

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.

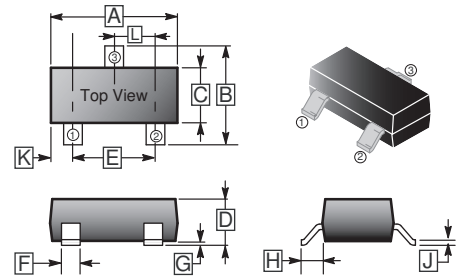
## FEATURES

- Low  $R_{DS(on)}$  provides higher efficiency and extends battery life.
- Low thermal impedance copper leadframe SC-59 saves board Space.
- Fast switching speed.
- Low Gate Charge

## APPLICATION

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

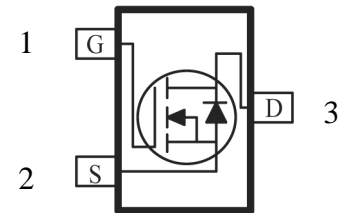
### SC-59



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



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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>1</sup>	$I_D$	$T_A=25^\circ\text{C}$	1.2
		$T_A=70^\circ\text{C}$	1
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	10	A
Continuous Source Current (Diode Conduction) <sup>1</sup>	$I_S$	1.3	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 Rating</b>			
Maximum Junction to Ambient <sup>1</sup>	$t \leq 5$ sec	$R_{\theta JA}$	250 $^\circ\text{C} / \text{W}$

Notes:

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

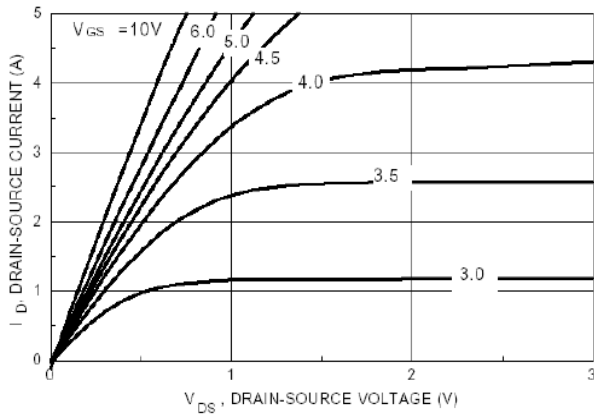
**ELECTRICAL CHARACTERISTICS** ( $T_A=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
<b>Static</b>						
Gate-Threshold Voltage	$V_{GS(th)}$	0.8	1.7	2.1	V	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	30	-	-	V	$V_{GS}=0$ , $I_D=250\mu\text{A}$
Gate-Body Leakage	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{DS}=0$ , $V_{GS}=\pm 20\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$	-	-	1	$\mu\text{A}$	$V_{DS}=24\text{V}$ , $V_{GS}=0$
		-	-	10		$V_{DS}=24\text{V}$ , $V_{GS}=0$ , $T_J=55^\circ\text{C}$
On-State Drain Current <sup>1</sup>	$I_{D(on)}$	3.5	-	-	A	$V_{DS}=5\text{V}$ , $V_{GS}=4.5\text{V}$
Drain-Source On-Resistance <sup>1</sup>	$R_{DS(ON)}$	-	125	160	m $\Omega$	$V_{GS}=10\text{V}$ , $I_D=1.4\text{A}$
		-	230	260		$V_{GS}=4.5\text{V}$ , $I_D=1.2\text{A}$ , $T_J=55^\circ\text{C}$
		-	190	250		$V_{GS}=4.5\text{V}$ , $I_D=1.2\text{A}$
Forward Transconductance <sup>1</sup>	$g_{fs}$	-	1.8	-	S	$V_{DS}=5\text{V}$ , $I_D=1.2\text{A}$
Diode Forward Voltage	$V_{SD}$	-	0.7	1.2	V	$I_S=1.2\text{A}$ , $V_{GS}=0$
<b>Dynamic <sup>2</sup></b>						
Total Gate Charge	$Q_g$	-	1.9	2.7	nC	$V_{DS}=10\text{V}$ , $V_{GS}=4.5\text{V}$ , $I_D=1.2\text{A}$ , $R_L=6\Omega$
Gate-Source Charge	$Q_{gs}$	-	0.5	-		
Gate-Drain Charge	$Q_{gd}$	-	0.9	-		
Turn-on Delay Time	$T_{d(on)}$	-	6	15	nS	$V_{DS}=10\text{V}$ , $V_{GEN}=10\text{V}$ , $R_L=50\Omega$ , $I_D=1\text{A}$
Rise Time	$T_r$	-	15	31		
Turn-off Delay Time	$T_{d(off)}$	-	15	32		
Fall Time	$T_f$	-	18	42		

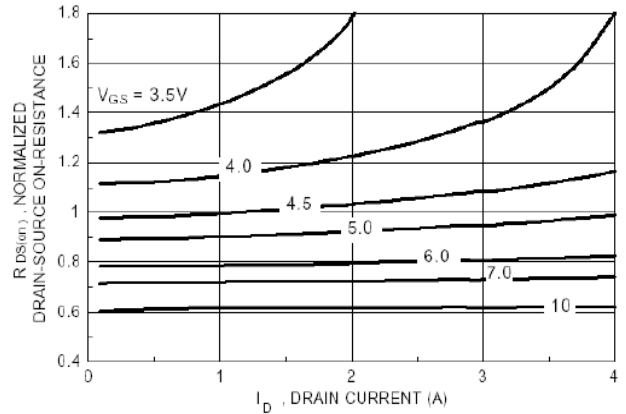
Notes

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

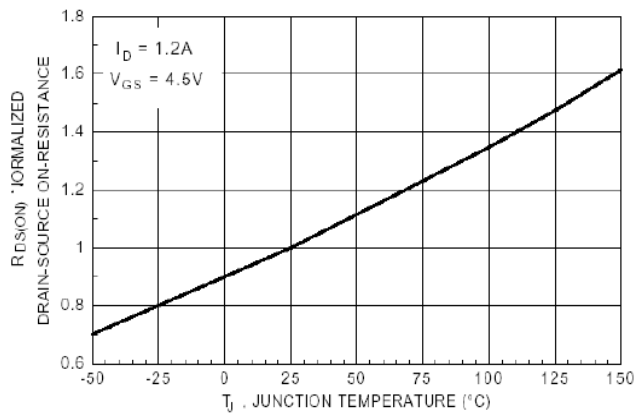
**CHARACTERISTIC CURVES**



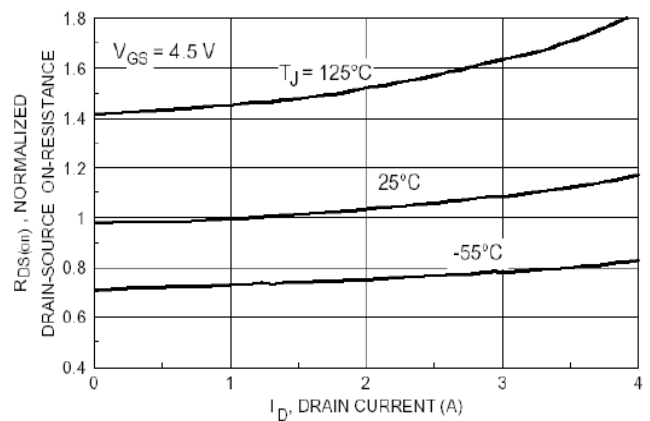
**Figure 1. On-Region Characteristics**



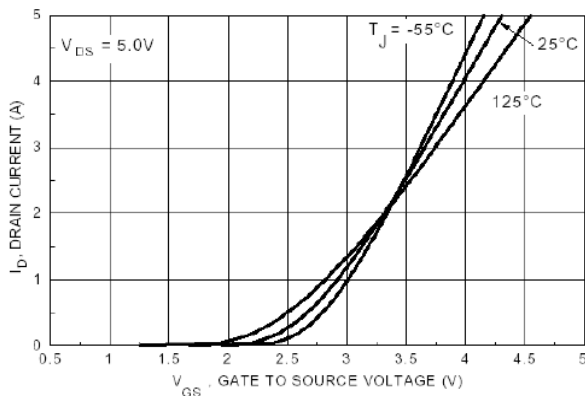
**Figure 2. On-Resistance Variation with Drain Current and Gate Voltage**



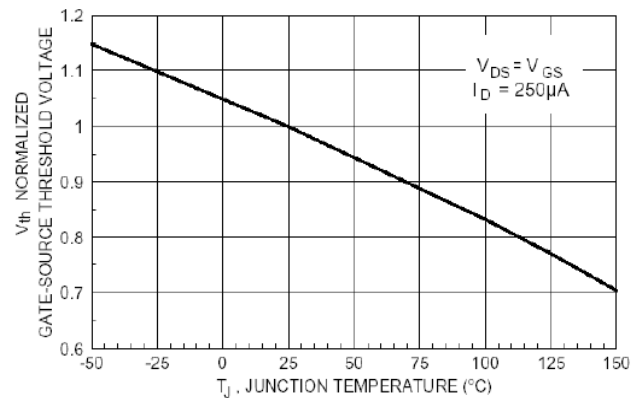
**Figure 3. On-Resistance Variation with Temperature**



**Figure 4. On-Resistance Variation with Gate to Source Voltage**

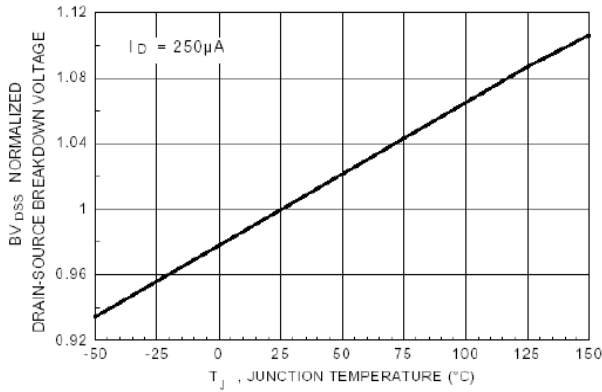


**Figure 5. Transfer Characteristics**

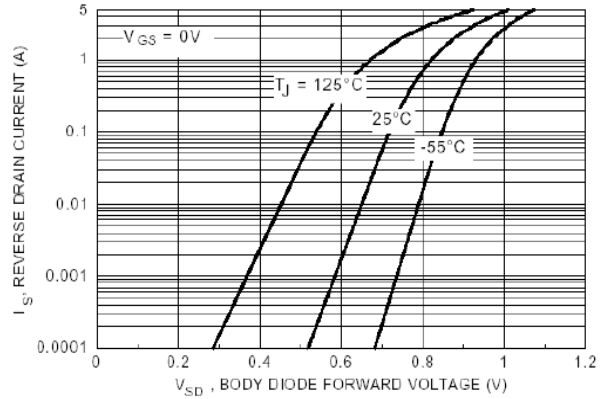


**Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature**

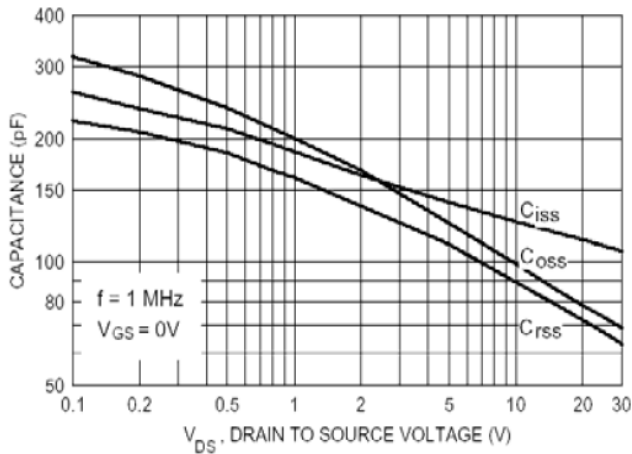
**CHARACTERISTIC CURVES**



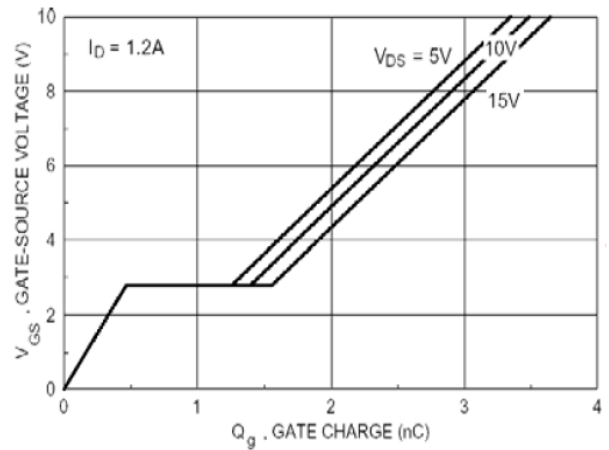
**Figure 7. Breakdown Voltage Variation With Temperature**



**Figure 8. Body Diode Forward Voltage With Source Current Temperature**

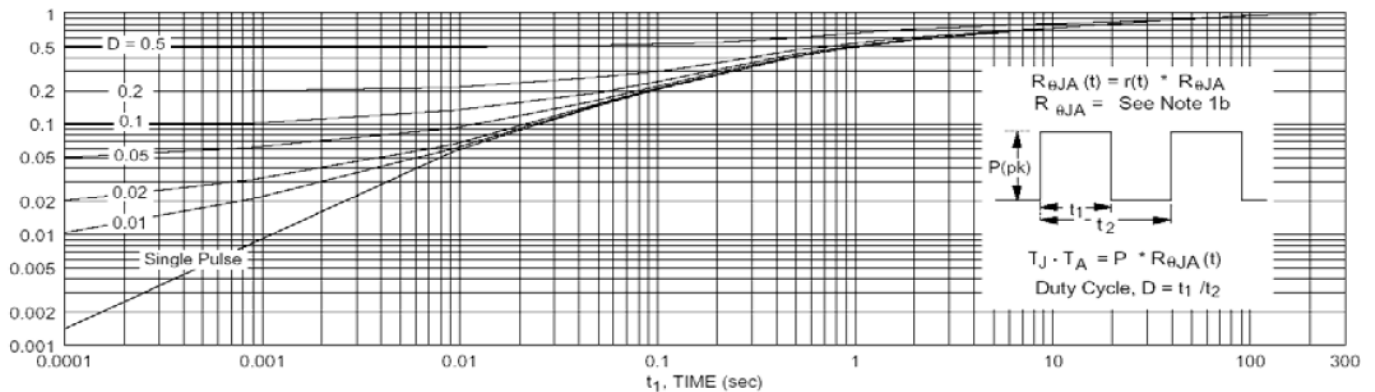


**Figure 9. Capacitance Characteristic**



**Figure 10. Gate Charge Characteristic**

**Normalized Thermal Transient Junction to Ambient**



**Figure 11. Transient Thermal Response Curve**