

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

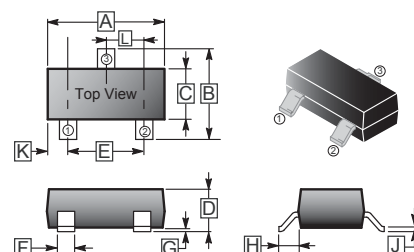
## DESCRIPTION

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

## 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.
- High performance trench technology.

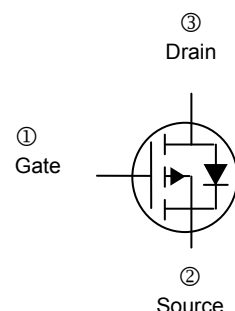
### SC-59



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	LeaderSize
SC-59	3K	7' inch



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

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 8$	V
Continuous Drain Current <sup>1</sup>	$I_D$	$T_A=25^\circ\text{C}$	-2.6
		$T_A=70^\circ\text{C}$	-1.5
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	-10	A
Continuous Source Current (Diode Conduction) <sup>1</sup>	$I_S$	$\pm 1.6$	A
Power Dissipation <sup>1</sup>	$P_D$	$T_A=25^\circ\text{C}$	1.25
		$T_A=70^\circ\text{C}$	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>	$R_{\theta JA}$	$t \leq 5$ sec	100
		Steady-State	166

Notes:

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

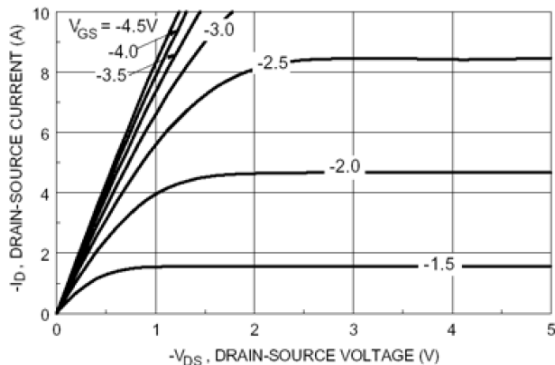
**ELECTRICAL CHARACTERISTICS** ( $T_A=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
<b>Static</b>						
Gate-Threshold Voltage	$V_{GS(th)}$	-0.4	-	-1	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Gate-Body Leakage	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{DS} = 0\text{V}, V_{GS} = \pm 8\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$	-	-	-1	$\mu\text{A}$	$V_{DS} = -16\text{V}, V_{GS} = 0\text{V}$
		-	-	-10		$V_{DS} = -16\text{V}, V_{GS} = 0\text{V}, T_J = 55^\circ\text{C}$
On-State Drain Current <sup>1</sup>	$I_{D(ON)}$	-3	-	-	A	$V_{DS} = -5\text{V}, V_{GS} = -4.5\text{V}$
Drain-Source On-Resistance <sup>1</sup>	$R_{DS(ON)}$	-	-	0.130	$\Omega$	$V_{GS} = -4.5\text{V}, I_D = -2.6\text{A}$
		-	-	0.190		$V_{GS} = -2.5\text{V}, I_D = -2.1\text{A}$
Forward Transconductance <sup>1</sup>	$g_{FS}$	-	3	-	S	$V_{DS} = -5\text{V}, I_D = -2.8\text{A}$
Diode Forward Voltage	$V_{SD}$	-	-0.70	-	V	$I_S = -1.6\text{A}, V_{GS} = 0\text{V}$
<b>Dynamic <sup>2</sup></b>						
Total Gate Charge	$Q_g$	-	12.2	-	nC	$I_D = -2.6\text{A}$ $V_{DS} = -5\text{V}$ $V_{GS} = -4.5\text{V}$
Gate-Source Charge	$Q_{gs}$	-	1.1	-		
Gate-Drain Charge	$Q_{gd}$	-	1.5	-		
Turn-On Delay Time	$T_{d(ON)}$	-	6.5	-	nS	$V_{DD} = -5\text{V}$ $V_{GEN} = -4.5\text{V}$ $R_G = 6\Omega$ $R_L = 5\Omega$
Rise Time	$T_r$	-	20	-		
Turn-Off Delay Time	$T_{d(OFF)}$	-	31	-		
Fall Time	$T_f$	-	21	-		

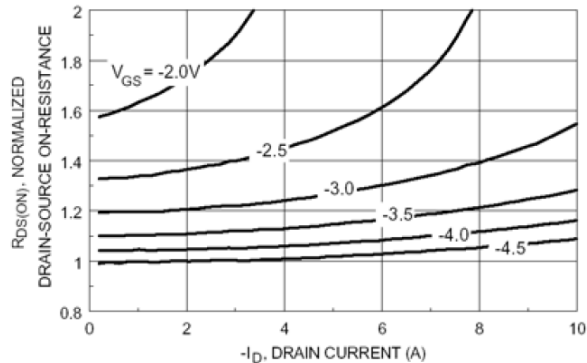
Notes:

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

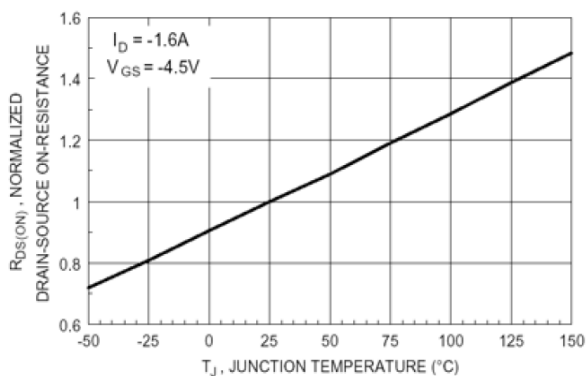
**CHARACTERISTIC CURVE**



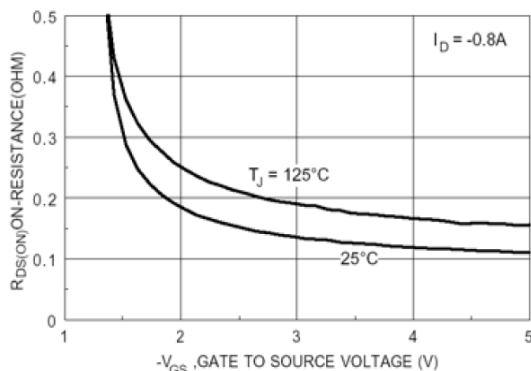
**Figure 1. On-Region Characteristics.**



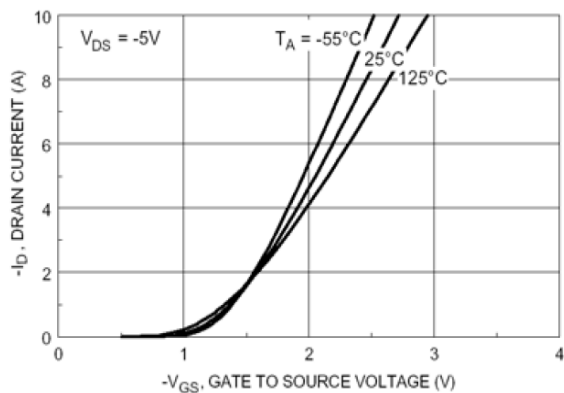
**Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.**



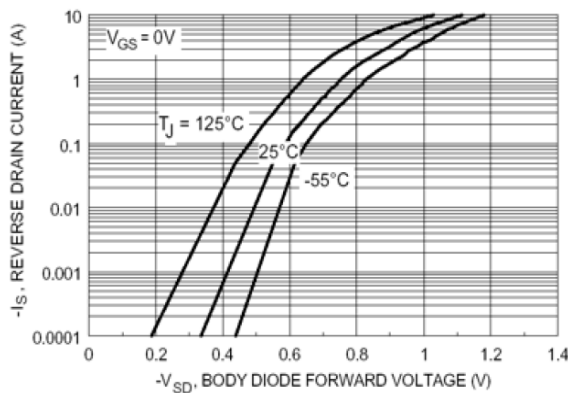
**Figure 3. On-Resistance Variation with Temperature.**



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

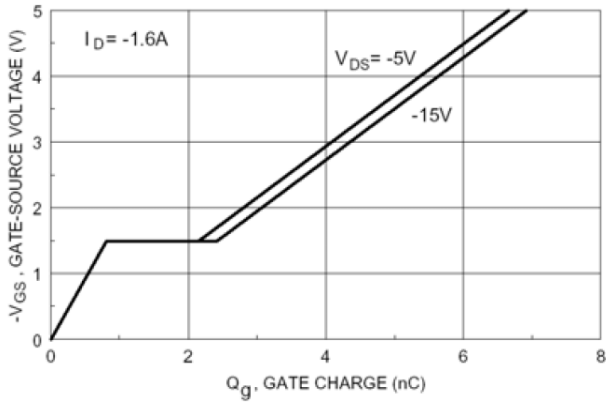


**Figure 5. Transfer Characteristics.**

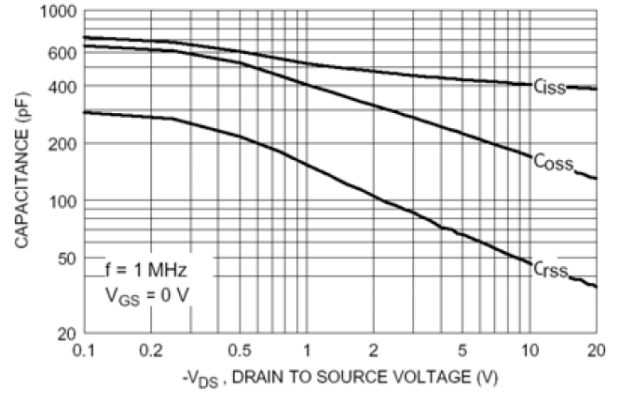


**Figure 6 . Body Diode Forward Voltage Variation with Source Current and Temperature.**

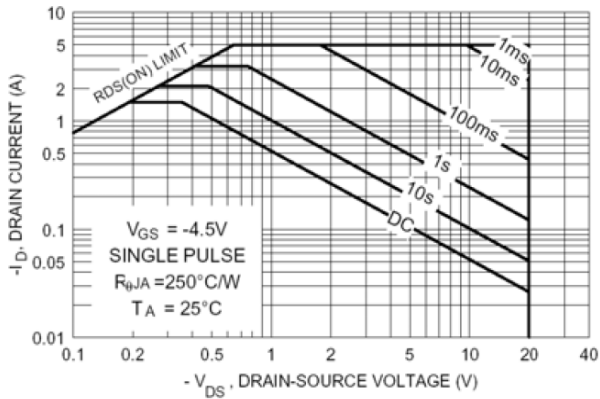
**CHARACTERISTIC CURVE**



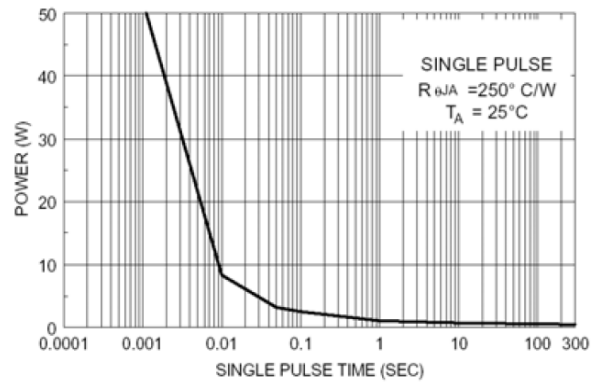
**Figure 7. Gate Charge Characteristics.**



**Figure 8. Capacitance Characteristics.**

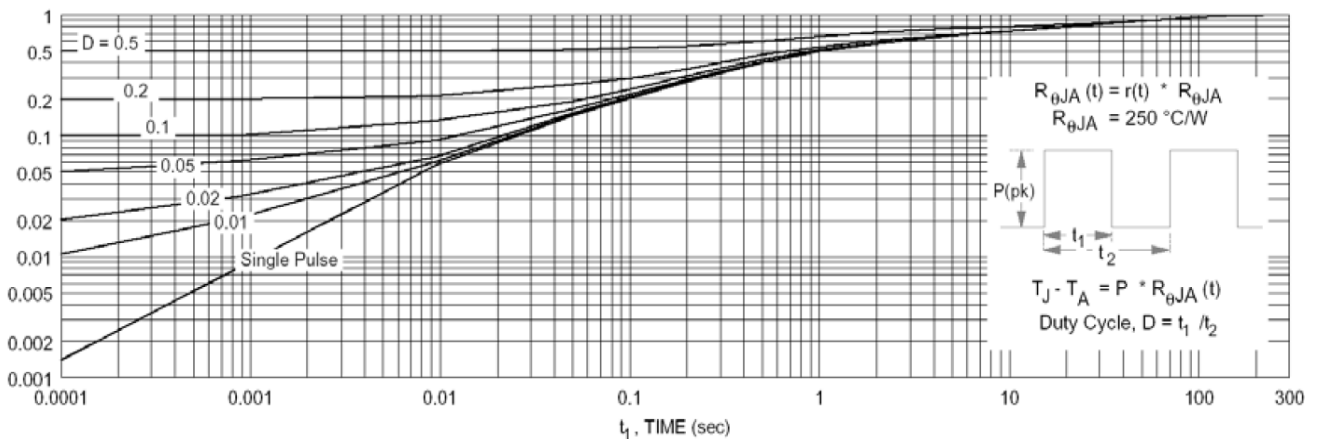


**Figure 9. Maximum Safe Operating Area.**



**Figure 10. Single Pulse Maximum Power Dissipation.**

**Normalized Thermal Transient Junction to Ambient**



**Figure 11. Transient Thermal Response Curve.**