

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

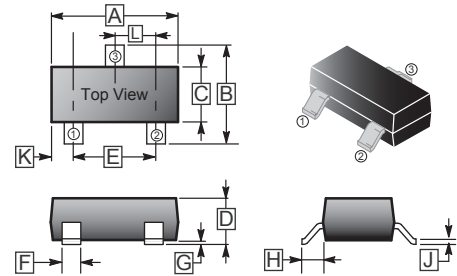
## DESCRIPTION

These miniature surface mount MOSFETs utilize High Cell Density process. Low  $R_{DS(on)}$  assures minimal power loss and conserves energy, making this device ideal for use in power management circuitry. Typical applications are PWMDC-DC converters, power management in portable and battery-powered products such as computers, printers, battery charger, telecommunication power system, and telephones power system.

## FEATURES

- Low  $R_{DS(on)}$  provides higher efficiency and extends battery life.
- Miniature SC-59 surface mount package saves board space.
- High power and current handling capability.
- MLow side high current DC-DC Converter applications

## SC-59



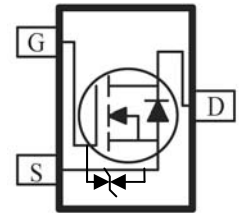
REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.70	3.10	G	0.10	REF.
B	2.25	3.00	H	0.40	REF.
C	1.30	1.70	J	0.10	0.20
D	1.00	1.40	K	0.45	0.55
E	1.70	2.30	L	0.85	1.15
F	0.35	0.50			

## PACKAGE INFORMATION

Package	MPQ	Leader Size
SC-59	3K	7' inch



ESD  
Protection Diode  
2KV



## ABSOLUTE MAXIMUM RATINGS ( $T_A=25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current <sup>1</sup>	$I_D$	$T_A=25^\circ\text{C}$	5.3
		$T_A=70^\circ\text{C}$	4.1
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	20	A
Continuous Source Current (Diode Conduction) <sup>1</sup>	$I_S$	1.8	A
Power Dissipation <sup>1</sup>	$P_D$	$T_A=25^\circ\text{C}$	1.3
		$T_A=70^\circ\text{C}$	0.8
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 ~ 150	$^\circ\text{C}$
<b>THERMAL RESISTANCE RATINGS</b>			
Maximum Junction to Ambient <sup>1</sup>	$t \leq 10$ sec	$R_{\theta JA}$	100
	Steady State		166
			$^\circ\text{C} / \text{W}$

### Notes

- 1 Surface Mounted on 1" x 1" FR4 Board.
- 2 Pulse width limited by maximum junction temperature.

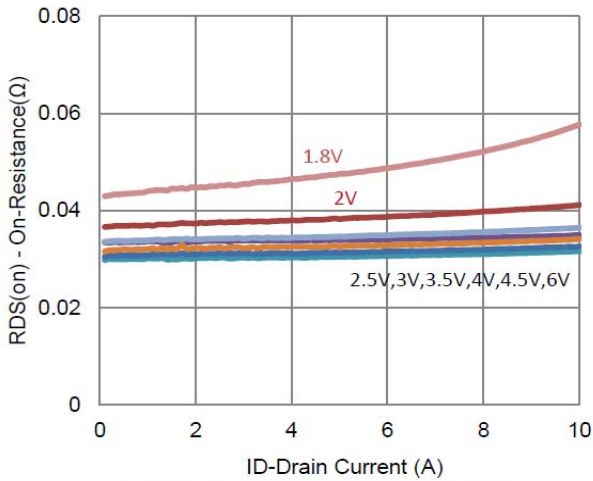
**ELECTRICAL CHARACTERISTICS** ( $T_A=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Gate-Threshold Voltage	$V_{GS(th)}$	0.4	-	-	V	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$
Gate-Body Leakage	$I_{GSS}$	-	-	$\pm 10$	nA	$V_{DS}=0$ , $V_{GS}=\pm 12\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$	-	-	1	$\mu\text{A}$	$V_{DS}=16\text{V}$ , $V_{GS}=0$
		-	-	25		$V_{DS}=16\text{V}$ , $V_{GS}=0$ , $T_J=55^\circ\text{C}$
On-State Drain Current <sup>1</sup>	$I_{D(on)}$	10	-	-	A	$V_{DS}=5\text{V}$ , $V_{GS}=4.5\text{V}$
Drain-Source On-Resistance <sup>1</sup>	$R_{DS(ON)}$	-	-	32	m $\Omega$	$V_{GS}=4.5\text{V}$ , $I_D=4.2\text{A}$
		-	-	44		$V_{GS}=2.5\text{V}$ , $I_D=3.8\text{A}$
Forward Transconductance <sup>1</sup>	$g_{fs}$	-	11	-	S	$V_{DS}=15\text{V}$ , $I_D=4.2\text{A}$
Diode Forward Voltage	$V_{SD}$	-	0.7	-	V	$I_S=0.9\text{A}$ , $V_{GS}=0$
<b>Dynamic <sup>2</sup></b>						
Input Capacitance	$C_{iss}$	-	413	-	pF	$V_{DS}=10\text{V}$ , $V_{GS}=4.5\text{V}$ , $f=1\text{MHz}$ .
Output Capacitance	$C_{oss}$	-	76	-		
Reverse Transfer Capacitance	$C_{rss}$	-	67	-		
Total Gate Charge	$Q_g$	-	6.2	-	nC	$V_{DS}=10\text{V}$ , $V_{GS}=4.5\text{V}$ , $I_D=4.2\text{A}$ .
Gate-Source Charge	$Q_{gs}$	-	1	-		
Gate-Drain Charge	$Q_{gd}$	-	2	-		
Turn-on Delay Time	$T_{d(on)}$	-	6	-	nS	$V_{DS}=10\text{V}$ , $V_{GEN}=4.5\text{V}$ , $R_{GEN}=6\Omega$ , $R_L=2.4\Omega$ , $I_D=4.2\text{A}$ .
Rise Time	$T_r$	-	19	-		
Turn-off Delay Time	$T_{d(off)}$	-	47	-		
Fall Time	$T_f$	-	67	-		

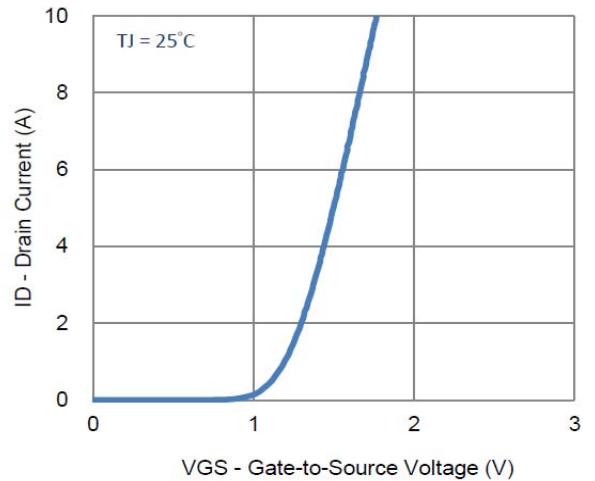
Notes

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

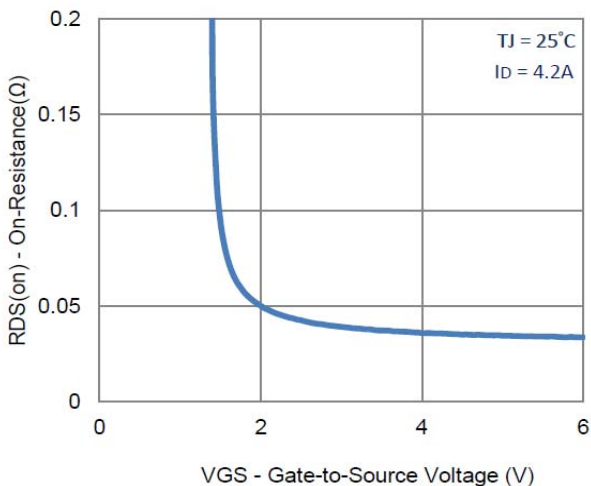
**CHARACTERISTIC CURVE**



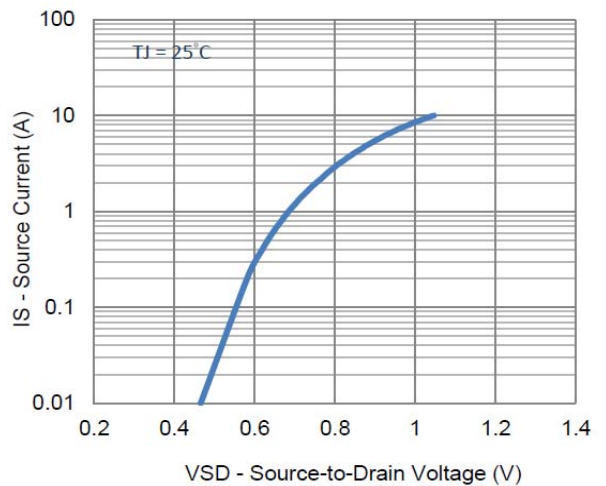
**1. On-Resistance vs. Drain Current**



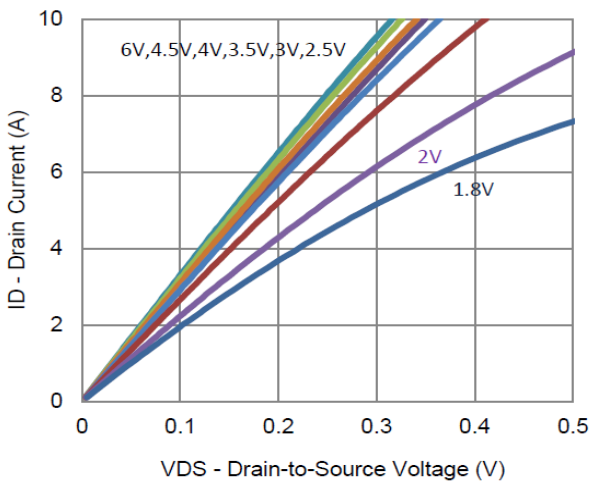
**2. Transfer Characteristics**



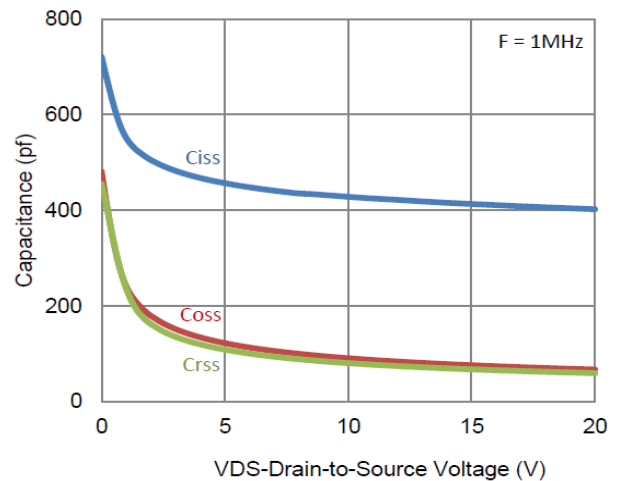
**3. On-Resistance vs. Gate-to-Source Voltage**



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

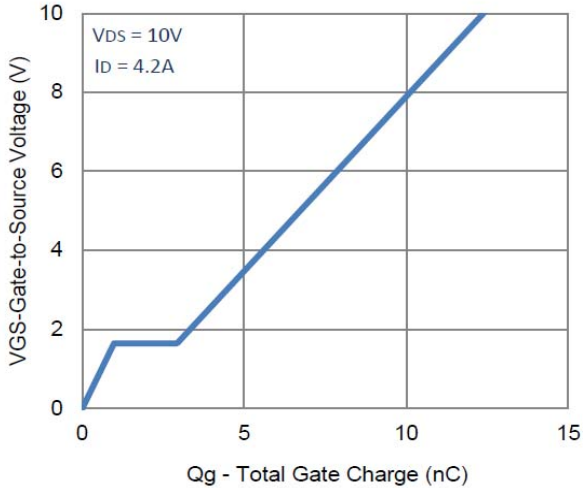


**5. Output Characteristics**

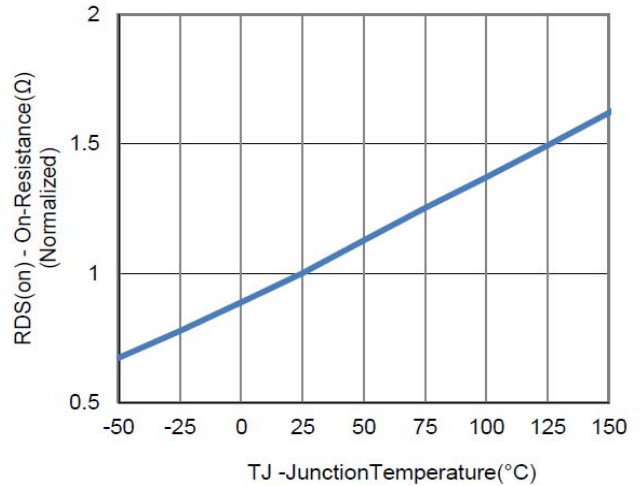


**6. Capacitance**

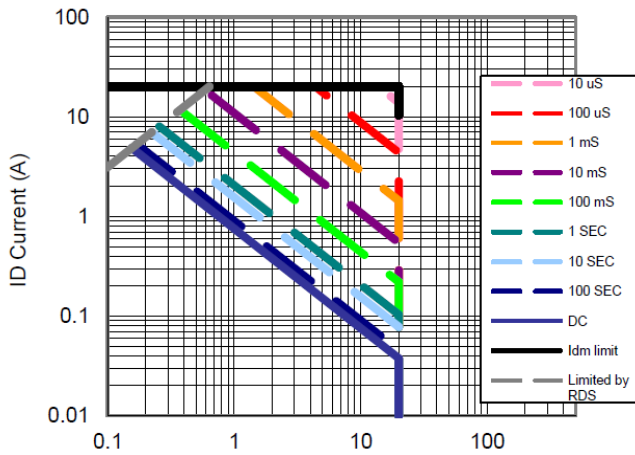
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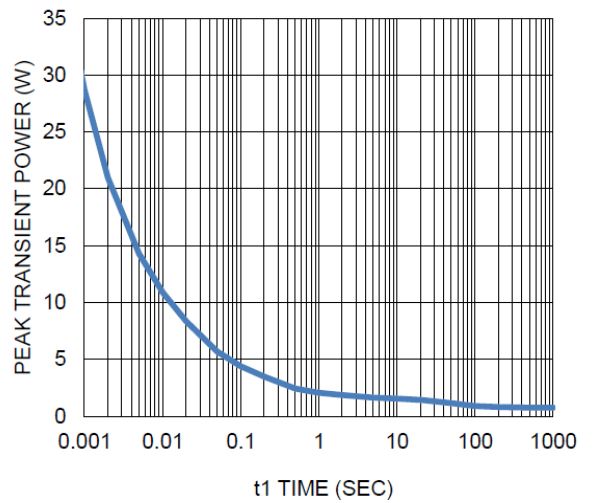
**7. Gate Charge**



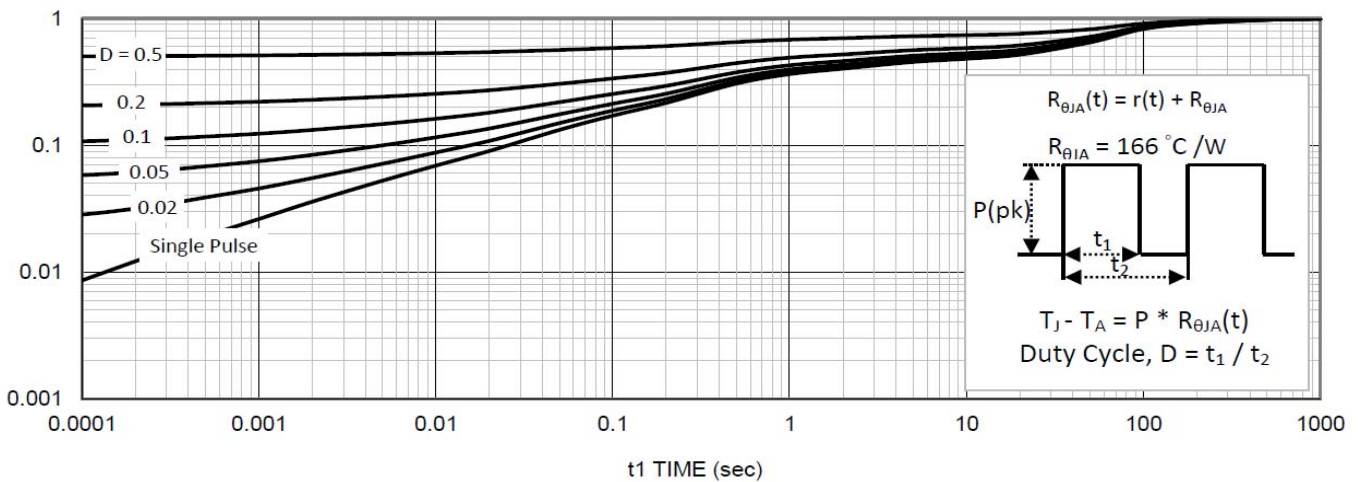
**8. Normalized On-Resistance Vs Junction Temperature**



**9. Safe Operating Area**



**10. Single Pulse Maximum Power Dissipation**



**11. Normalized Thermal Transient Junction to Ambient**