

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

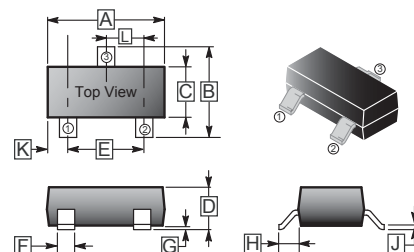
DESCRIPTION

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. 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



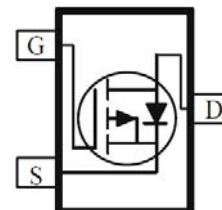
REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.70	3.10	G	0.10	REF.
B	2.25	3.00	H	0.40	REF.
C	1.30	1.70	J	0.10	0.20
D	1.00	1.40	K	0.45	0.55
E	1.70	2.30	L	0.85	1.15
F	0.35	0.50			

PACKAGE INFORMATION

Package	MPQ	LeaderSize
SC-59	3K	7' inch



ESD
Protection
Diode
2KV



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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 8	V
Continuous Drain Current ¹	I_D	$T_A=25^\circ\text{C}$	-4.5
		$T_A=70^\circ\text{C}$	-3.6
Pulsed Drain Current ²	I_{DM}	-10	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 Data			
Maximum Junction to Ambient ¹	$R_{\theta JA}$	$t \leq 5$ sec	100
		Steady-State	150

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
Static						
Gate-Threshold Voltage	$V_{GS(th)}$	-0.7	-	-	V	$V_{DS} = V_{GS}$, $I_D = -250\mu\text{A}$
Gate-Body Leakage	I_{GSS}	-	-	± 100	nA	$V_{DS} = 0\text{V}$, $V_{GS} = \pm 8\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}	-	-	-1	μA	$V_{DS} = -16\text{V}$, $V_{GS} = 0\text{V}$
		-	-	-10		$V_{DS} = -16\text{V}$, $V_{GS} = 0\text{V}$, $T_J = 55^\circ\text{C}$
On-State Drain Current ¹	$I_{D(ON)}$	-10	-	-	A	$V_{DS} = -5\text{V}$, $V_{GS} = -4.5\text{V}$
Drain-Source On-Resistance ¹	$R_{DS(ON)}$	-	-	43	m Ω	$V_{GS} = -4.5\text{V}$, $I_D = -3.6\text{A}$
		-	-	54		$V_{GS} = -2.5\text{V}$, $I_D = -3.1\text{A}$
		-	-	120		$V_{GS} = -1.8\text{V}$, $I_D = -2.7\text{A}$
Forward Transconductance ¹	g_{FS}	-	12	-	S	$V_{DS} = -5\text{V}$, $I_D = -1.25\text{A}$
Diode Forward Voltage	V_{SD}	-	-0.60	-	V	$I_S = -0.46\text{A}$, $V_{GS} = 0\text{V}$
Dynamic ²						
Total Gate Charge	Q_g	-	12.0	-	nC	$I_D = -2.4\text{A}$ $V_{DS} = -5\text{V}$ $V_{GS} = -4.5\text{V}$
Gate-Source Charge	Q_{gs}	-	2.0	-		
Gate-Drain Charge	Q_{gd}	-	2.0	-		
Turn-On Delay Time	$T_{d(ON)}$	-	6.5	-	nS	$I_L = -1\text{A}$, $V_{DD} = -10\text{V}$ $V_{GEN} = -4.5\text{V}$ $R_G = 6\Omega$
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

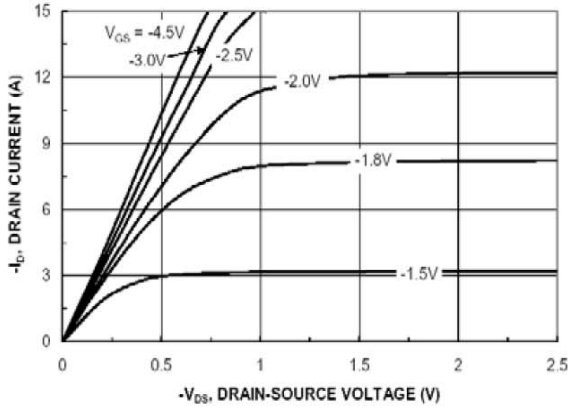


Figure 1. On-Region Characteristics

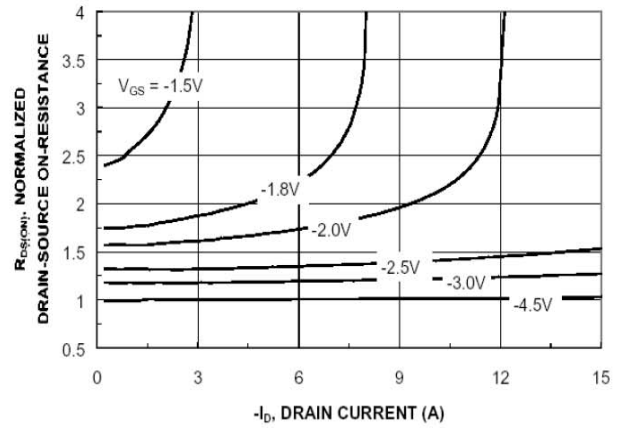


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage

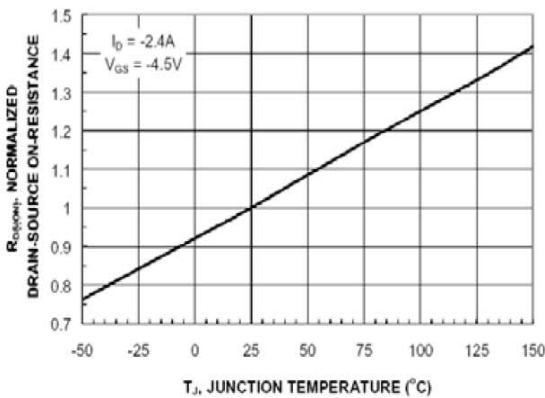


Figure 3. On-Resistance Variation with Temperature

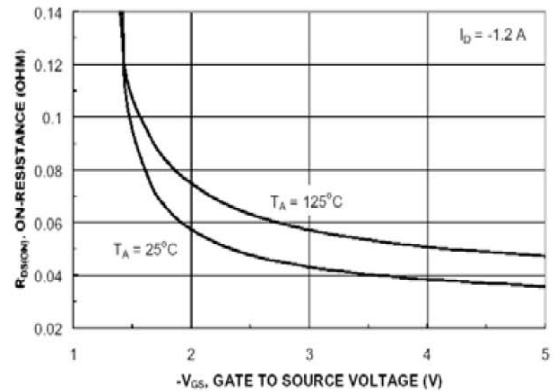


Figure 4. On-Resistance Variation with Gate to Source Voltage

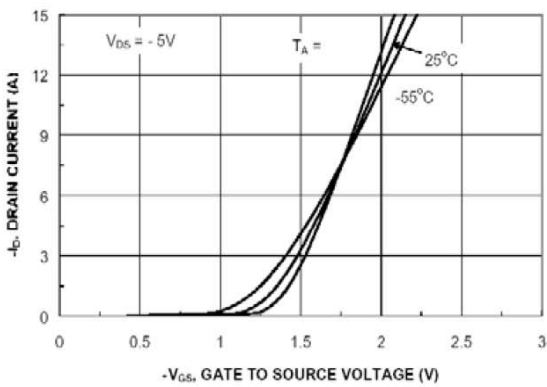


Figure 5. Transfer Characteristics

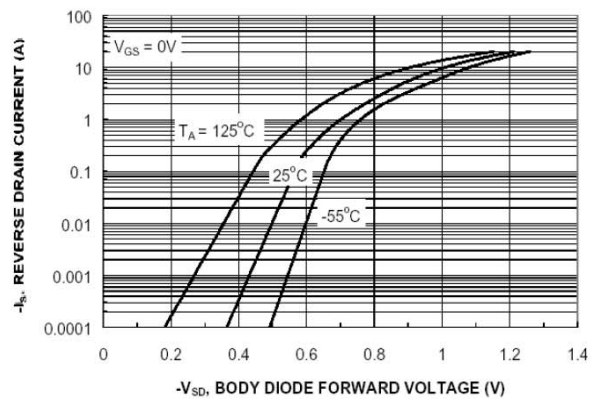


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

CHARACTERISTIC CURVE

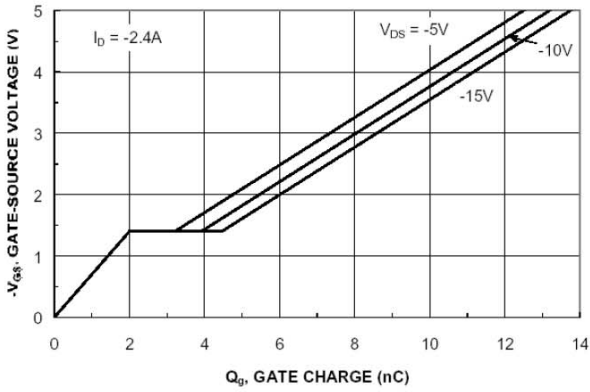


Figure 7. Gate Charge Characteristic

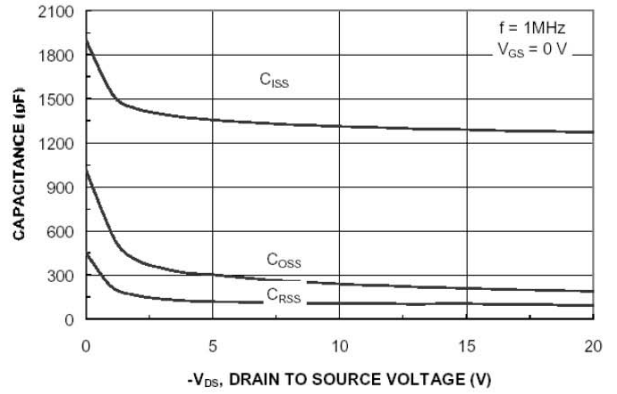


Figure 8. Capacitance Characteristic

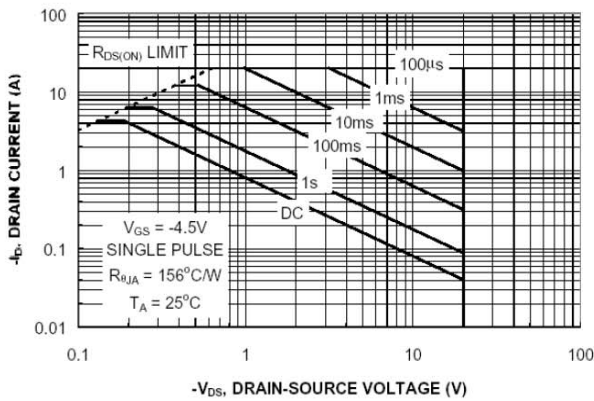


Figure 9. Maximum Safe Operating Area

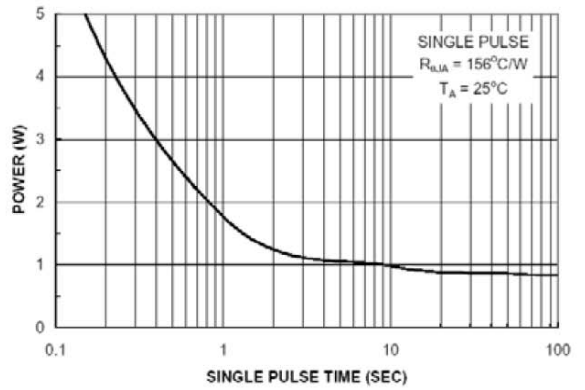


Figure 10. Single Pulse Maximum Power Dissipation

Normalized Thermal Transient Junction to Ambient

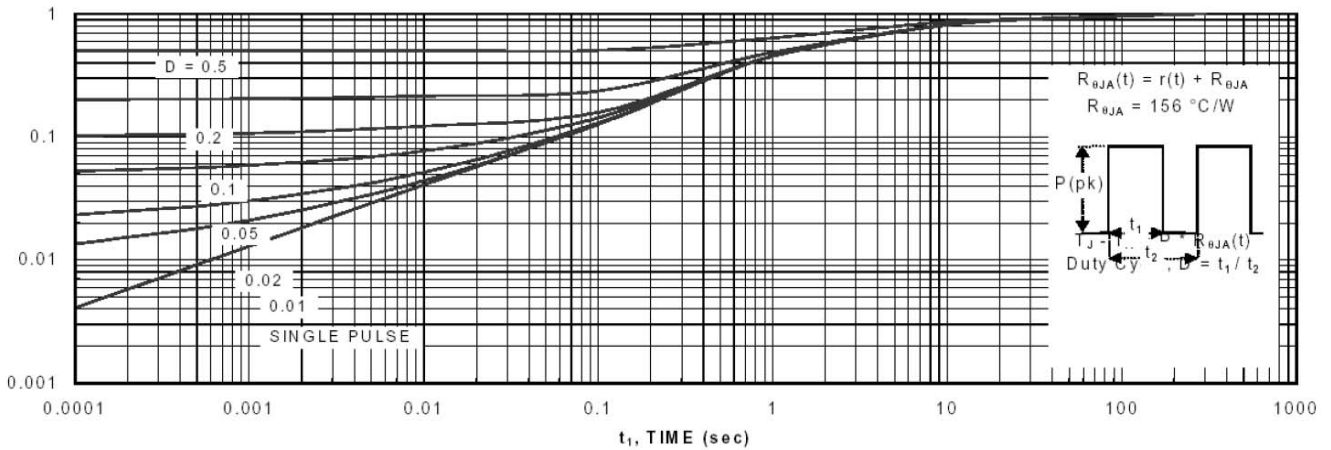


Figure 11. Transient Thermal Response Curve.