

SE12060GA

N-Channel Enhancement-Mode 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

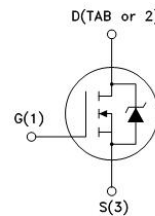
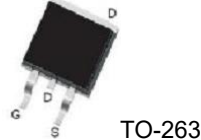
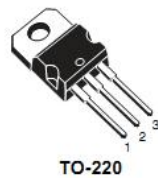
Features

For a single MOSFET

- $V_{DS} = 120V$
- $R_{DS(ON)} = 12m\Omega @ V_{GS}=10V$

Pin configurations

See Diagram below



Absolute Maximum Ratings

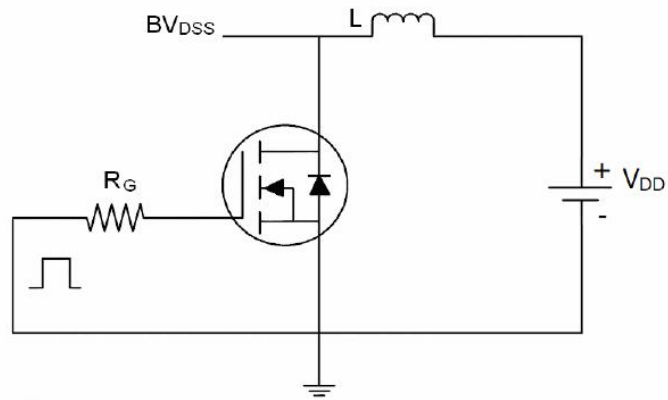
Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DS}	120	V
Gate-Source Voltage		V_{GS}	± 25	V
Drain Current	Continuous	I_D	60	A
	Pulsed		240	
Total Power Dissipation	@TA=25°C	P_D	214	W
Operating Junction Temperature Range		T_J	-55 to 175	°C

SE12060GA

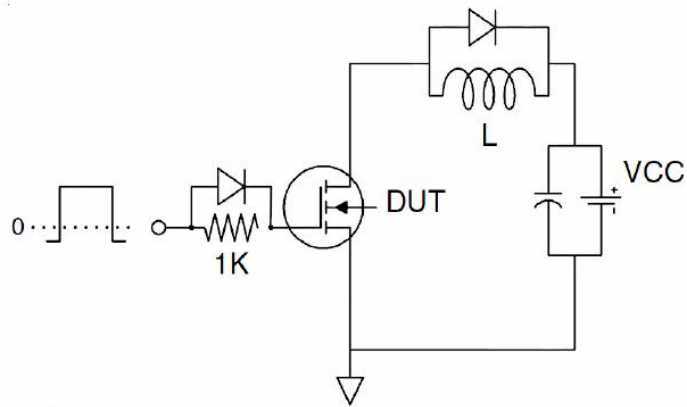
Electrical Characteristics (T _J =25°C unless otherwise noted)						
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS (Note 2)						
B _V DSS	Drain-Source Breakdown Voltage	I _D =250μA, V _{GS} =0 V	120			V
I _{DSS}	Drain to Source Leakage Current	V _{DS} =120V, V _{GS} =0V			1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =20V			100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D =250μA	1.0		2.5	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =20A	-	12	14	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =20A		65		S
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =60V, f=1MHz		4470		pF
C _{oss}	Output Capacitance			235		pF
C _{rss}	Reverse Transfer Capacitance			9.5		pF
SWITCHING PARAMETERS						
Q _g	Total Gate Charge ²	V _{GS} =10V, V _{DS} =60V, I _D =20A		56		nC
Q _{gs}	Gate Source Charge			18		nC
Q _{gd}	Gate Drain Charge			6		nC
t _{d(on)}	Turn-On Delay Time	V _{GS} =10V, V _{DS} =60V, R _{GEN} =10Ω I _D =20A		16		ns
t _{d(off)}	Turn-Off Delay Time			38		ns
t _{d(r)}	Turn-On Rise Time			21		ns
t _{d(f)}	Turn-Off Fall Time			19		ns

Test Circuits and Waveform

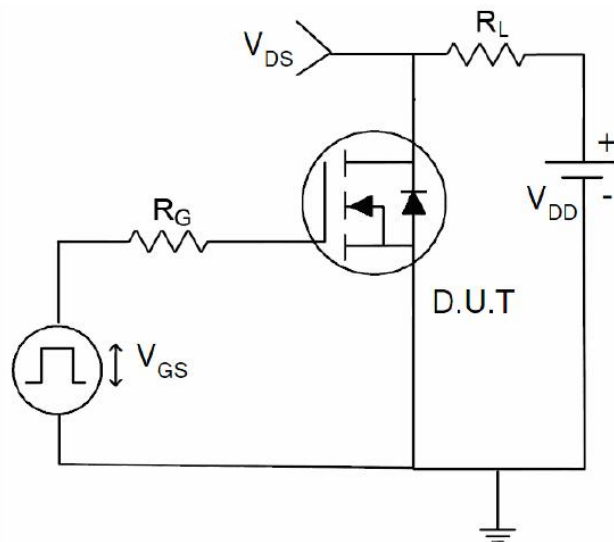
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



SE12060GA

Typical Characteristics

Fig 1. Typical Output Characteristics

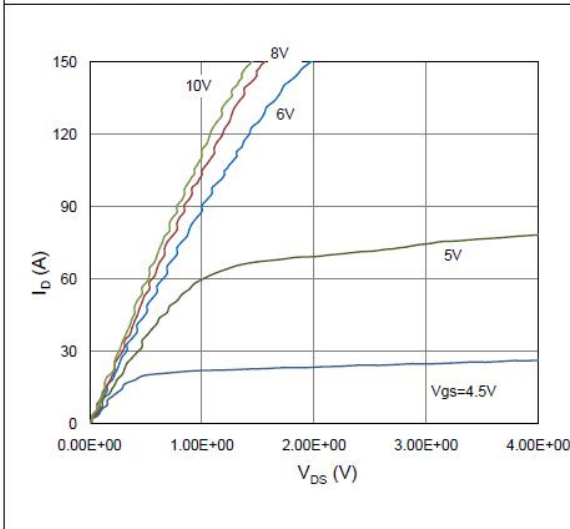


Figure 2. On-Resistance vs. Gate-Source Voltage

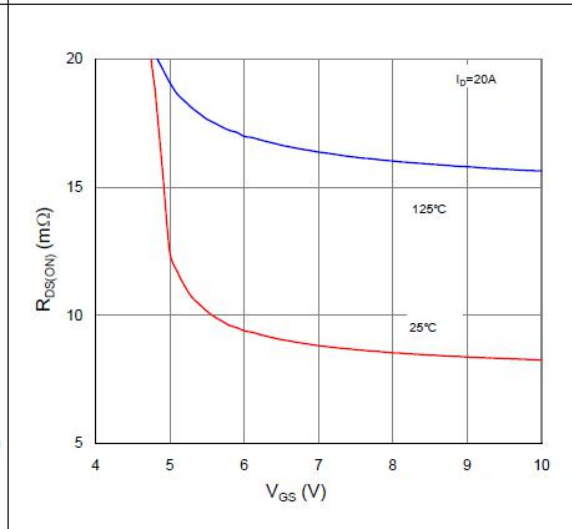


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

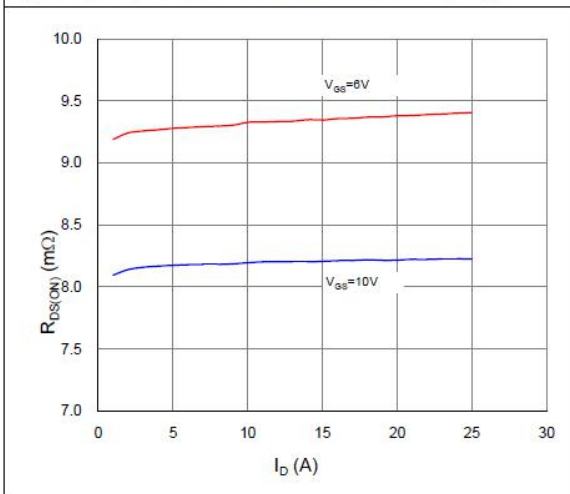


Figure 4. Normalized On-Resistance vs. Junction Temperature

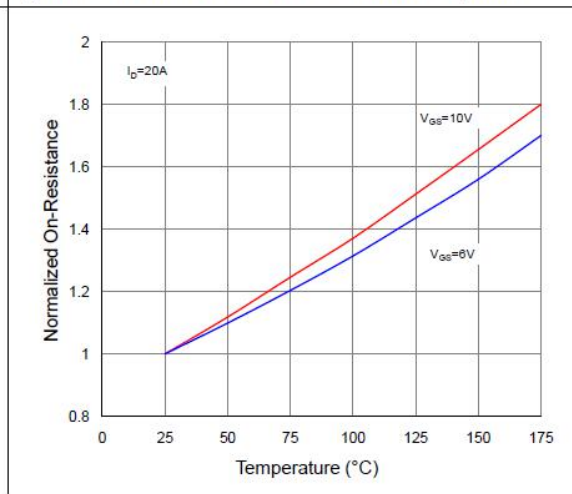


Figure 5. Typical Transfer Characteristics

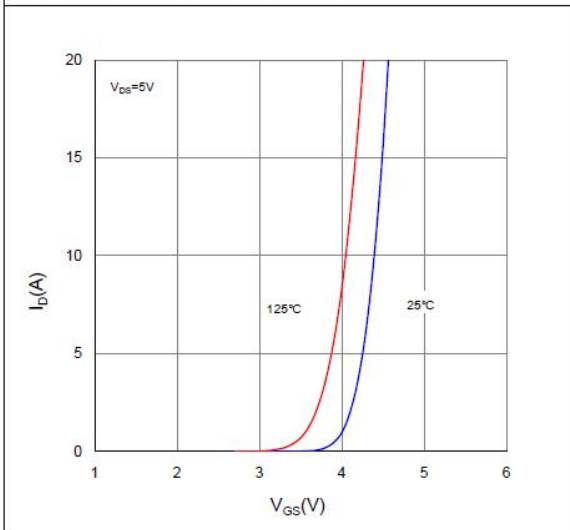
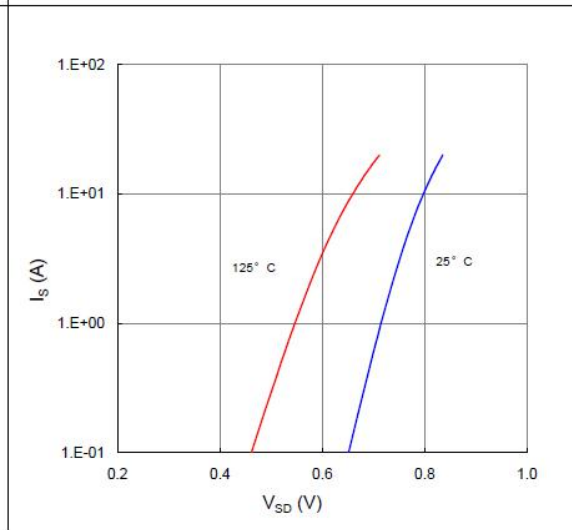


Figure 6. Typical Source-Drain Diode Forward Voltage



Typical Characteristics

Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

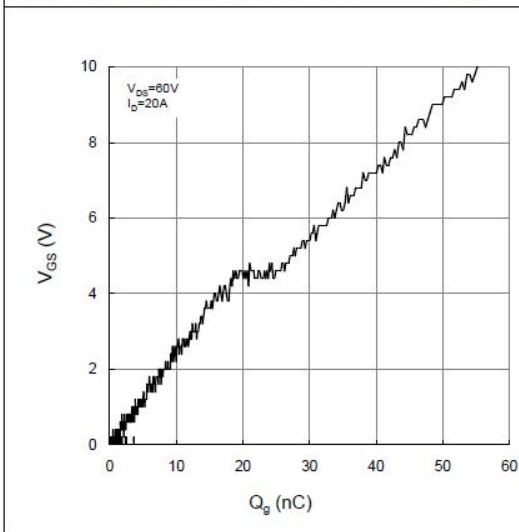


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

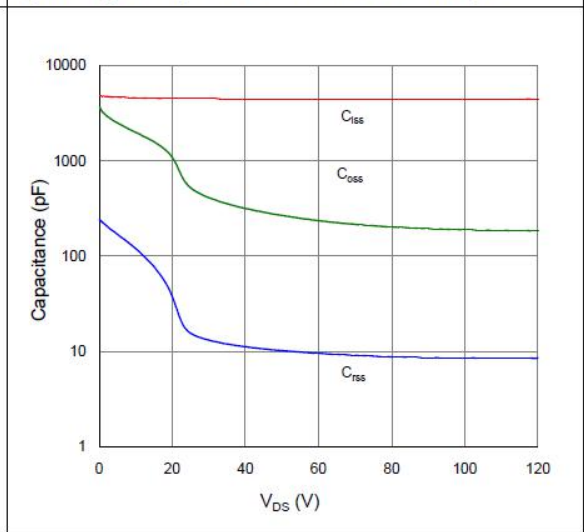


Figure 9. Maximum Safe Operating Area

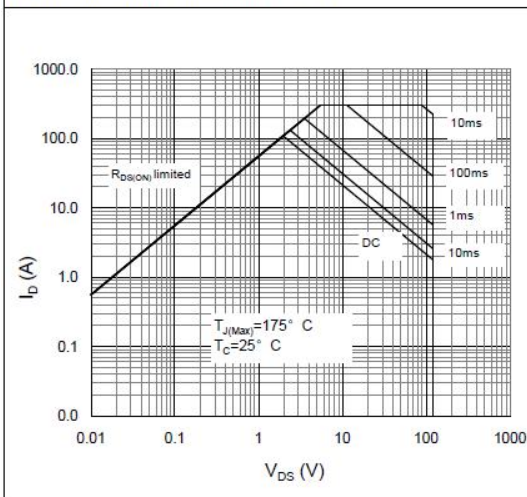


Figure 10. Maximum Drain Current vs. Case Temperature

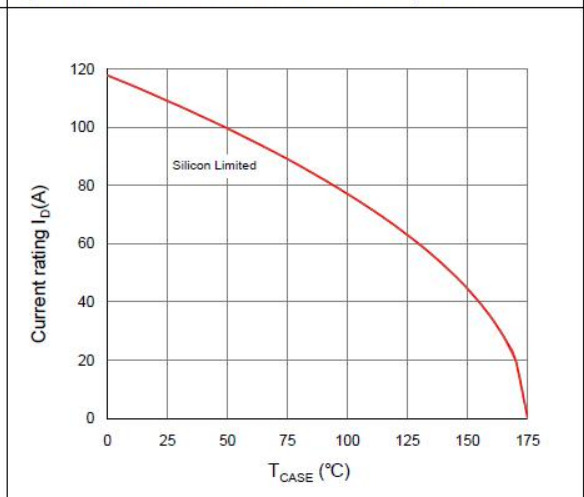
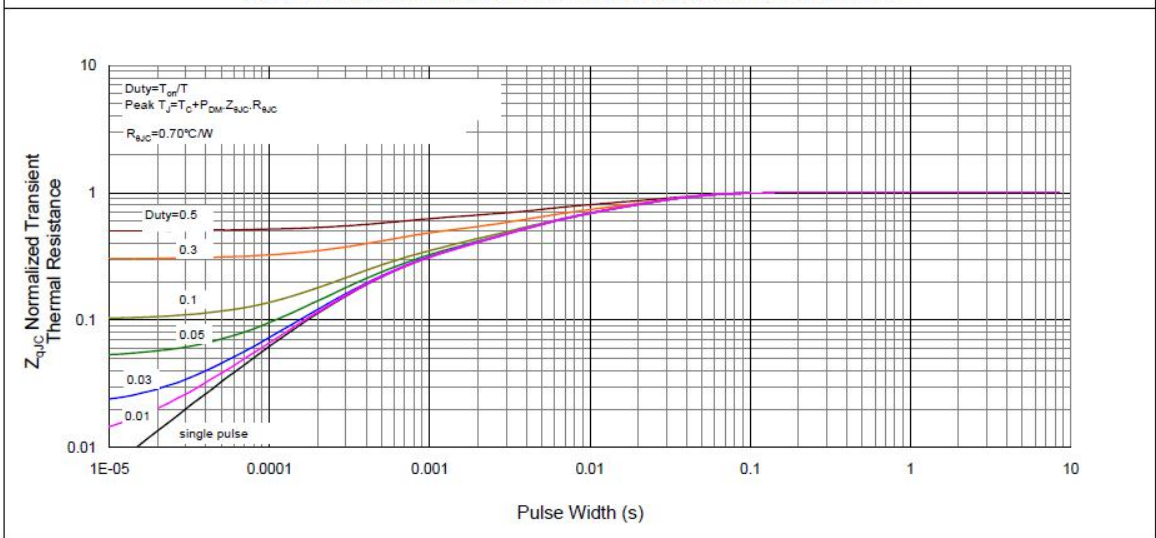


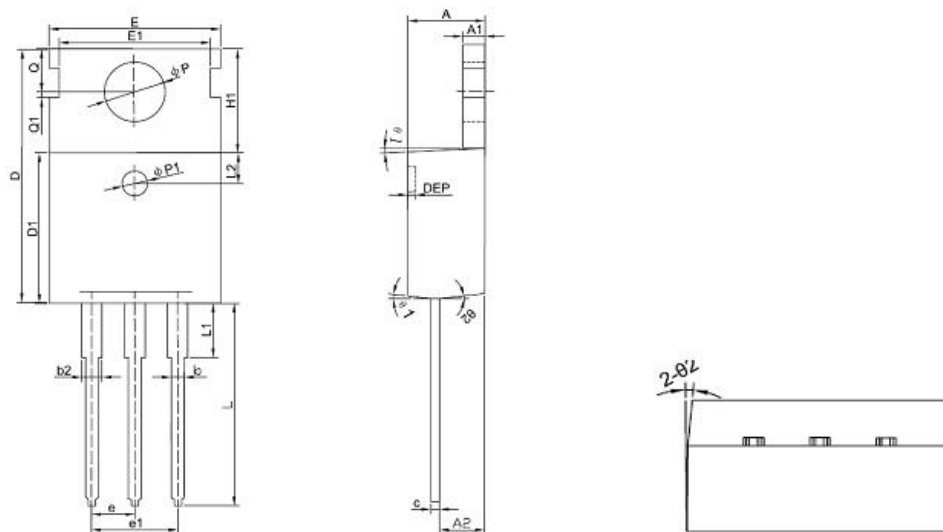
Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case



SE12060GA

Package Outline Dimension

TO-220



Symbol	Dimension In Millimeters			Dimension In Inches		
	Min	Nom	Max	Min	Nom	Max
A	4.400	4.550	4.700	0.173	0.179	0.185
A1	1.270	1.300	1.330	0.050	0.051	0.052
A2	2.590	2.690	2.790	0.102	0.106	0.110
b	0.770	-	0.900	0.030	-	0.035
b2	1.230	-	1.360	0.048	-	0.054
c	0.480	0.500	0.520	0.019	0.020	0.020
D	15.100	15.400	15.700	-	0.606	-
D1	9.000	9.100	9.200	0.354	0.358	0.362
DEP	0.050	0.285	0.520	0.002	0.011	0.020
E	10.060	10.160	10.260	0.396	0.400	0.404
E1	-	8.700	-	-	0.343	-
$\Phi P1$	1.400	1.500	1.600	0.055	0.059	0.063
e	2.54BSC			0.1BSC		
e1	5.08BSC			0.2BSC		
H1	6.100	6.300	6.500	0.240	0.248	0.256
L	12.750	12.960	13.170	0.502	0.510	0.519
L1	-	-	3.950	-	-	0.156
L2	1.85REF			0.073REF		
ΦP	3.570	3.600	3.630	0.141	0.142	0.143
Q	2.730	2.800	2.870	0.107	0.110	0.113
Q1	-	0.200	-	-	0.008	-
$\theta 1$	5 ⁰	7 ⁰	9 ⁰	5 ⁰	7 ⁰	9 ⁰
$\theta 2$	1 ⁰	3 ⁰	5 ⁰	1 ⁰	3 ⁰	5 ⁰

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.net

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