

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

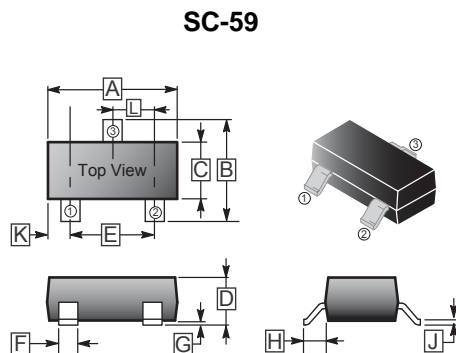
- Low $R_{DS(on)}$ provides higher efficiency and extends battery life.
- Low thermal impedance copper leadframe SC-59 saves board space.
- Fast switching speed.
- High performance trench technology.

APPLICATION

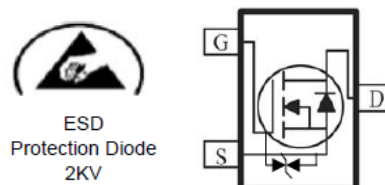
DC-DC converters and power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

PACKAGE INFORMATION

Package	MPQ	Leader Size
SC-59	3K	7 inch



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}	± 12	V
Continuous Drain Current ¹	I_D	$T_A=25^\circ\text{C}$	3.5
		$T_A=70^\circ\text{C}$	2.8
Pulsed Drain Current ²	I_{DM}	20	A
Continuous Source Current (Diode Conduction) ¹	I_S	1.9	A
Power Dissipation ¹	P_D	$T_A=25^\circ\text{C}$	1.3
		$T_A=70^\circ\text{C}$	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	$R_{\theta JA}$	$t \leq 10$ sec	100
		Steady-State	166

Notes

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

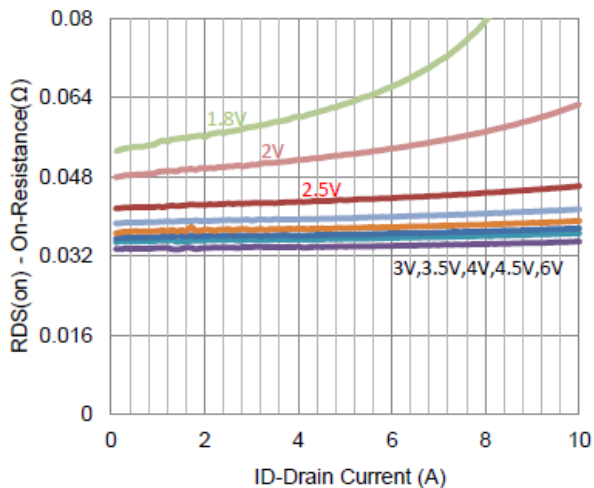
ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Teat Conditions
Static						
Gate-Threshold Voltage	$V_{GS(th)}$	1	-	-	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Gate-Body Leakage	I_{GSS}	-	-	± 10	nA	$V_{DS} = 0, V_{GS} = \pm 12\text{V}$
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1	μA	$V_{DS} = 16\text{V}, V_{GS} = 0$
		-	-	25		$V_{DS} = 16\text{V}, V_{GS} = 0, T_J = 55^\circ\text{C}$
On-State Drain Current ¹	$I_{D(ON)}$	7	-	-	A	$V_{DS} = 5\text{V}, V_{GS} = 4.5\text{V}$
Drain-Source On-Resistance ¹	$R_{DS(ON)}$	-	-	58	m Ω	$V_{GS} = 4.5\text{V}, I_D = 2.8\text{A}$
		-	-	82		$V_{GS} = 2.5\text{V}, I_D = 2.4\text{A}$
Forward Transconductance ¹	g_{FS}	-	10	-	S	$V_{DS} = 10\text{V}, I_D = 2.8\text{A}$
Diode Forward Voltage	V_{SD}	-	0.69	-	V	$I_S = 1\text{A}, V_{GS} = 0$
Dynamic ²						
Input Capacitance	C_{iss}		413		pF	$V_{DS} = 15\text{V},$ $V_{GS} = 0,$ $f = 1\text{MHz}$
Output Capacitance	C_{oss}		76			
Reverse Transfer Capacitance	C_{rss}		67			
Total Gate Charge	Q_g	-	6	-	nC	$I_D = 2.8\text{A}$ $V_{DS} = 10\text{V}$ $V_{GS} = 4.5\text{V}$
Gate-Source Charge	Q_{gs}	-	0.9	-		
Gate-Drain Charge	Q_{gd}	-	1.9	-		
Turn-On Delay Time	$T_{d(ON)}$	-	8	-	nS	$I_D = 2.8\text{A},$ $V_{DS} = 10\text{V}$ $V_{GEN} = 4.5\text{V}$ $R_L = 3.6\Omega,$ $R_{GEN} = 6\Omega$
Rise Time	T_r	-	21	-		
Turn-Off Delay Time	$T_{d(OFF)}$	-	49	-		
Fall Time	T_f	-	26	-		

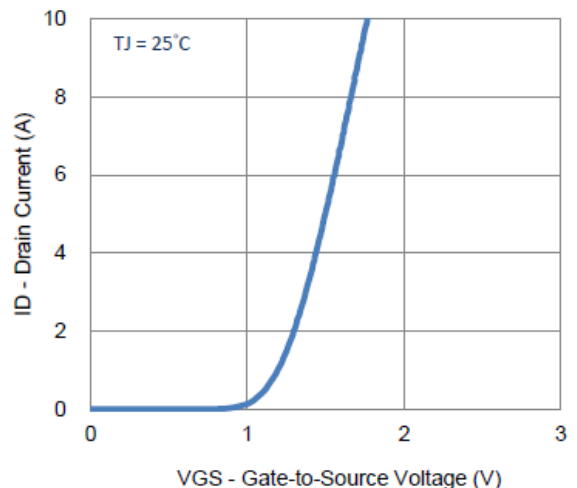
Notes

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

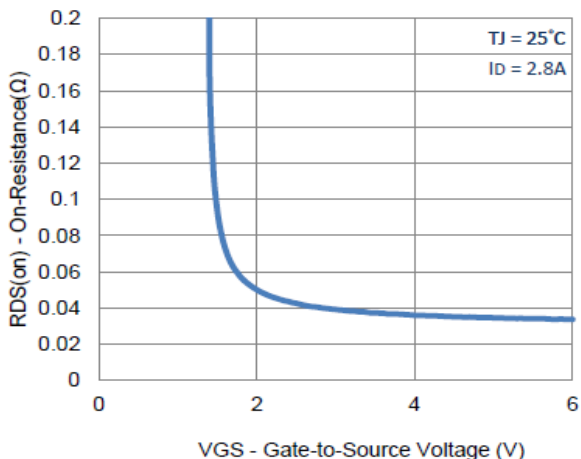
CHARACTERISTIC CURVE



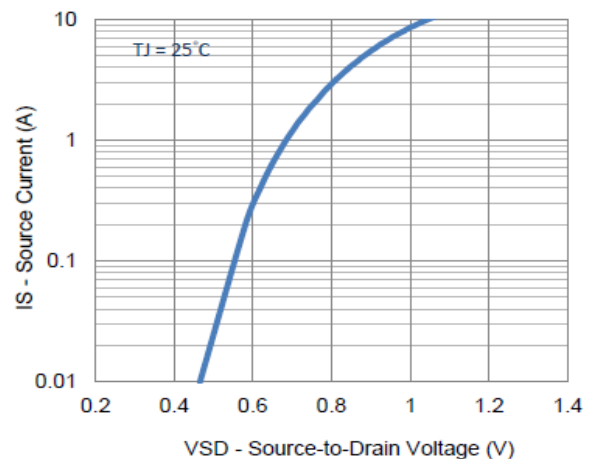
1. On-Resistance vs. Drain Current



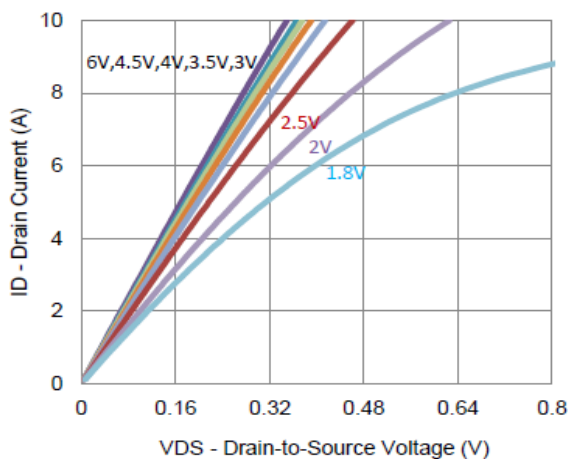
2. Transfer Characteristics



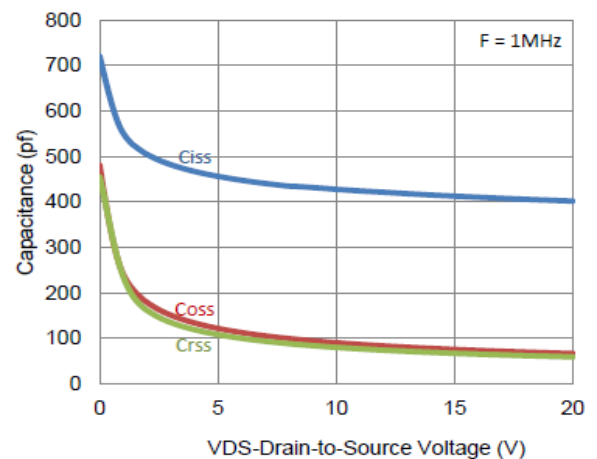
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

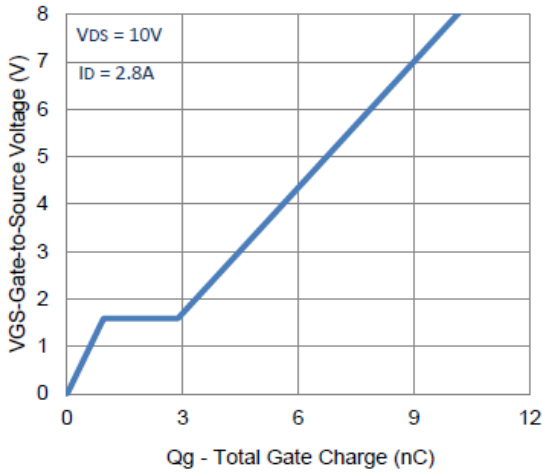


5. Output Characteristics

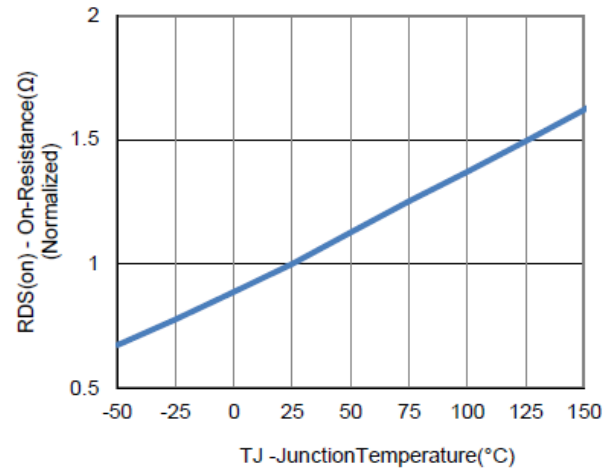


6. Capacitance

CHARACTERISTIC CURVE

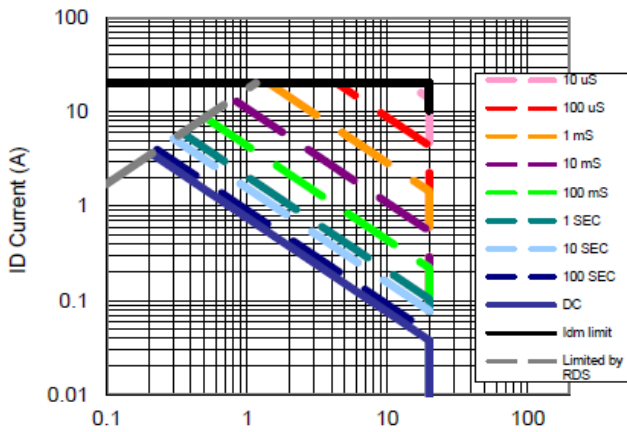


7. Gate Charge

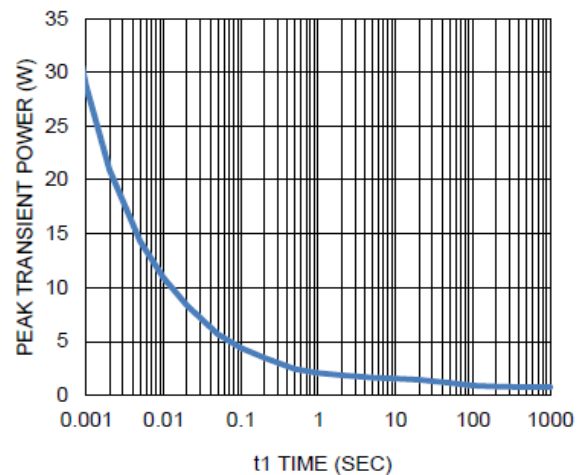


8. Normalized On-Resistance Vs Junction Temperature

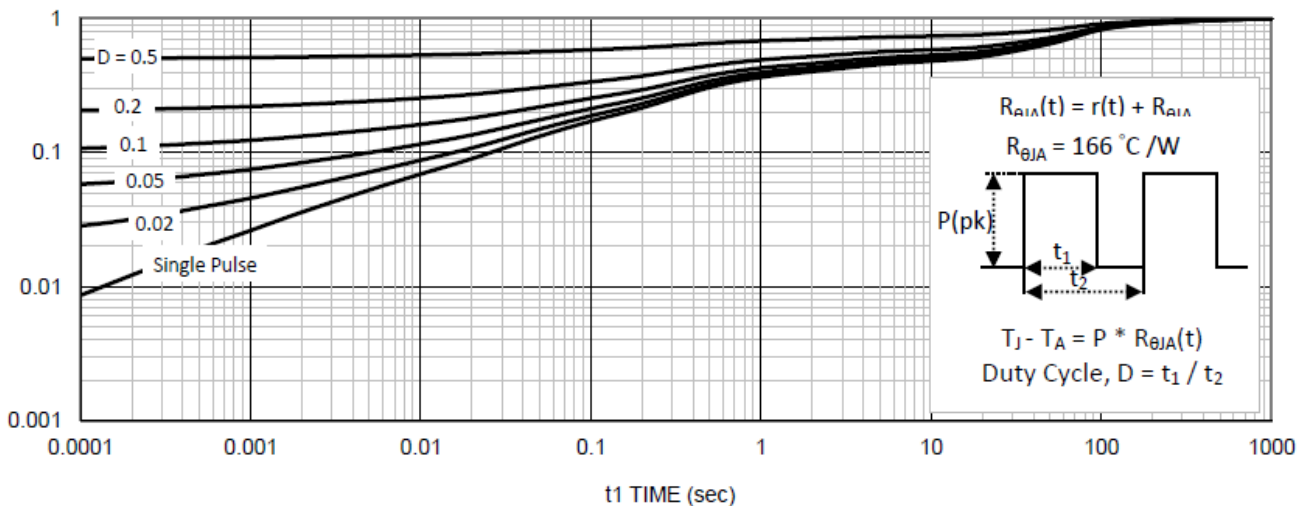
ID = 2.3A



9. Safe Operating Area



10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient