

SE138U

N-Channel Enhancement-Mode MOSFET

Revision: B

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

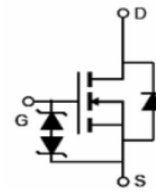
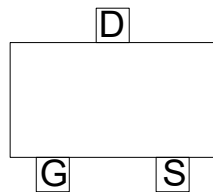
Features

For a single MOSFET

- $V_{DS} = 60V$
- $R_{DS(ON)} = 0.7\Omega @ V_{GS}=10V$

Pin configurations

See Diagram below



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Absolute Maximum Ratings

Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current	Continuous	I_D	0.22	A
	Pulsed ¹		0.88	
Total Power Dissipation	@TA=25°C	P_D	0.36	W
Operating Junction Temperature Range		T_J	-55 to 150	°C

Thermal Resistance

Symbol	Parameter	Typ	Max	Units
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	-	350	°C/W

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Electrical Characteristics (T _J =25°C unless otherwise noted)						
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS (Note 2)						
BV _{DSS}	Drain-Source Breakdown Voltage	I _D =250μA, V _{GS} =0 V	60			V
I _{DSS}	Drain to Source Leakage Current	V _{DS} = 30V, V _{GS} =0V			100	nA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =20V			100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D =1mA	0.8	1.3	1.5	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =0.22A	-	0.7	1.6	Ω
		V _{GS} =4.5V, I _D =0.22A		1.0	3.6	
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V, f=1MHz		27		pF
C _{oss}	Output Capacitance			13		pF
C _{rss}	Reverse Transfer Capacitance			6		pF
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =10V, V _{DS} =25V, I _D =0.22A		1.7	2.4	nC
Q _{gs}	Gate Source Charge			0.1		nC
Q _{gd}	Gate Drain Charge			0.4		nC
t _{d(on)}	Turn-On Delay Time	V _{GS} =10V, V _{DS} =30V, R _{GEN} =6Ω, I _D =0.29A		2.5	5	ns
t _{d(off)}	Turn-Off Delay Time			20	36	ns
t _{d(r)}	Turn-On Rise Time			9	18	ns
t _{d(f)}	Turn-Off Fall Time			7	14	ns
Source-Drain Diode						
Symbol	Parameter	Test Condition	Min	Typ	Max	Units
I _s	Source Current	IF=0.44A, V _{DS} =0V, dI/dt=100A/μs			0.22	A
V _{SD}	Diode Forward Voltage				0.8	1.4

Typical Characteristics

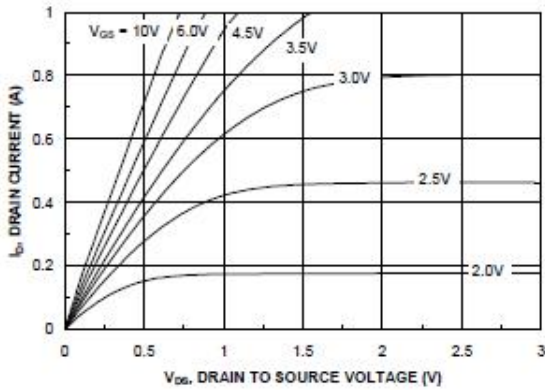


Figure 1. On-Region Characteristics.

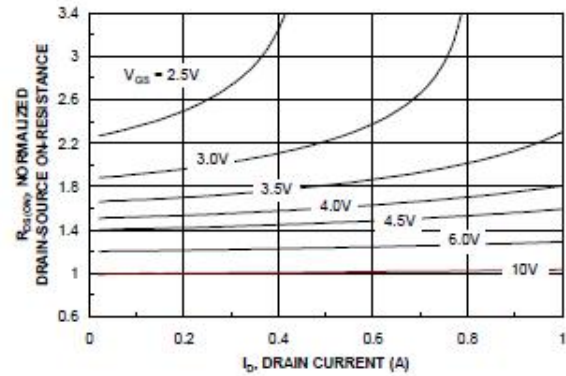


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

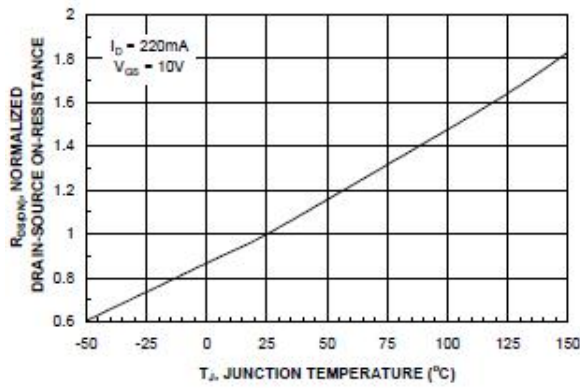


Figure 3. On-Resistance Variation with Temperature.

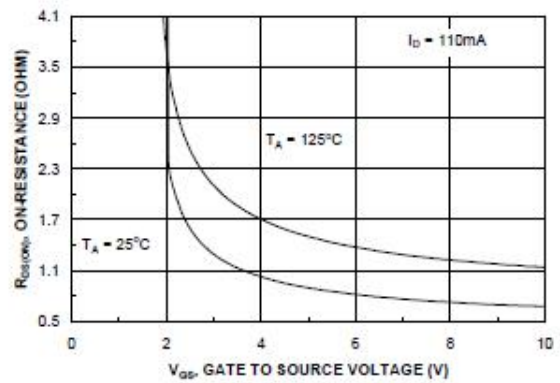


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

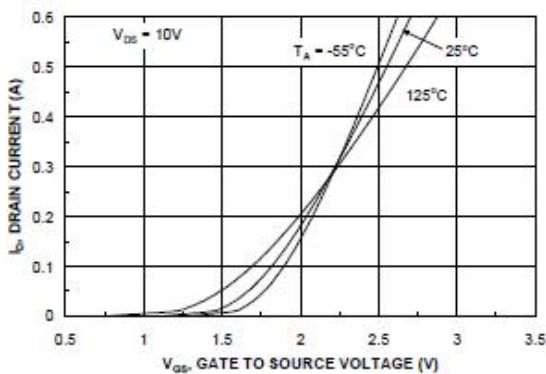


Figure 5. Transfer Characteristics.

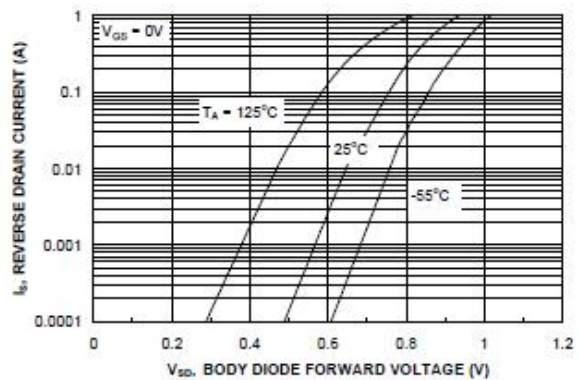


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

Typical Characteristics

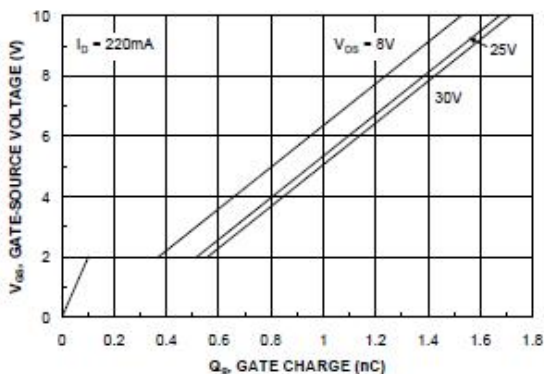


Figure 7. Gate Charge Characteristics.

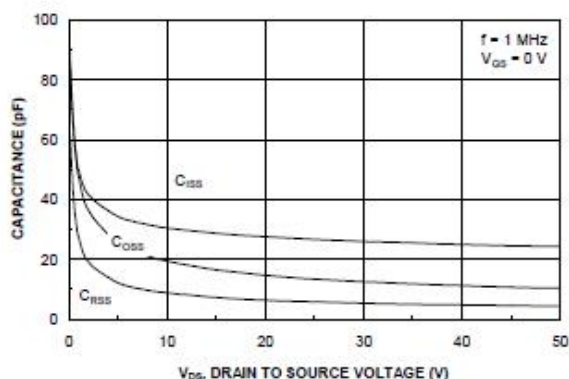


Figure 8. Capacitance Characteristics.

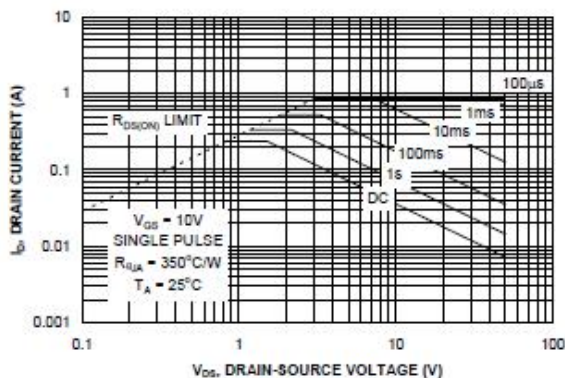


Figure 9. Maximum Safe Operating Area.

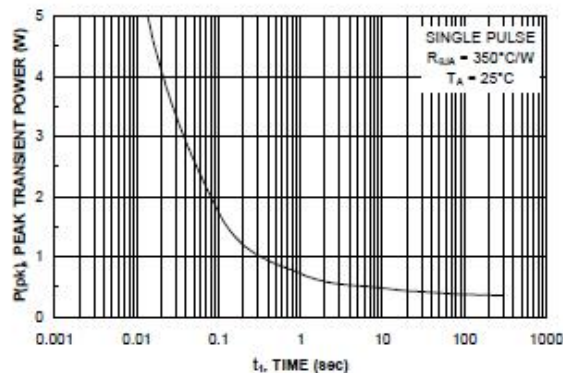


Figure 10. Single Pulse Maximum Power Dissipation.

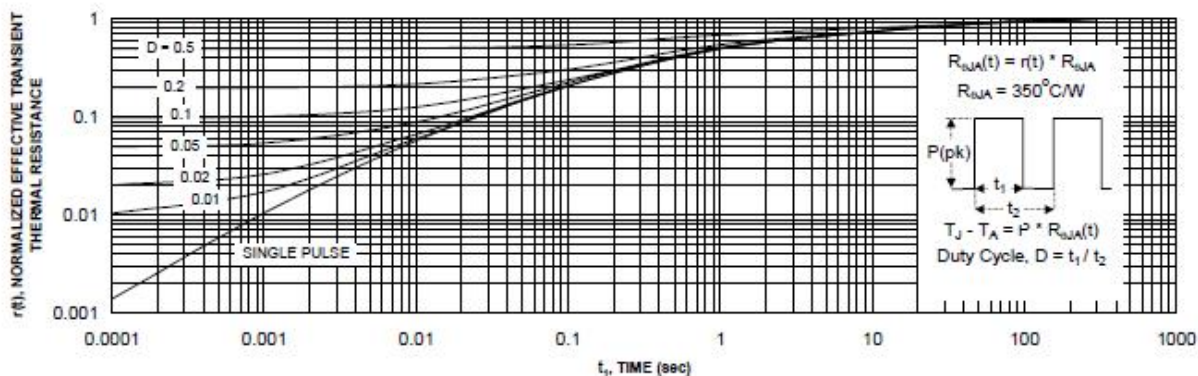


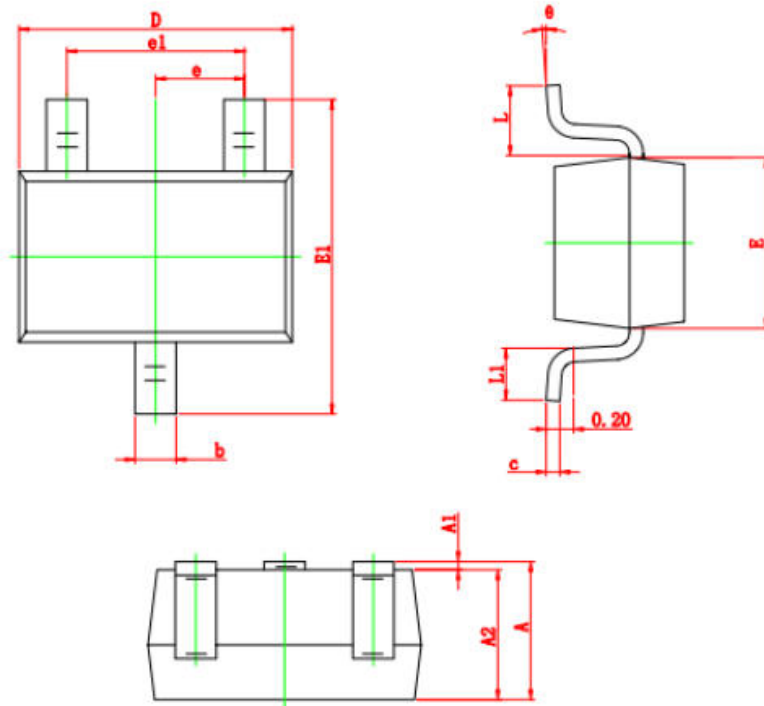
Figure 11. Transient Thermal Response Curve.

Thermal characterization performed using the conditions described in Note 1a. Transient thermal response will change depending on the circuit board design.

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Package Outline Dimension

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Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.200	0.400	0.008	0.016
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

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