

RoHS Compliant Product
A suffix of "-C" specifies halogen & 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.
- High performance trench technology.

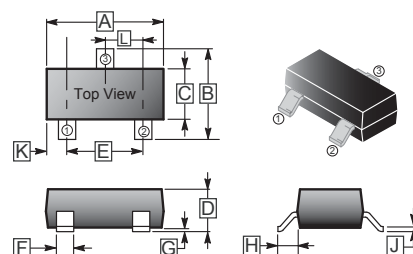
APPLICATION

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

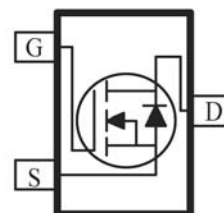
PACKAGE INFORMATION

Package	MPQ	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}	± 20	V
Continuous Drain Current ¹	I_D	$T_A=25^\circ\text{C}$	2.5
		$T_A=70^\circ\text{C}$	2
Pulsed Drain Current ²	I_{DM}	10	A
Continuous Source Current (Diode Conduction) ¹	I_S	0.46	A
Power Dissipation ¹	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	$^\circ\text{C}$
Thermal Resistance Rating			
Maximum Junction to Ambient ¹	$R_{\theta JA}$	$t \leq 5$ sec	150
		Steady-State	200

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 Condition
Static						
Gate-Threshold Voltage	$V_{GS(th)}$	1	1.5	3	V	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$
Gate-Body Leakage	I_{GSS}	-	4	100	nA	$V_{DS}=0$, $V_{GS}=8\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1	μA	$V_{DS}=16\text{V}$, $V_{GS}=0$
		-	-	10		$V_{DS}=20\text{V}$, $V_{GS}=0$, $T_J=55^\circ\text{C}$
On-State Drain Current ¹	$I_{D(ON)}$	6	-	-	A	$V_{DS}=5\text{V}$, $V_{GS}=4.5\text{V}$
Drain-Source On-Resistance ¹	$R_{DS(ON)}$	-	62	85	m Ω	$V_{GS}=10\text{V}$, $I_D=2.5\text{A}$
		-	102	125		$V_{GS}=4.5\text{V}$, $I_D=1.7\text{A}$
Forward Transconductance ¹	g_{FS}	-	3.5	-	S	$V_{DS}=5\text{V}$, $I_D=3\text{A}$
Diode Forward Voltage	V_{SD}	-	0.65	-	V	$I_S=0.46\text{A}$, $V_{GS}=0$
Dynamic ²						
Total Gate Charge	Q_g	-	3.5	7	nC	$I_D=2.5\text{A}$ $V_{DS}=10\text{V}$ $V_{GS}=4.5\text{V}$
Gate-Source Charge	Q_{gs}	-	0.8	2		
Gate-Drain Charge	Q_{gd}	-	1.0	2		
Input Capacitance	C_{iss}	-	720	1500	pF	$V_{DS}=15\text{V}$ $V_{GS}=0$ $f=1\text{MHz}$
Output Capacitance	C_{oss}	-	165	400		
Reverse Transfer Capacitance	C_{rss}	-	60	200		
Turn-On Delay Time	$T_{d(ON)}$	-	10	20	nS	$I_D=1\text{A}$, $V_{DD}=10\text{V}$ $V_{GEN}=4.5\text{V}$ $R_G=6\Omega$
Rise Time	T_r	-	13	30		
Turn-Off Delay Time	$T_{d(OFF)}$	-	14	30		
Fall Time	T_f	-	4	20		

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

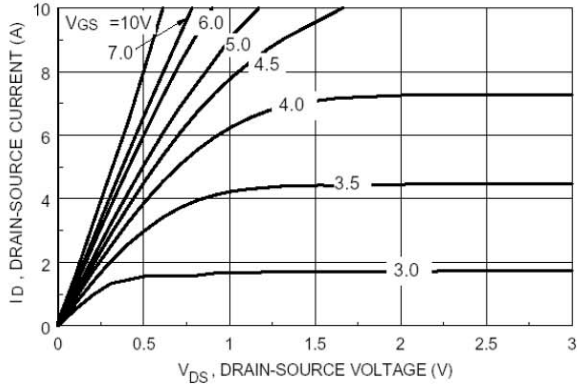


Figure 1. On-Region Characteristics

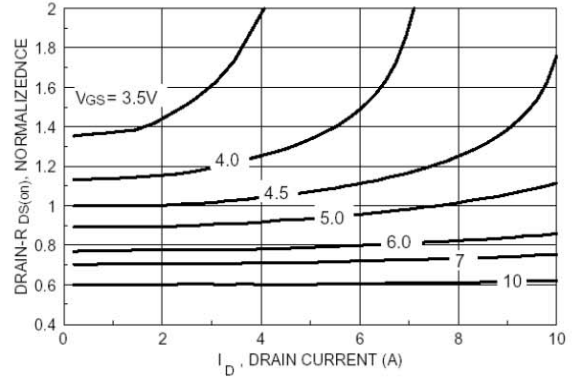


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage

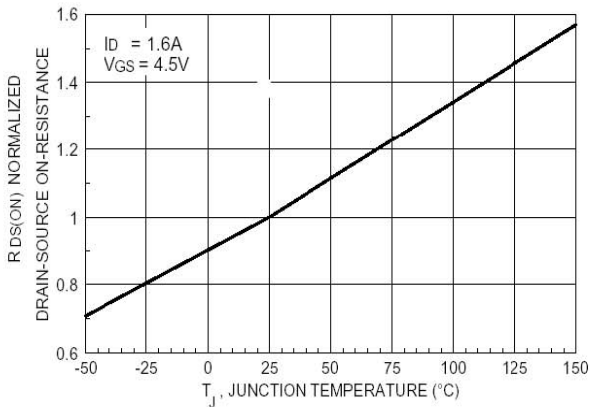


Figure 3. On-Resistance Variation with Temperature

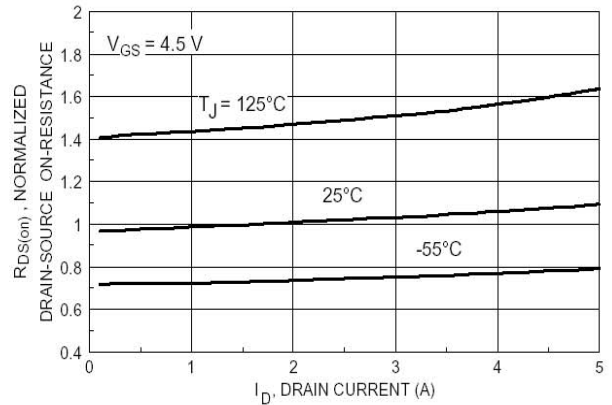


Figure 4. On-Resistance Variation with Drain Current and Temperature

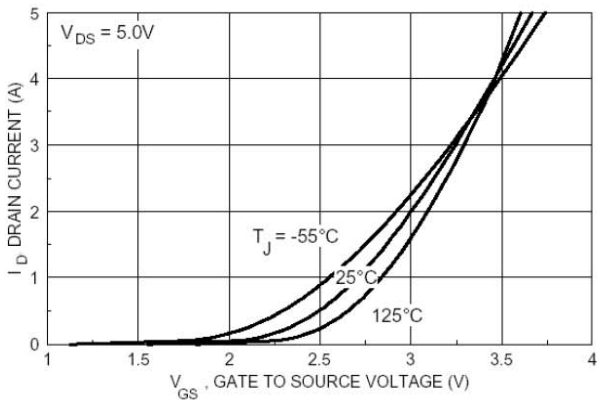


Figure 5. Transfer Characteristics

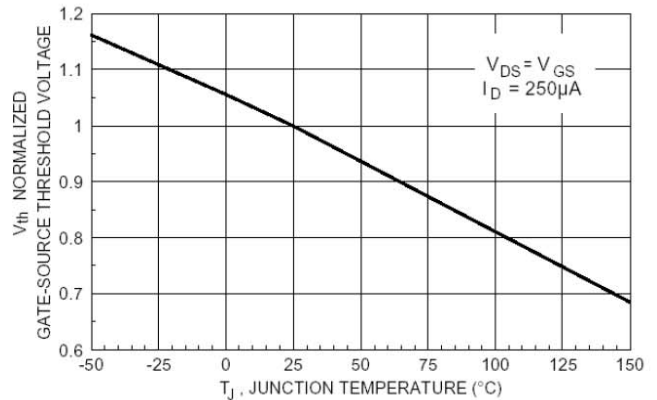


Figure 6. Gate Threshold Variation with Temperature

CHARACTERISTIC CURVE

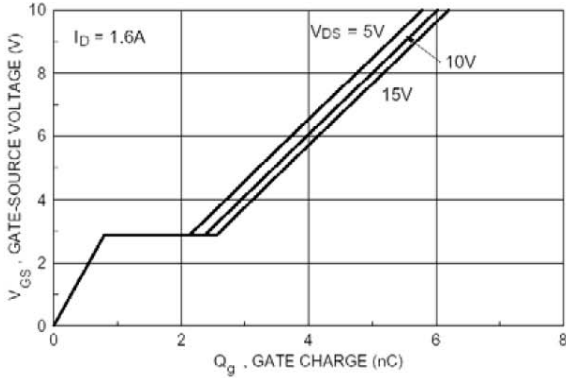


Figure 7. Gate Charge Characteristic

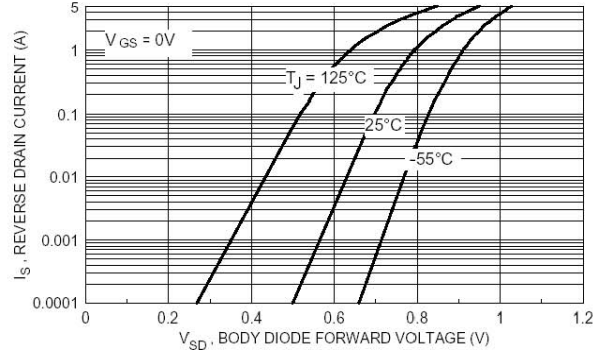


Figure 8. Capacitance Characteristic

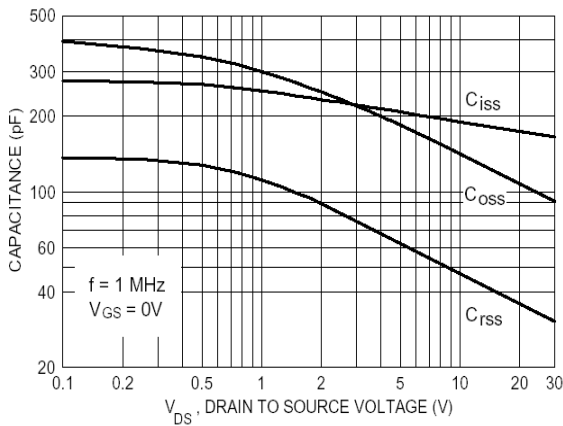


Figure 9. Maximum Safe Operating Area

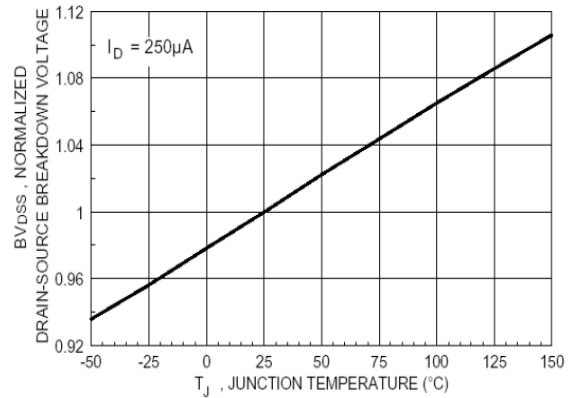


Figure 10. Breakdown Voltage Variation with Temperature

Normalized Thermal Transient Impedance, Junction to Ambient

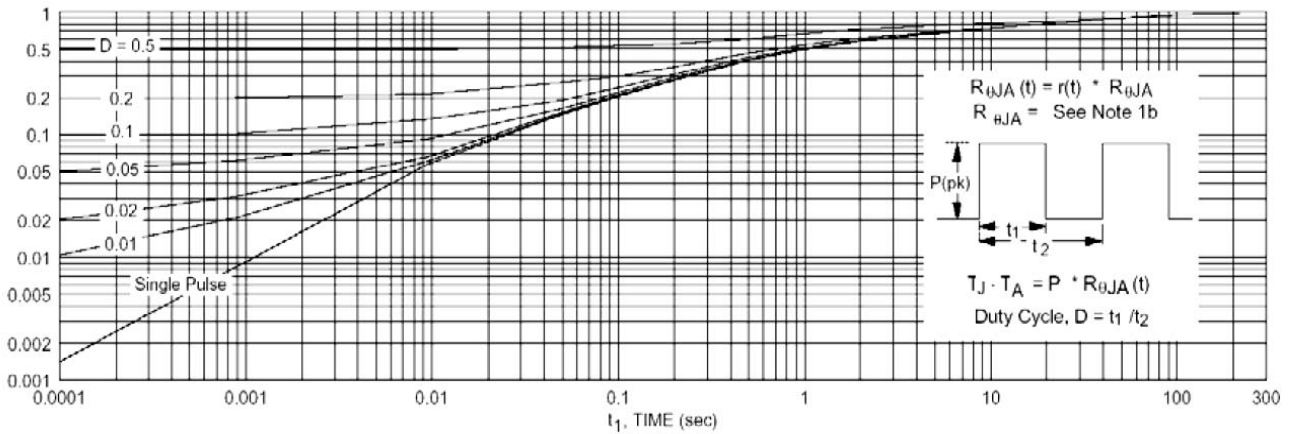


Figure 11. Transient Thermal Response Curve.