

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.

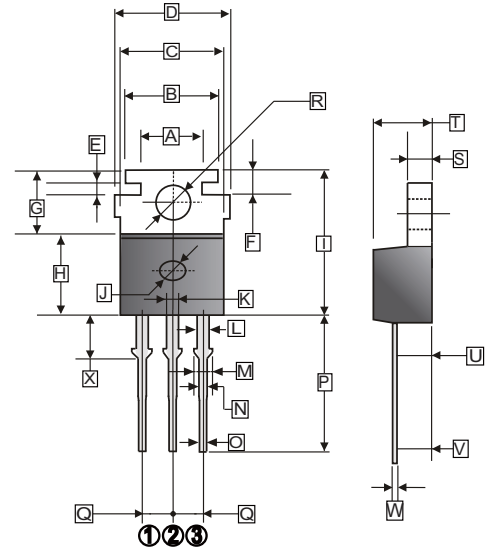
FEATURES

- 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.

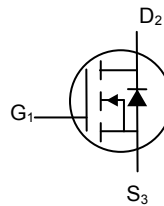
APPLICATION

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}	± 20	V
Continuous Drain Current ¹	I_D	90	A
Pulsed Drain Current ²	I_{DM}	240	A
Continuous Source Current (Diode Conduction) ^a	I_S	90	A
Power Dissipation ¹	P_D	120	W
Operating Junction and Storage Temperature Range	T_j, T_{stg}	-55~175	$^\circ\text{C}$
Thermal Resistance Rating			
Maximum Junction to Ambient ¹	$R_{\theta JA}$	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.

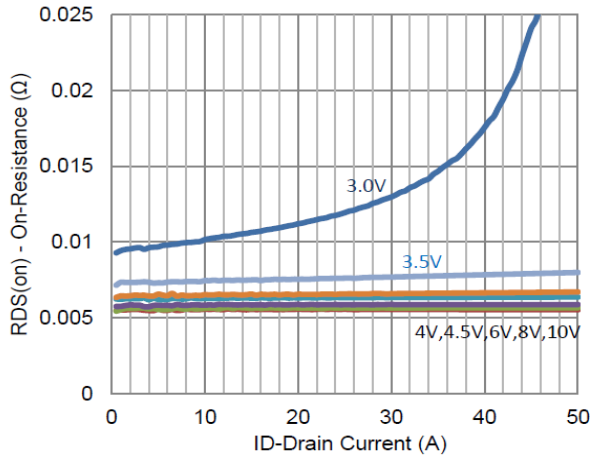
ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static						
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}	-	-	± 100	nA	$V_{DS}=0$, $V_{GS}=20\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1	μA	$V_{DS}=48\text{V}$, $V_{GS}=0$
		-	-	25		$V_{DS}=48\text{V}$, $V_{GS}=0$, $T_J=55^\circ\text{C}$
On-State Drain Current ¹	$I_{D(on)}$	120	-	-	A	$V_{DS}=5\text{V}$, $V_{GS}=10\text{V}$
Drain-Source On-Resistance ¹	$R_{DS(ON)}$	-	-	9.9	m Ω	$V_{GS}=10\text{V}$, $I_D=30\text{A}$
		-	-	13		$V_{GS}=4.5\text{V}$, $I_D=20\text{A}$
Forward Transconductance ¹	g_{fs}	-	30	-	S	$V_{DS}=15\text{V}$, $I_D=20\text{A}$
Diode Forward Voltage	V_{SD}	-	0.8	-	V	$I_S=20\text{A}$, $V_{GS}=0$
Dynamic ²						
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	-		

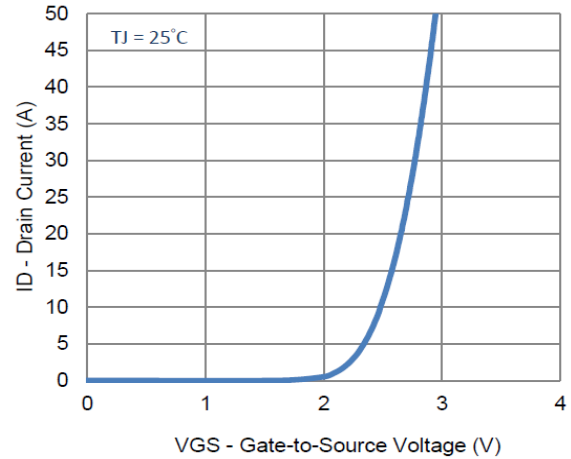
Notes:

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

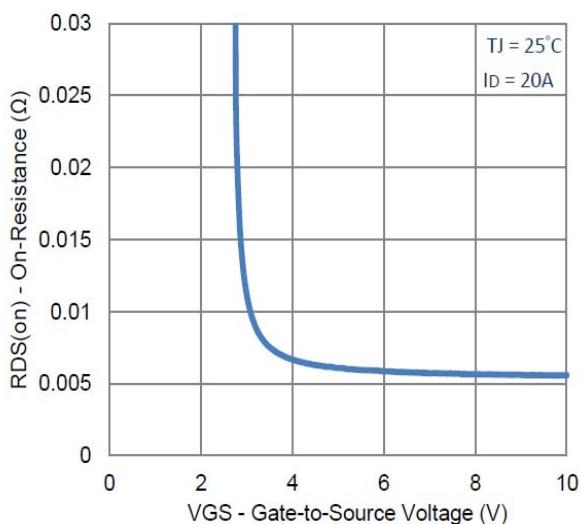
CHARACTERISTIC CURVES



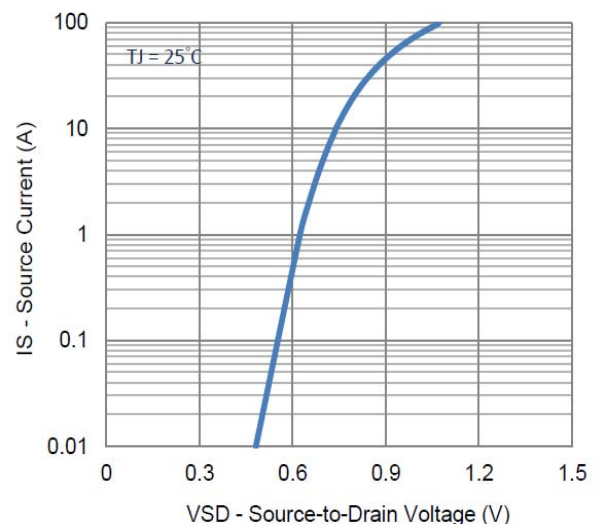
1. On-Resistance vs. Drain Current



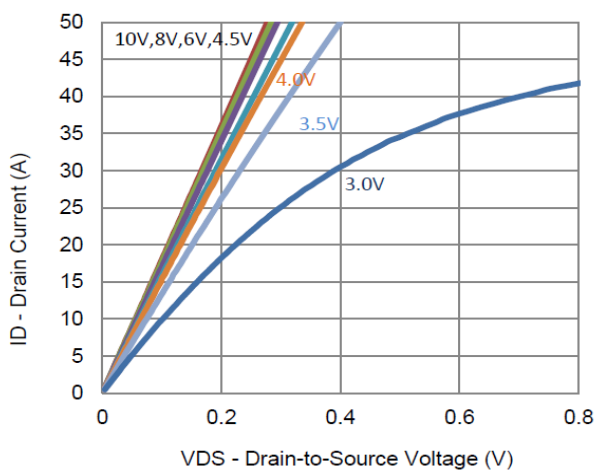
2. Transfer Characteristics



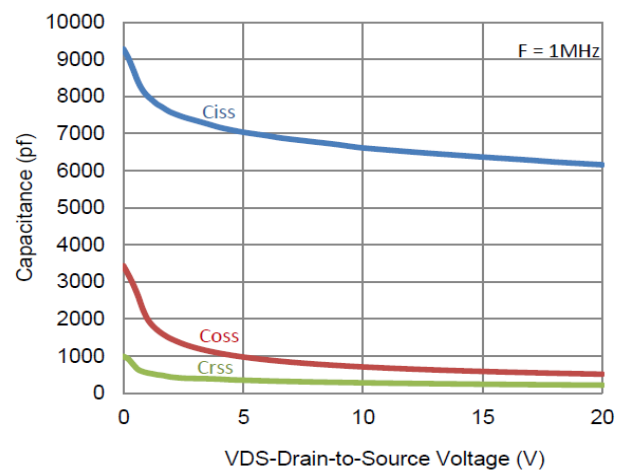
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

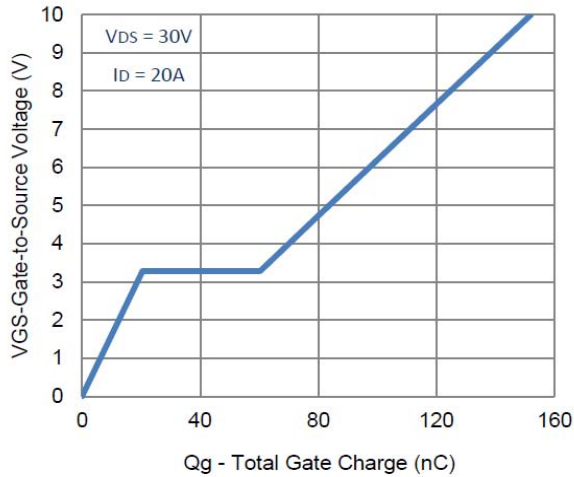


5. Output Characteristics

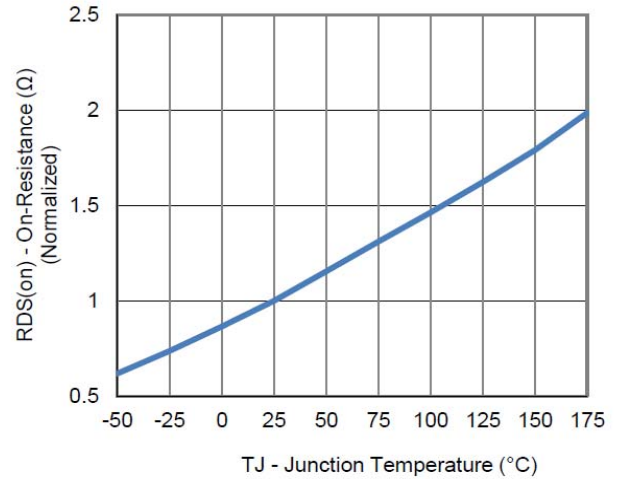


6. Capacitance

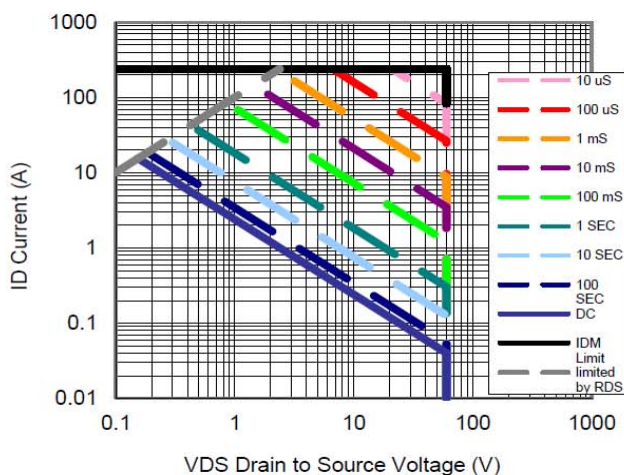
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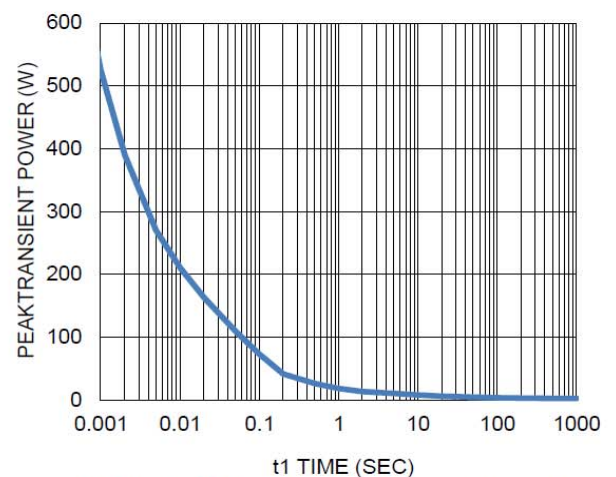
7. Gate Charge



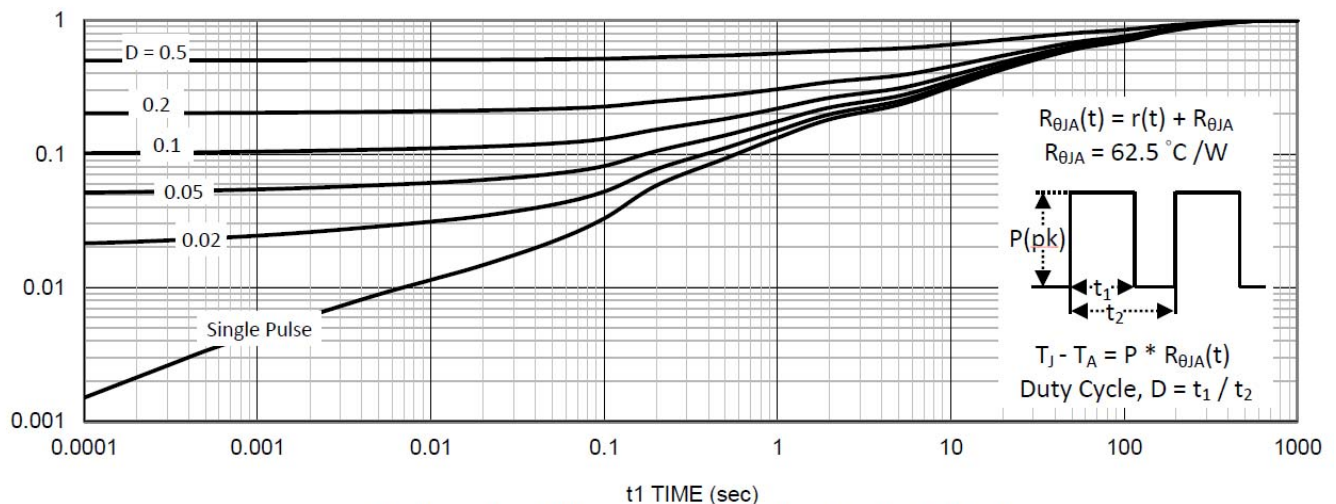
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area



10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient