

SE47NS60R

N-Channel Enhancement-Mode Super Junction MOSFET

Revision: A

General Description

Thigh Density Cell Design For Ultra Low On-Resistance Fully Characterized Avalanche Voltage and Current Improved Shoot-Through FOM

- Simple Drive Requirement
- Small Package Outline
- Surface Mount Device

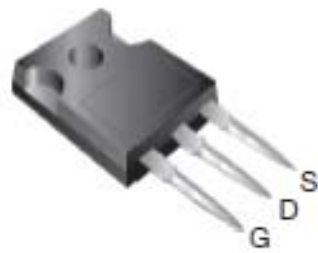
Features

For a single MOSFET

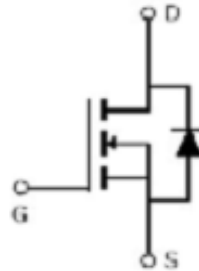
- $V_{DS} = 600V$
- $R_{DS(ON)} = 48.7m\Omega @ V_{GS}=10V$

Pin configurations

See Diagram below



TO-247



Absolute Maximum Ratings

Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DS}	630	V
Gate-Source Voltage		V_{GS}	± 30	V
Drain Current	Continuous	I_D	60.5	A
	Pulsed		182	
Total Power Dissipation	@TC=25°C	P_D	480	W
Operating Junction Temperature Range		T_J	-55 to 150	°C

Thermal Resistance

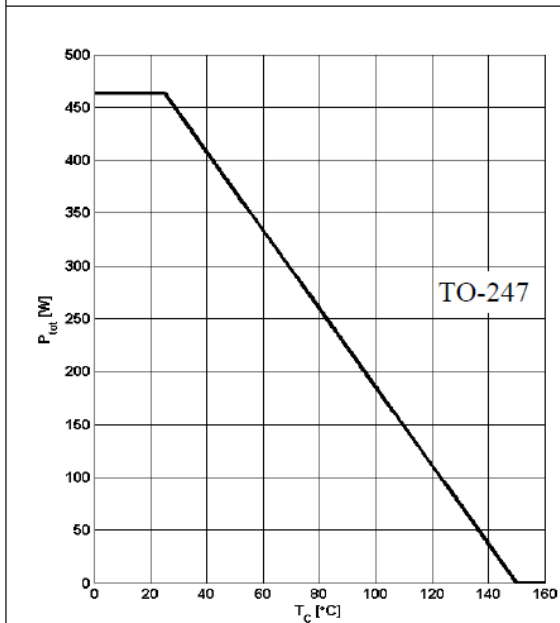
Symbol	Parameter	Min	Max	Units
$R_{\theta JC}$	Junction to Case		0.26	°C/W
$R_{\theta JA}$	Junction to Ambient ($t \leq 10s$)		62	°C/W

SE47NS60R

Electrical Characteristics (T _J =25°C unless otherwise noted)						
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS (Note 2)						
B _V DSS	Drain-Source Breakdown Voltage	I _D =250μA, V _{GS} =0 V	600			V
I _{DSS}	Drain to Source Leakage Current	V _{DS} = 600V, V _{GS} =0V			10	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =30V			100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D =250μA	2.2	3.2	4.2	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =17.6A		48.7	60	mΩ
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =50V, f=1MHz		4700		pF
C _{oss}	Output Capacitance			215		pF
C _{rss}	Reverse Transfer Capacitance			5.4		pF
SWITCHING PARAMETERS						
Q _g	Total Gate Charge ²	V _{GS} =10V, V _{DD} =480V, I _D =26A		27		nC
Q _{gs}	Gate Source Charge			41		nC
Q _{gd}	Gate Drain Charge			117		nC
t _{d(on)}	Turn-On Delay Time	V _{GS} =10V, V _{DS} =400V, R _{GEN} =1.8Ω I _D =26A		18		ns
t _{d(off)}	Turn-Off Delay Time			79		ns
t _{d(r)}	Turn-On Rise Time			20		ns
t _{d(f)}	Turn-Off Fall Time			12		ns
REVRESE DIODE CHARCTERISTICS						
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} =0V, I _{SD} =26A		0.94	1.1	V
t _{rr}	Reverse Recovery Time	V _R =100V, I _F =26A, dI _F /dt=100A/us		122		ns
Q _{rr}	Reverse Recovery Charge			809		nC
I _{rrm}	Peak Reverse Recovery Current			14.9		A

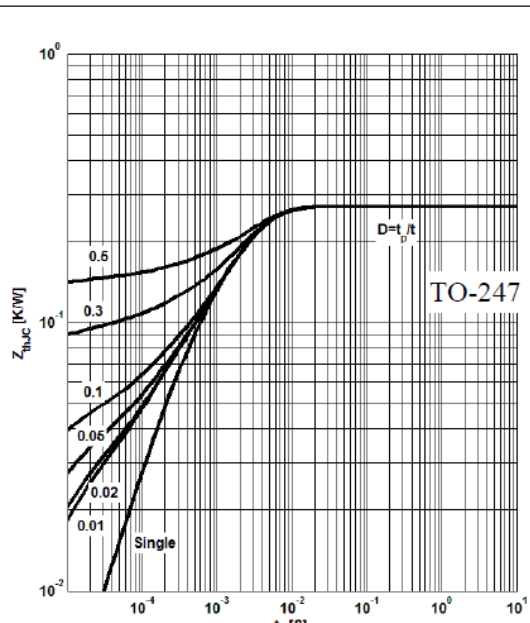
Typical Characteristics

Figure 1: Power Dissipation



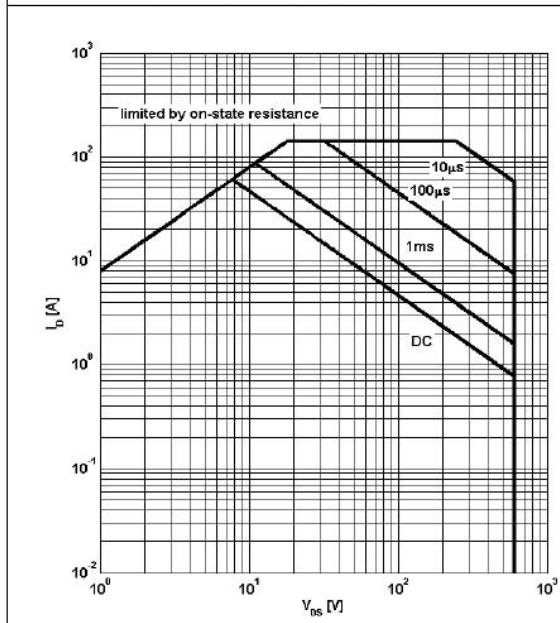
$P_{tot} = f(T_c)$

Figure 2: Max. Transient Thermal Impedance



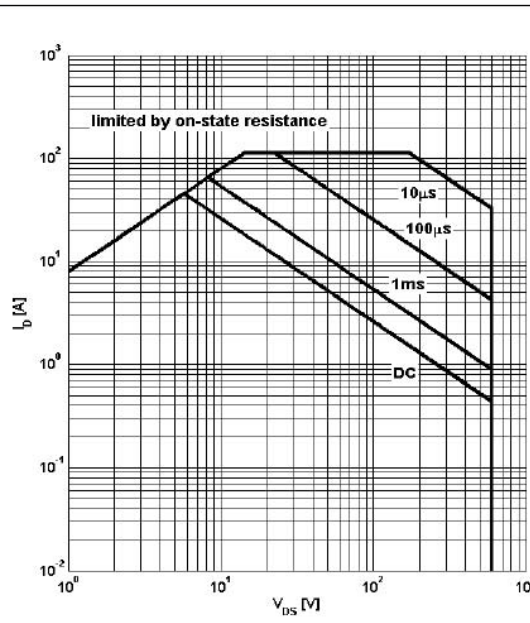
$Z_{(th)C} = f(t_p)$; parameter: $D = t_p/T$

Figure 3: Safe Operating Area



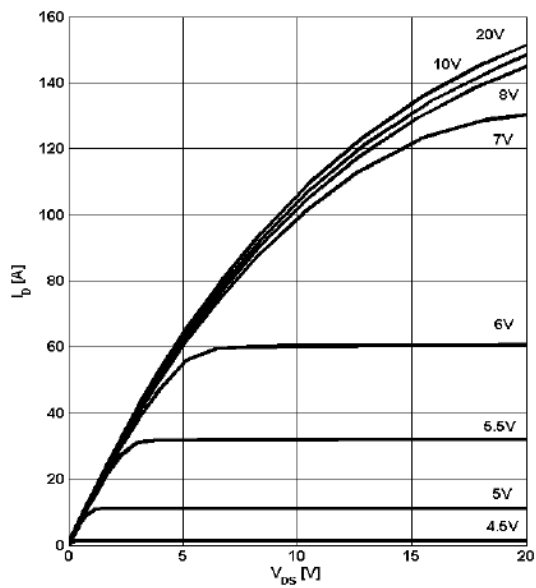
$I_D = f(V_{DS})$; $T_c = 25^\circ\text{C}$; $V_{GS} > 7\text{V}$; parameter t_p

Figure 4: Safe Operating Area



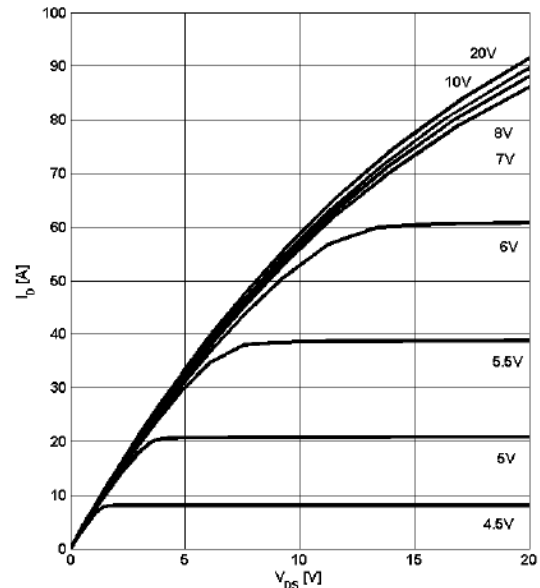
$I_D = f(V_{DS})$; $T_c = 80^\circ\text{C}$; $V_{GS} > 7\text{V}$; parameter t_p

Figure 5: Typ. Output Characteristics



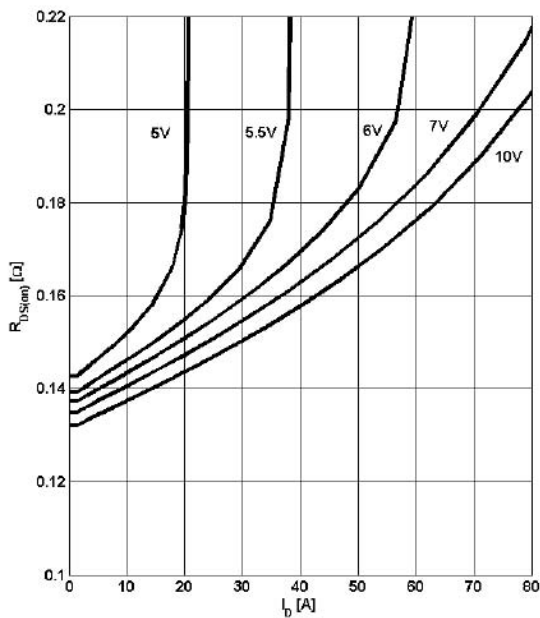
$I_D = f(V_{DS})$; $T_j = 25^\circ\text{C}$; parameter: V_{GS}

Figure 6: Typ. Output Characteristics



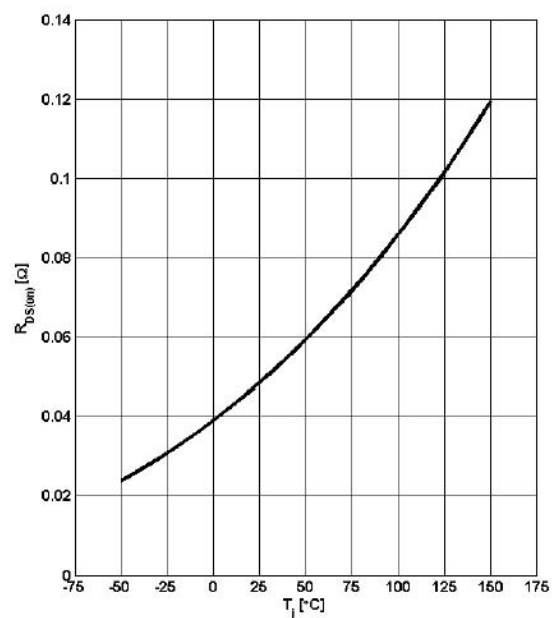
$I_D = f(V_{DS})$; $T_j = 125^\circ\text{C}$; parameter: V_{GS}

Figure 7: Typ. Drain-Source On-State Resistance



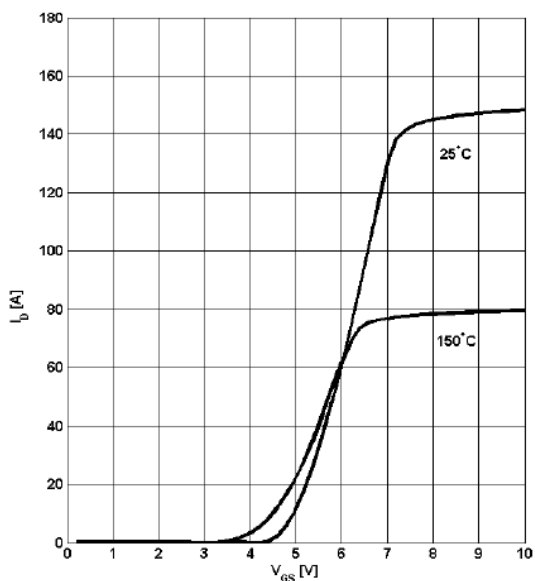
$R_{DS(ON)} = f(I_D)$; $T_j = 125^\circ\text{C}$; parameter: V_{GS}

Figure 8: Typ. Drain-Source On-State Resistance



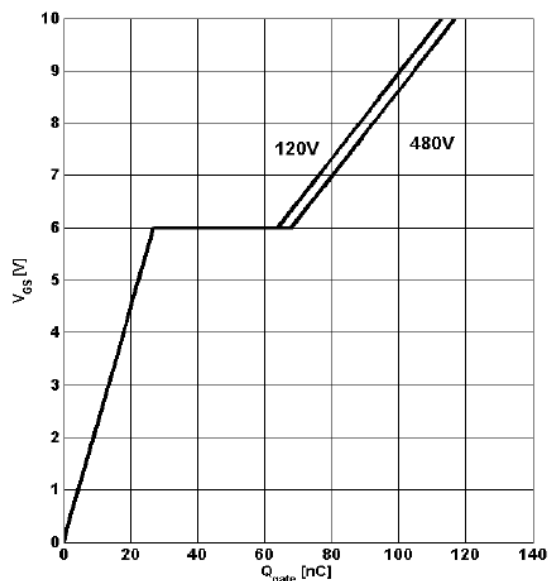
$R_{DS(ON)} = f(T_j)$; $I_D = 17.6\text{A}$; $V_{GS} = 10\text{V}$

Figure 9: Typ. Transfer Characteristics



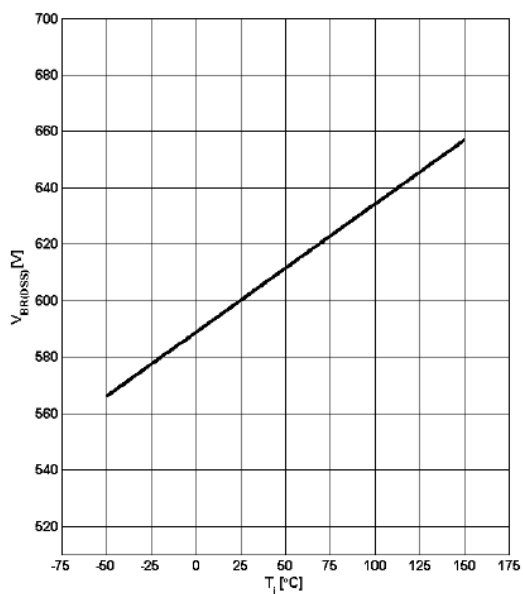
$I_D = f(V_{GS}); V_{DS} = 20V$

Figure 10: Typ. Gate Charge



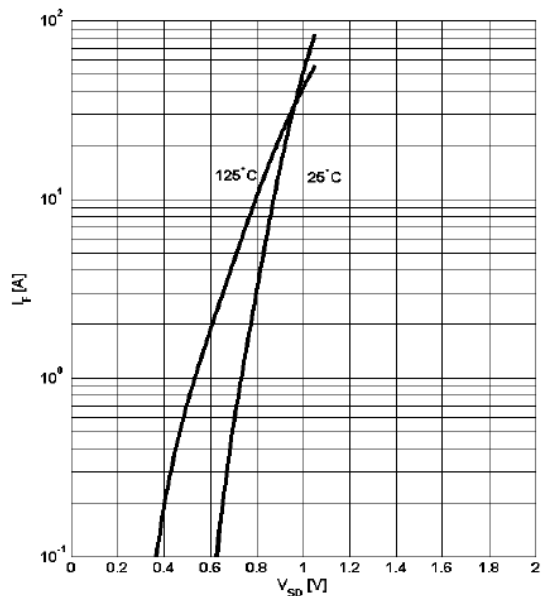
$V_{GS} = f(Q_{gate}), I_D = 26A \text{ pulsed}$

Figure 11: Drain-Source Breakdown Voltage



$V_{BR(DSS)} = f(T_j); I_D = 1mA$

Figure 12: Forward Characteristics of Reverse Diode

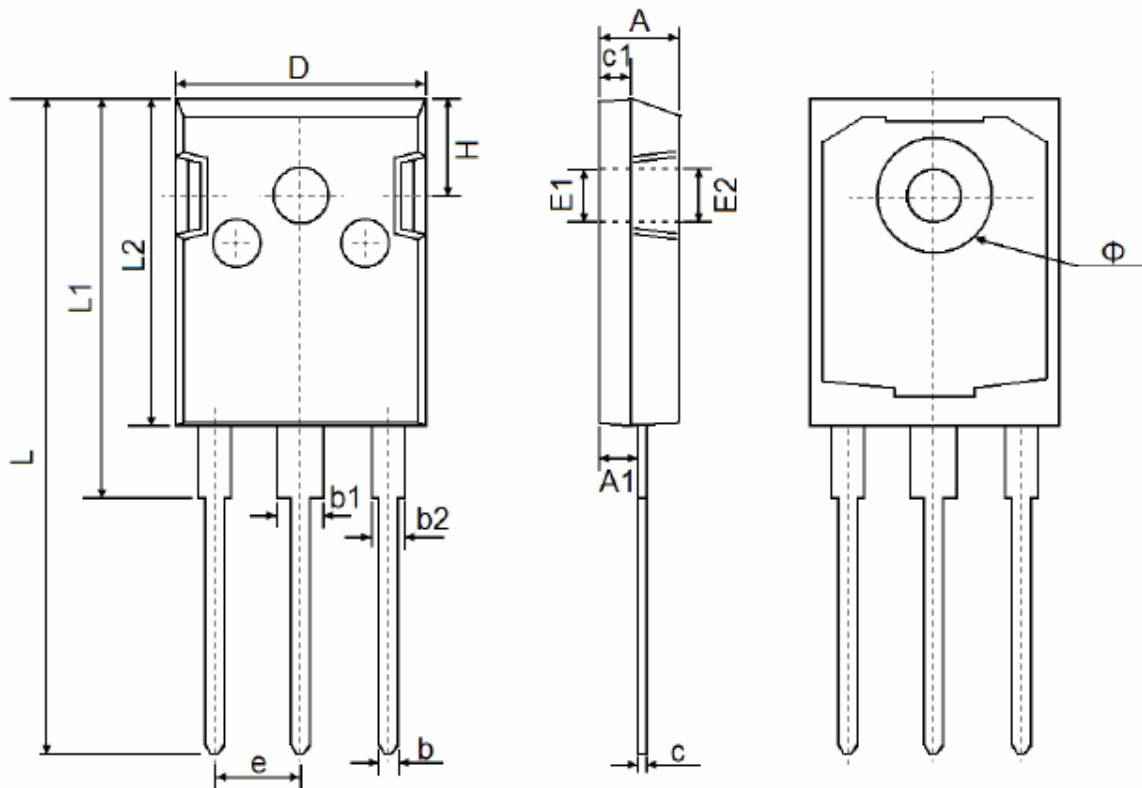


$I_F = f(V_{SD}); \text{parameter: } T_j$

SE47NS60R

Package Outline Dimension

TO-247



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.850	5.150	0.191	0.200
A1	2.200	2.600	0.087	0.102
b	1.000	1.400	0.039	0.055
b1	2.800	3.200	0.110	0.126
b2	1.800	2.200	0.071	0.087
c	0.500	0.700	0.020	0.028
c1	1.900	2.100	0.075	0.083
D	15.450	15.750	0.608	0.620
E1	3.500 REF		0.138 REF	
E2	3.600 REF		0.142 REF	
L	40.900	41.300	1.610	1.626
L1	24.800	25.100	0.976	0.988
L2	20.300	20.600	0.799	0.811
φ	7.100	7.300	0.280	0.287
e	5.450 TYP		0.215 TYP	
H	5.980 REF		0.235 REF	

The SINO-IC logo is a registered trademark of ShangHai Sino-IC Microelectronics Co., Ltd.

© 2005 SINO-IC - Printed in China - All rights reserved.

SHANGHAI SINO-IC MICROELECTRONICS CO., LTD

Add: Building 3, Room 3401-03, No.200 Zhangheng Road,
ZhangJiang Hi-Tech Park, Pudong, Shanghai 201203, China

Phone: +86-21-33932402 33932403

33932405 33933508 33933608

Fax: +86-21-33932401

Email: webmaster@sino-ic.com

Website: <http://www.sino-ic.com>