

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 gate charge
- Fast switch
- Miniature SC-59 surface mount package saves board space.

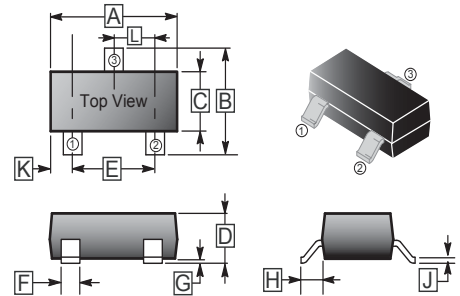
APPLICATION

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

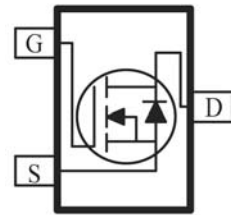
PACKAGE INFORMATION

Package	MPQ	Leader Size
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	Ratings	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	± 12	V
Continuous Drain Current ¹	$I_D @ T_A=25^\circ\text{C}$	I_D	5.3	A
	$I_D @ T_A=70^\circ\text{C}$		4.3	A
Pulsed Drain Current ²		I_{DM}	± 20	A
Continuous Source Current (Diode Conduction) ¹		I_S	1.6	A
Power Dissipation ¹	$P_D @ T_A=25^\circ\text{C}$	P_D	1.3	W
	$P_D @ T_A=70^\circ\text{C}$		0.8	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	$R_{\theta JA}$	100	$^\circ\text{C} / \text{W}$
	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
Gate-Threshold Voltage	$V_{GS(th)}$	0.7	-	2	V	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$
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	$V_{DS}=16\text{V}$, $V_{GS}=0$
		-	-	10		$V_{DS}=16\text{V}$, $V_{GS}=0$, $T_J=55^\circ\text{C}$
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	$R_{DS(ON)}$	-	-	32	m Ω	$V_{GS}=4.5\text{V}$, $I_D=4.6\text{A}$
		-	-	44		$V_{GS}=2.5\text{V}$, $I_D=3.9\text{A}$
Forward Transconductance ¹	g_{fs}	-	11.3	-	S	$V_{DS}=10\text{V}$, $I_D=4\text{A}$
Diode Forward Voltage	V_{SD}	-	0.75	-	V	$I_S=1.6\text{A}$, $V_{GS}=0$
Dynamic ²						
Total Gate Charge	Q_g	-	13.4	-	nC	$V_{DS}=10\text{V}$, $V_{GS}= 4.5\text{V}$, $I_D=4\text{A}$
Gate-Source Charge	Q_{gs}	-	0.9	-		
Gate-Drain Charge	Q_{gd}	-	2	-		
Turn-on Delay Time	$T_{d(on)}$	-	8	-	nS	$V_{DD}=10\text{V}$, $V_{GEN}=4.5\text{V}$, $R_L=15\Omega$, $I_D=1\text{A}$
Rise Time	T_r	-	24	-		
Turn-off Delay Time	$T_{d(off)}$	-	35	-		
Fall Time	T_f	-	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

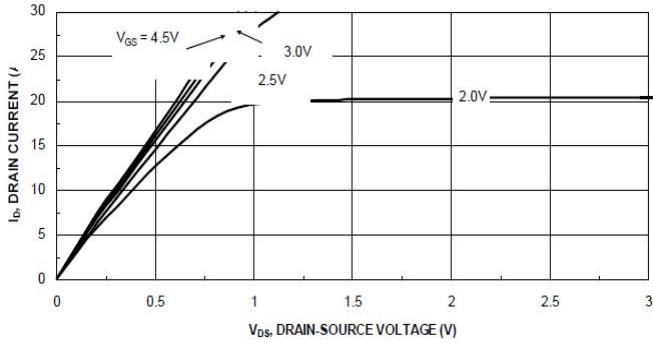


Figure 1. Output Characteristics

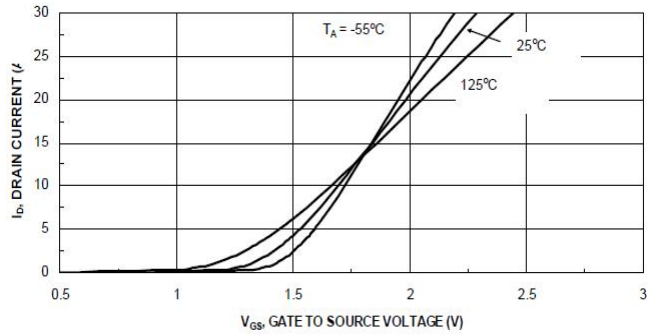


Figure 2. Transfer Characteristics

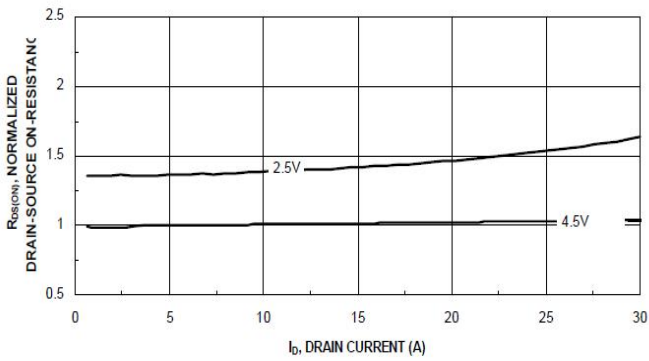


Figure 3. On-Resistance vs. Drain Current

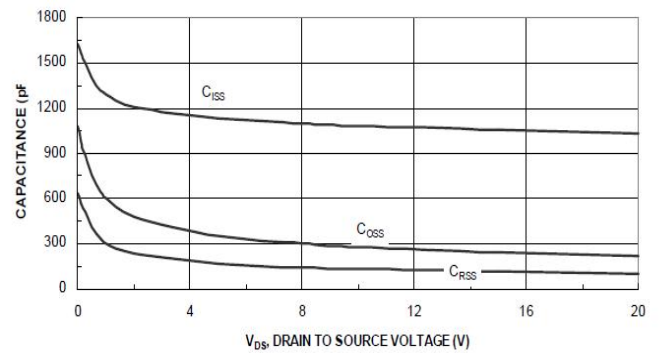


Figure 4. Capacitance

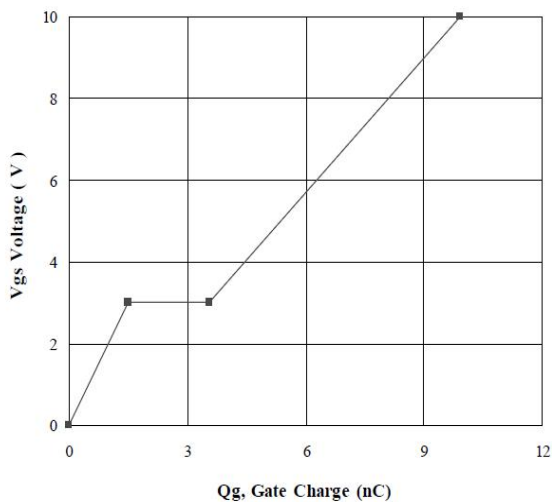


Figure 5. Gate Charge

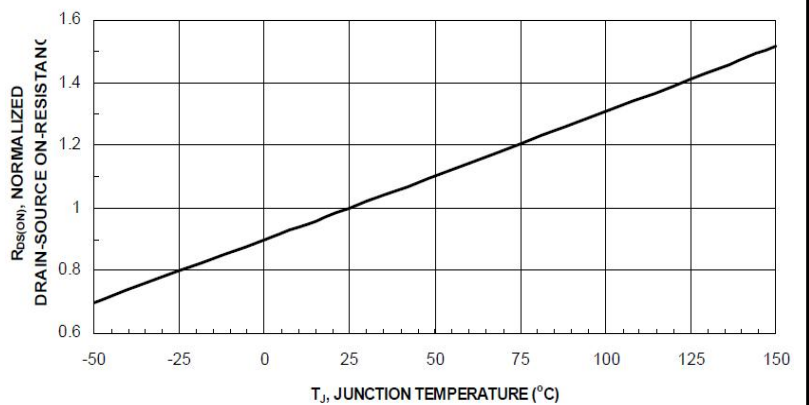


Figure 6. On-Resistance vs. Junction Temperature

CHARACTERISTIC CURVE

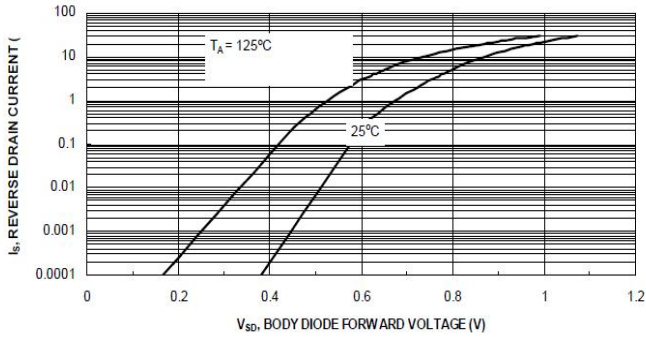


Figure 7. Source-Drain Diode Forward Voltage

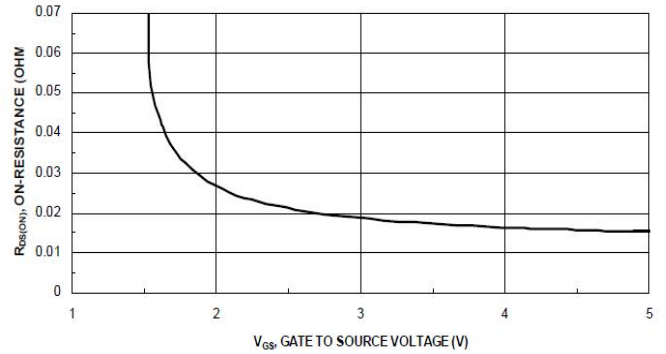


Figure 8. On-Resistance vs. Gate-to-Source Voltage

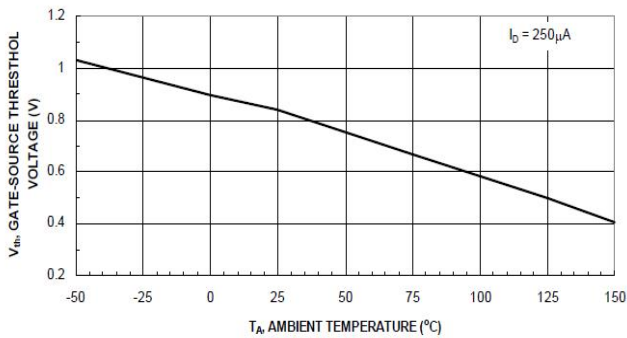


Figure 9. Threshold Voltage

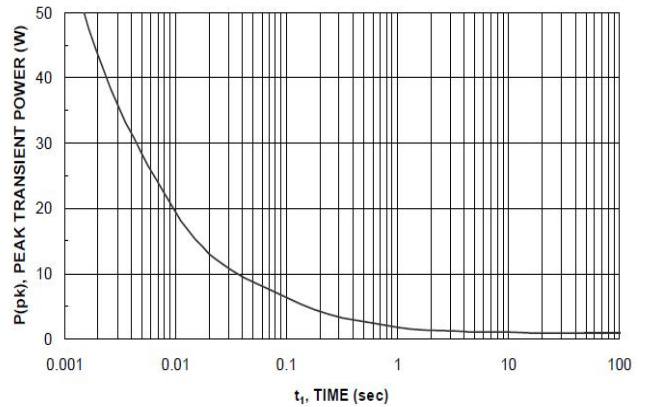


Figure 10. Single Pulse Power

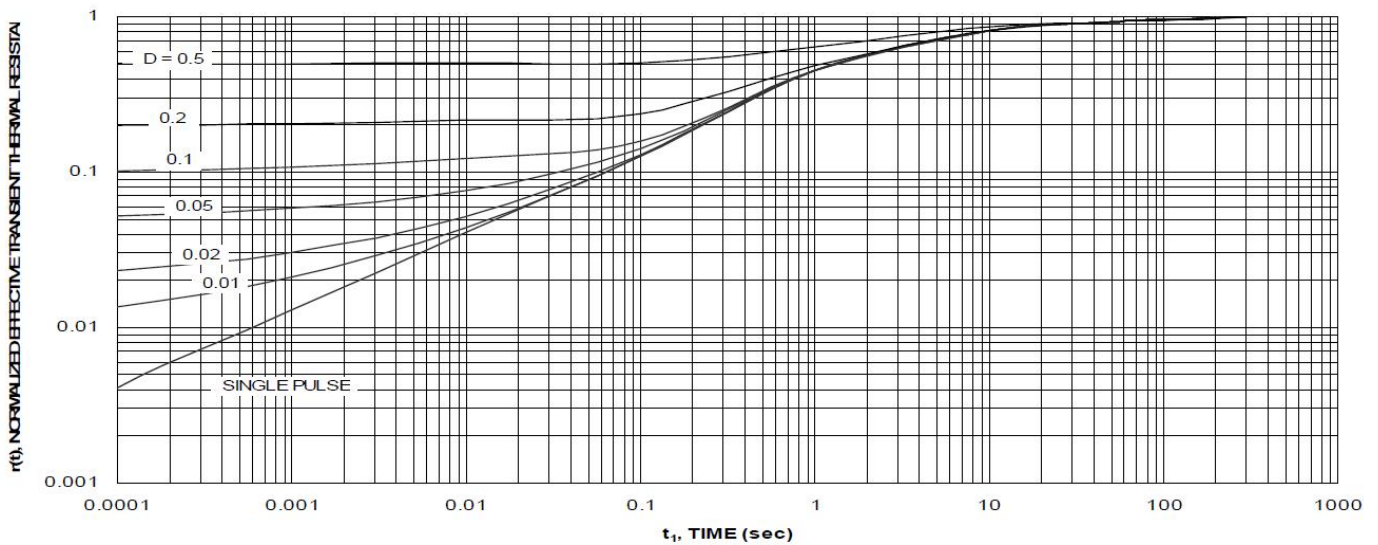


Figure 11. Normalized Thermal Transient Impedance, Junction-to-Ambient