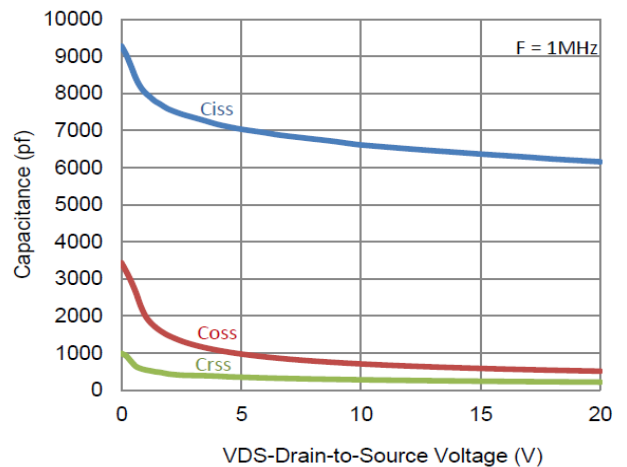
**3. On-Resistance vs. Gate-to-Source Voltage**



**4. Drain-to-Source Forward Voltage**



**5. Output Characteristics**



**6. Capacitance**

**CHARACTERISTIC CURVES**

