

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

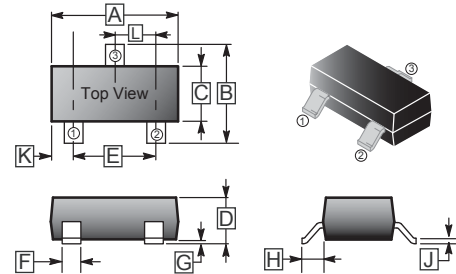
FEATURES

- Low $R_{DS(on)}$ provides higher efficiency and extends battery life.
- Low gate charge
- Fast switch

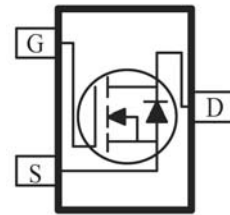
PACKAGE INFORMATION

Package	MPQ	LeaderSize
SC-59	3K	7' inch

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			



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}	± 8	V	
Continuous Drain Current ¹	$I_D @ T_A=25^\circ\text{C}$	2.2	A	
	$I_D @ T_A=70^\circ\text{C}$	1.7	A	
Pulsed Drain Current ²	I_{DM}	10	A	
Continuous Source Current (Diode Conduction) ¹	I_S	0.45	A	
Power Dissipation ¹	$P_D @ T_A=25^\circ\text{C}$	0.5	W	
	$P_D @ T_A=70^\circ\text{C}$	0.42	W	
Operating Junction and Storage Temperature Range	T_j, T_{stg}	-55 ~ 150	$^\circ\text{C}$	
Thermal Resistance Ratings				
Maximum Junction to Ambient ¹	$t \leq 5$ sec	$R_{\theta JA}$	250	$^\circ\text{C} / \text{W}$
	Steady State		285	

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
Switch Off Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	30	-	-		$V_{GS}=0, I_D=250\mu\text{A}$
Gate-Body Leakage	I_{GSS}	-	-	± 100	nA	$V_{DS}=0, V_{GS}= \pm 8\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1	μA	$V_{DS}=24\text{V}, V_{GS}=0$
		-	-	10		$V_{DS}=24\text{V}, V_{GS}=0, T_J=55^\circ\text{C}$
Switch On Characteristics						
Gate-Threshold Voltage	$V_{GS(th)}$	0.43	0.7	1	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$
On-State Drain Current ¹	$I_{D(on)}$	10	-	-	A	$V_{DS}=5\text{V}, V_{GS}=4.5\text{V}$
Drain-Source On-Resistance ¹	$R_{DS(ON)}$	-	54	65	m Ω	$V_{GS}=4.5\text{V}, I_D=2.2\text{A}$
		-	80	99		$V_{GS}=4.5\text{V}, I_D=2.2\text{A}, T_J=55^\circ\text{C}$
		-	70	82		$V_{GS}=2.5\text{V}, I_D=2\text{A}$
Forward Transconductance ¹	g_{fs}	-	13	-	S	$V_{DS}=5\text{V}, I_D=2.2\text{A}$
Diode Forward Voltage	V_{SD}	-	0.65	1.2	V	$I_S=0.45\text{A}, V_{GS}=0$
Dynamic ²						
Total Gate Charge	Q_g	-	7	9	nC	$V_{DS}=10\text{V}, V_{GS}=4.5\text{V}, I_D=2.2\text{A}$
Gate-Source Charge	Q_{gs}	-	1.1	-		
Gate-Drain Charge	Q_{gd}	-	1.9	-		
Switching						
Turn-on Delay Time	$T_{d(on)}$	-	4	11	nS	$V_{DS}=10\text{V}, V_{GEN}=4.5\text{V}, R_G=6\Omega, I_D=1\text{A}$
Rise Time	T_r	-	11	19		
Turn-off Delay Time	$T_{d(off)}$	-	18	30		
Fall Time	T_f	-	5	10		

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

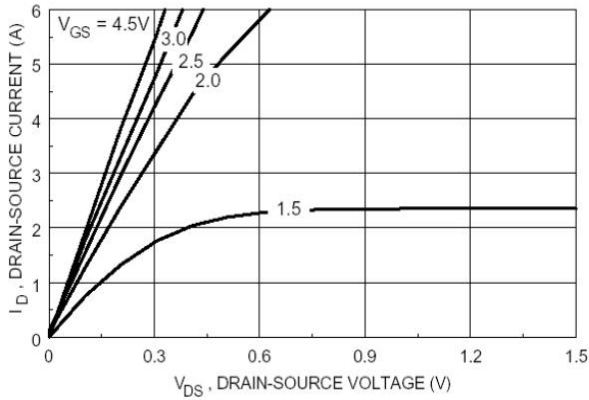


Figure 1. On-Region Characteristics

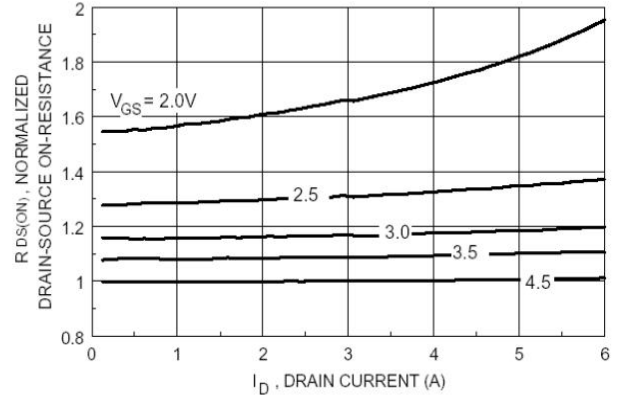


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage

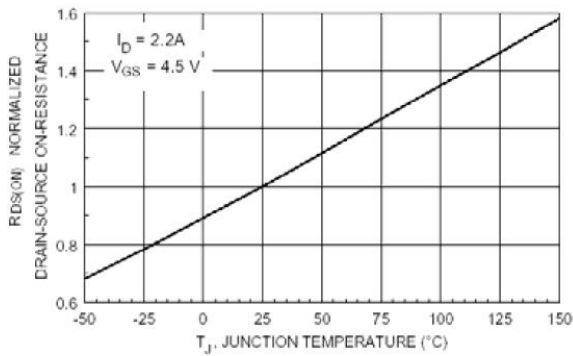


Figure 3. On-Resistance Variation with Temperature

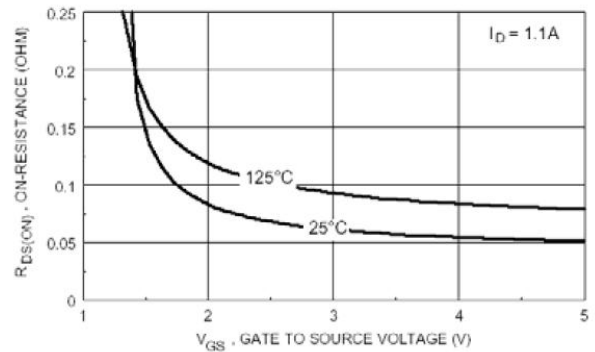


Figure 4. On-Resistance Variation with Gate to Source Voltage

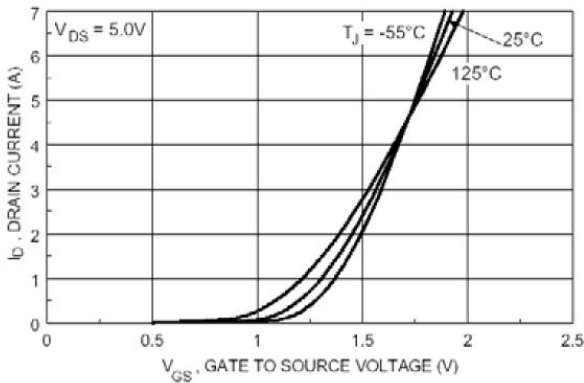


Figure 5. Transfer Characteristics

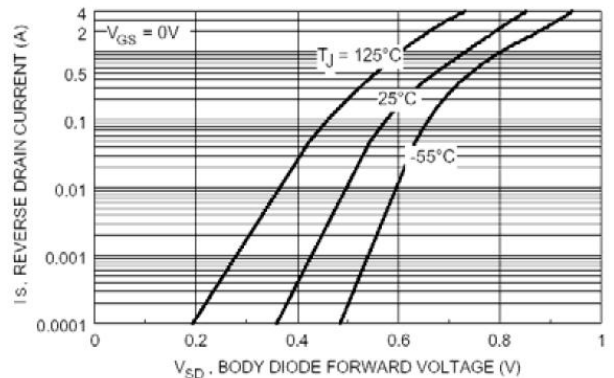


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

CHARACTERISTIC CURVE

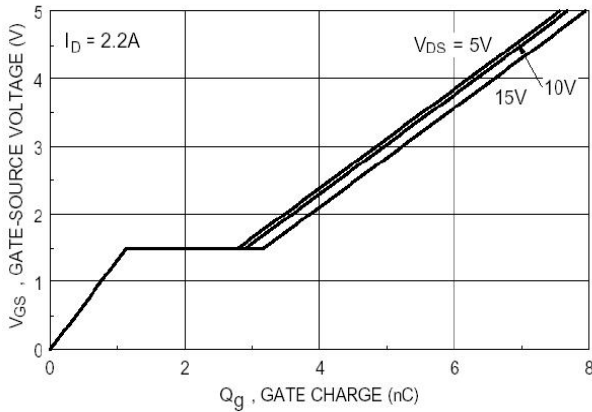


Figure 7. Gate Charge Characteristics.

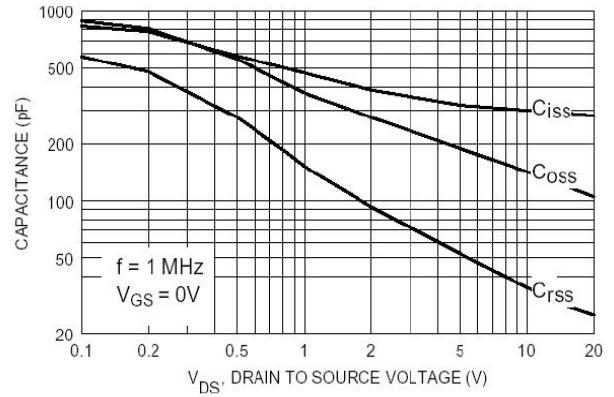


Figure 8. Capacitance Characteristics.

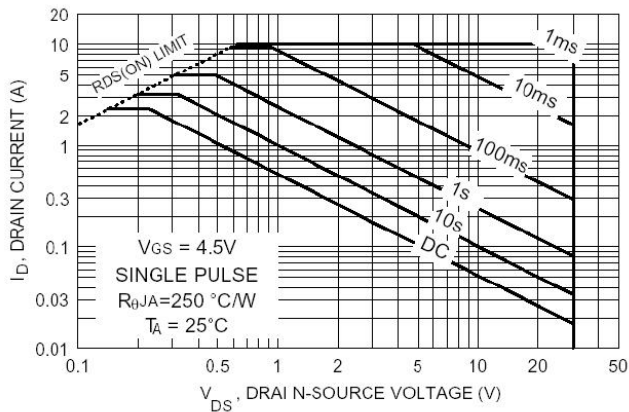


Figure 9. Maximum Safe Operating Area.

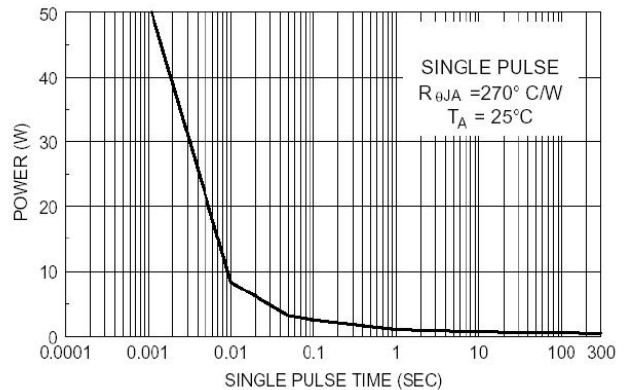


Figure 10. Single Pulse Maximum Power Dissipation.

Normalized Thermal Transient Impedance, Junction to Ambient

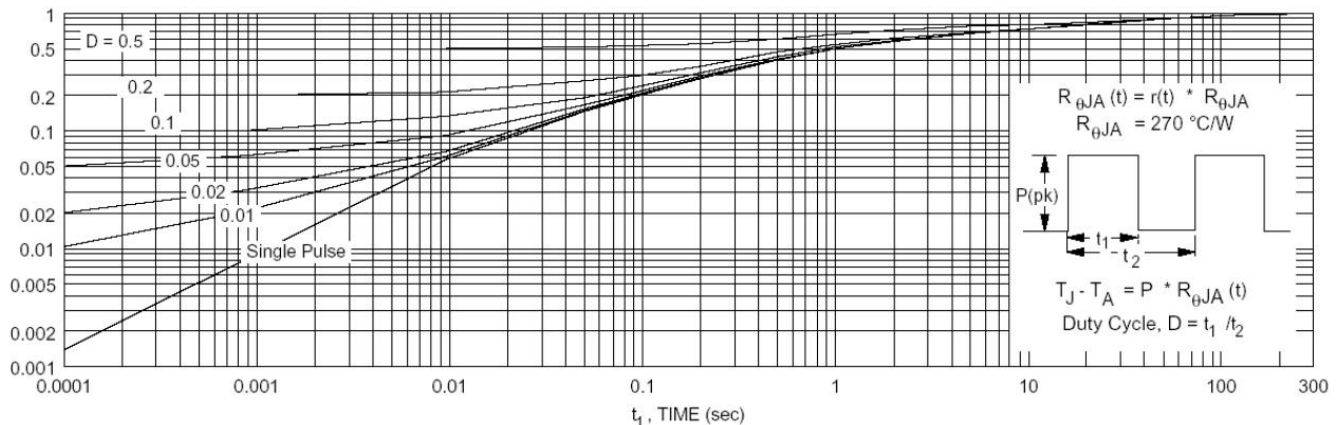


Figure 11. Transient Thermal Response Curve