

SE4060GB

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

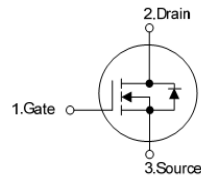
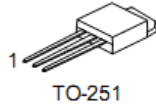
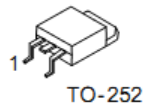
Features

For a single MOSFET

- $V_{DS} = 45V$
- $R_{DS(ON)} = 7.5m\Omega @ V_{GS}=10V$

Pin configurations

See Diagram below



Absolute Maximum Ratings

Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DS}	45	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current	Continuous	I_D	56	A
	Pulsed		150	
Avalanche Energy Single Pulsed ³		E_{AS}	20	mJ
Power Dissipation		P_D	62.5	W
Operating Junction Temperature Range		T_J	-55 to 150	$^{\circ}C$

Thermal Resistance

Symbol	Parameter	SE4060G	Units
$R_{\theta JA}$	Junction to Ambient	50	$^{\circ}C/W$

SE4060GB

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	V _{GS} =0 V, I _D =250μA,	45			V	
I _{DSS}	Drain to Source Leakage Current	V _{DS} = 500V, V _{GS} =0V			1	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	1.0	1.55	2.2	V	
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =20A		7.5	9.5	mΩ	
		V _{GS} =4.5V, I _D =10A		10	14		
g _{FS}	Transconductance	V _{DS} =5V, I _D =20A		25		S	
DYNAMIC PARAMETERS							
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =20V, f=1MHz		942		pF	
C _{oss}	Output Capacitance				309		pF
C _{rss}	Reverse Transfer Capacitance				29		pF
SWITCHING PARAMETERS							
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =20V, I _D =10A		14.5		nC	
Q _{gs}	Gate Source Charge				2		nC
Q _{gd}	Gate Drain Charge				2.5		nC
t _{d(on)}	Turn-On Delay Time	V _{DS} =20V, R _{GEN} =10Ω I _D =10A		6		ns	
t _{d(off)}	Turn-Off Delay Time				21		ns
t _{d(r)}	Turn-On Rise Time				5		ns
t _{d(f)}	Turn-Off Fall Time				5		ns
Source-Drain Diode Characteristics							
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} =0V, I _S =20A		0.9	1.2	V	
t _{rr}	Reverse Recovery Time	V _{GS} =0V, I _S =10A		24		ns	
Q _{RR}	Reverse Recovery Charge	di _F /dt=100A/μs ¹		19		nC	

Typical Characteristics

Fig 1. Typical Output Characteristics

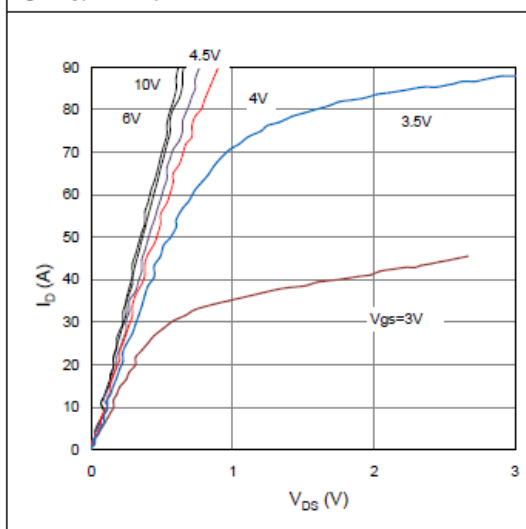


Figure 2. On-Resistance vs. Gate-Source Voltage

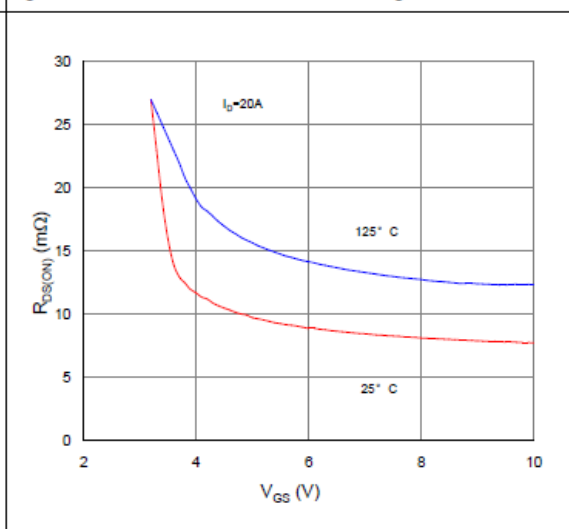


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

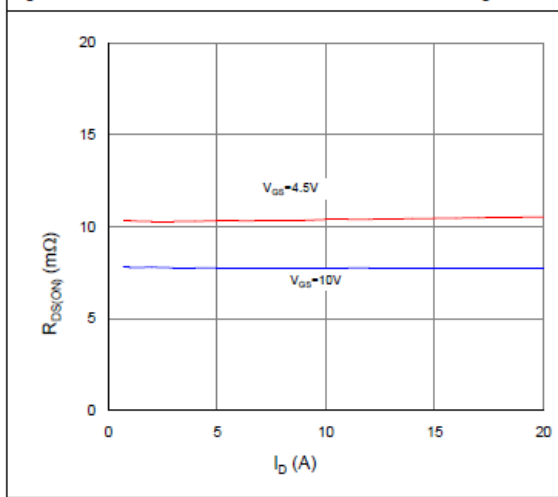


Figure 4. Normalized On-Resistance vs. Junction Temperature

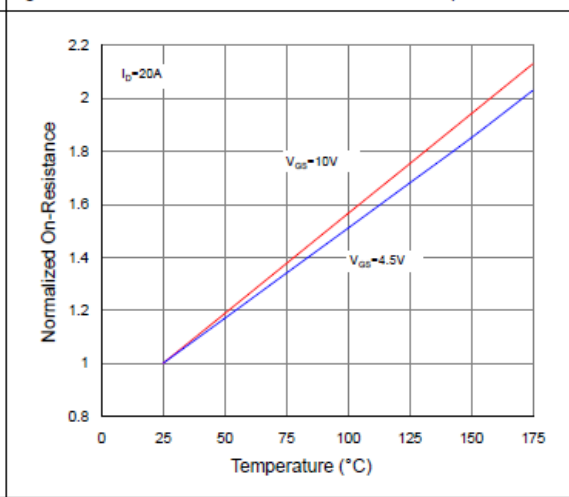


Figure 5. Typical Transfer Characteristics

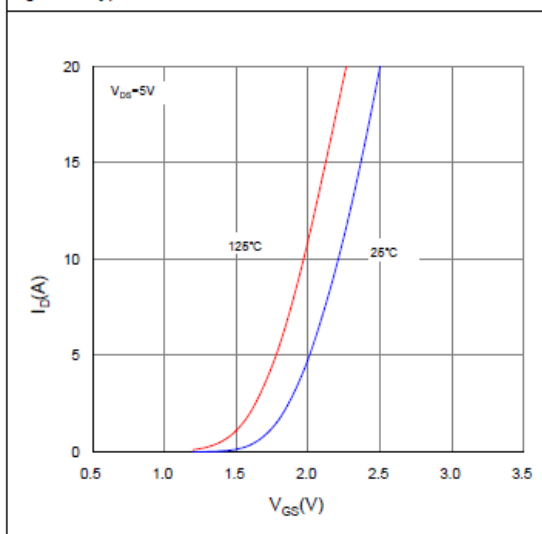
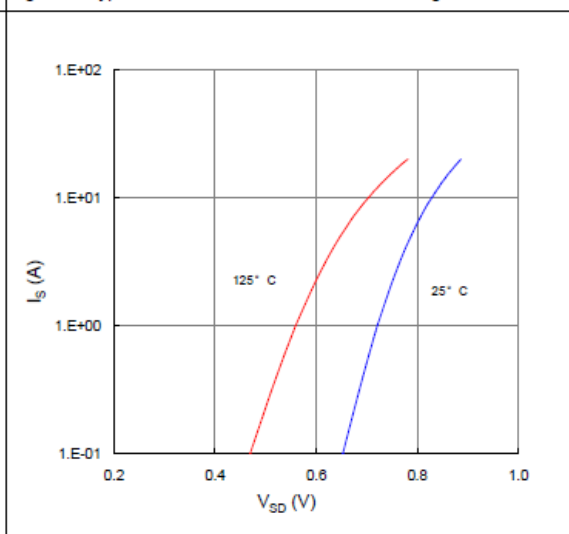


Figure 6. Typical Source-Drain Diode Forward Voltage



Typical Characteristics

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

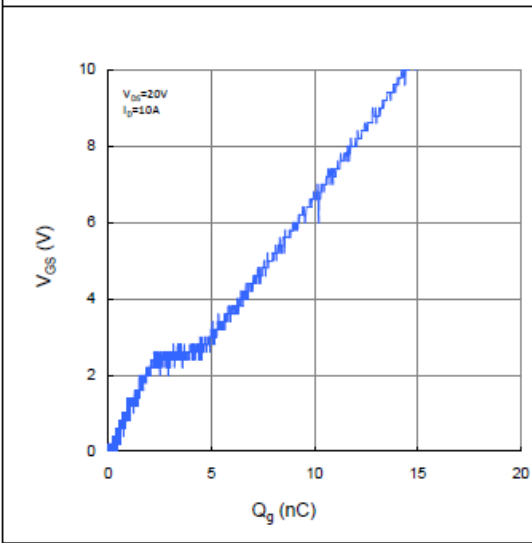


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

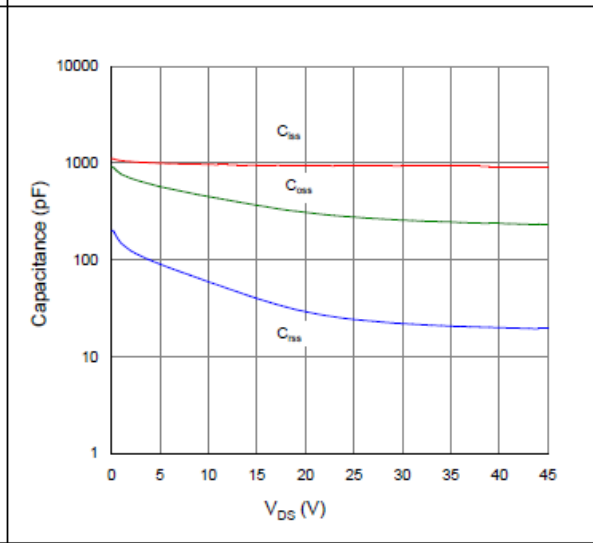


Figure 9. Maximum Safe Operating Area

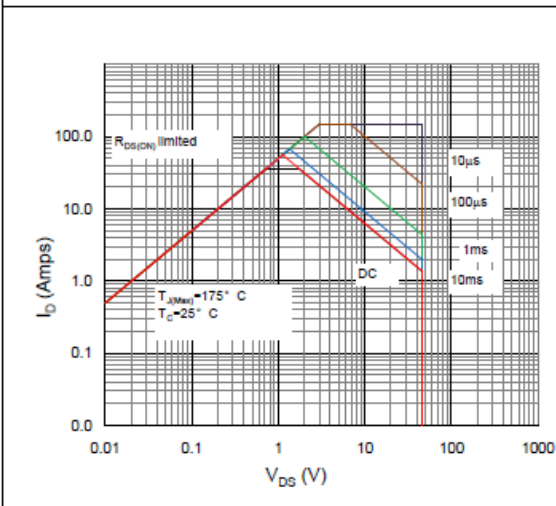


Figure 10. Maximum Drain Current vs. Case Temperature

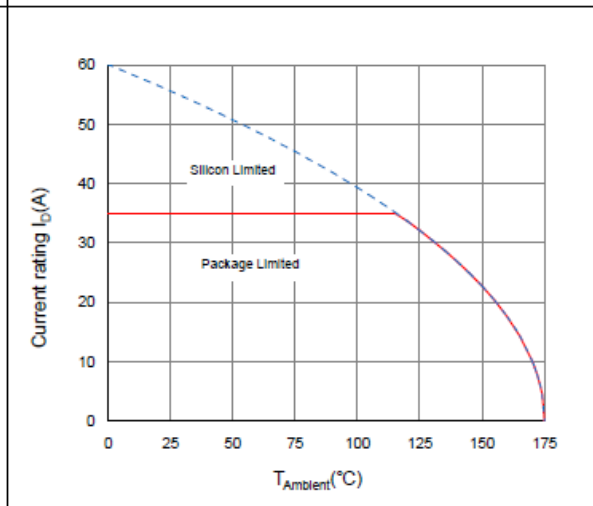
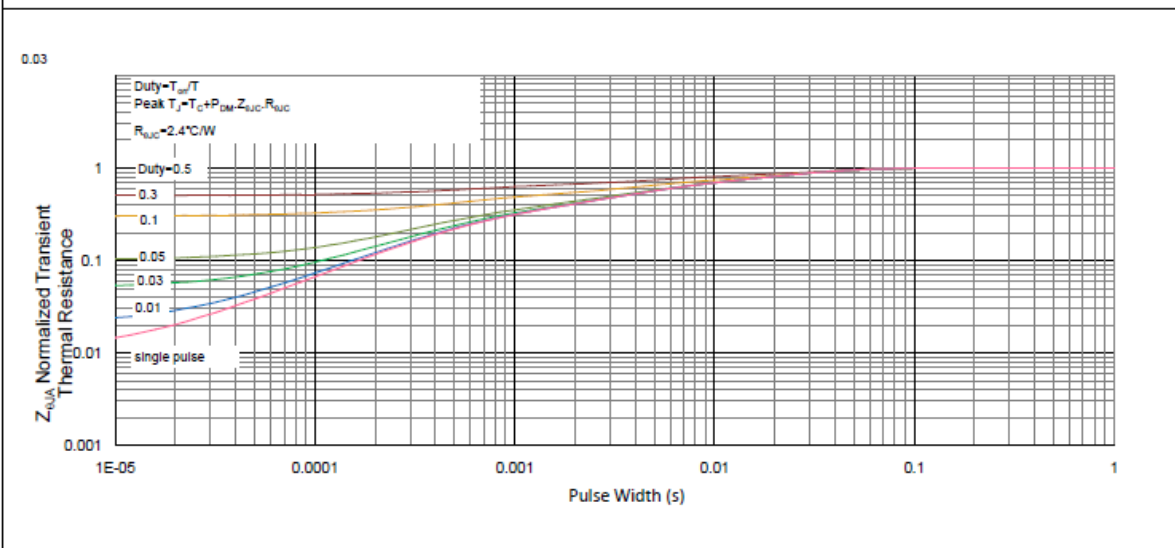


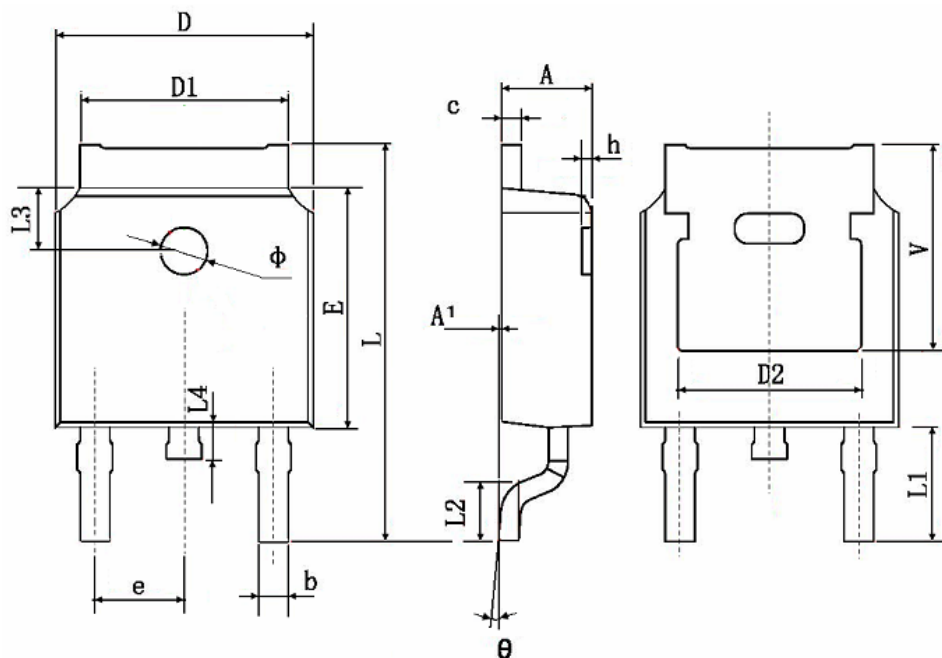
Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient



SE4060GB

Package Outline Dimension

TO-252

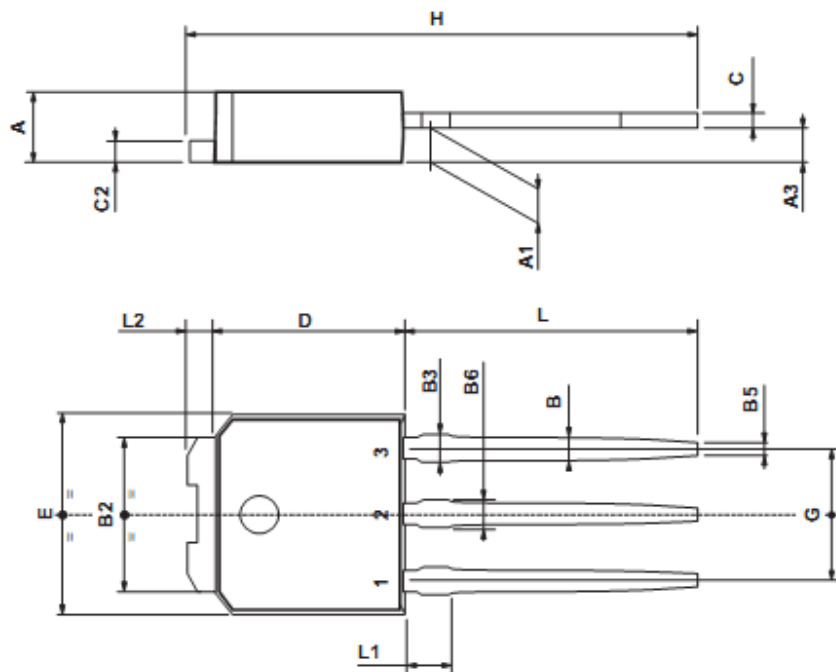


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	0.483 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	

SE4060GB

Package Outline Dimension

TO-251



DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	2.2		2.4	0.086		0.094
A1	0.9		1.1	0.035		0.043
A3	0.7		1.3	0.027		0.051
B	0.64		0.9	0.025		0.031
B2	5.2		5.4	0.204		0.212
B3			0.85			0.033
B5		0.3			0.012	
B6			0.95			0.037
C	0.45		0.6	0.017		0.023
C2	0.48		0.6	0.019		0.023
D	6		6.2	0.236		0.244
E	6.4		6.6	0.252		0.260
G	4.4		4.6	0.173		0.181
H	15.9		16.3	0.626		0.641
L	9		9.4	0.354		0.370
L1	0.8		1.2	0.031		0.047
L2		0.8	1		0.031	0.039

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