

SE6003C

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

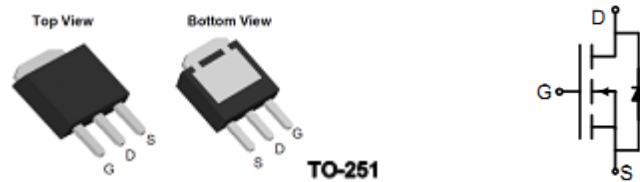
Features

For a single MOSFET

- $V_{DS} = 60V$
- $R_{DS(ON)} = 85m\Omega @ V_{GS}=10V$
- $R_{DS(ON)} = 105m\Omega @ V_{GS}=4.5V$

Pin configurations

See Diagram below



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	3	A
	Pulsed		10	
Total Power Dissipation	@TA=25°C	P_D	1.7	W
Operating Junction Temperature Range		T_J	-55 to 150	°C

Thermal Resistance

Symbol	Parameter	Typ	Max	Units
$R_{\theta JA}$	Junction to Ambient ($t \leq 10s$)	-	73.5	°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)							
B _V DSS	Drain-Source Breakdown Voltage	I _D =250μA, V _{GS} =0 V	60			V	
I _{DSS}	Drain to Source Leakage Current	V _{DS} = 60V, V _{GS} =0V			1	μA	
I _{GSS}	Gate-Body Leakage Current	V _{GS} =20 V			100	nA	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D =250μA	0.5	1.0	2.5	V	
g _{fs}	Forward Transconductance	V _{DS} = 10V, I _D =3A		7		S	
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =3A		85	100	mΩ	
		V _{GS} =4.5V, I _D =3A		105	125		
DYNAMIC PARAMETERS							
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V, f=1MHz		247		pF	
C _{oss}	Output Capacitance				34		pF
C _{rss}	Reverse Transfer Capacitance				19.5		pF
SWITCHING PARAMETERS							
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =30V, I _D =1.5A		6		nC	
Q _{gs}	Gate Source Charge				1		nC
Q _{gd}	Gate Drain Charge				1.3		nC
t _{d(on)}	Turn-On Delay Time	V _{GS} =10V, V _{DS} =30V, R _{GEN} =3.3Ω I _D =1A		6		ns	
t _{d(off)}	Turn-Off Delay Time				15		ns
t _{d(r)}	Turn-On Rise Time				15		ns
t _{d(f)}	Turn-Off Fall Time				10		ns
Source-Drain Diode							
Symbol	Parameter	Test Condition	Min	Typ	Max	Units	
V _{SD}	Forward On voltage ²	I _S =3A, V _{GS} =0V			1.3	V	
t _{rr}	Reverse Recovery Time	I _S =3A, V _{GS} =0V dI/dt=100A/		21		ns	
Q _{rr}	Reverse Recovery Charge				19		nC

Note 1: Pulse width limited by Max. junction temperature

Note 2: Pulse test

Note 3: Surface mounted on 1 1n² copper pad of FR4 board; 270°C/W when mounted on min. copper pad

Typical Characteristics

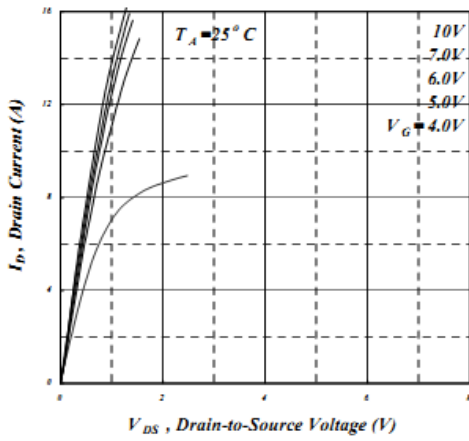


Fig 1. Typical Output Characteristics

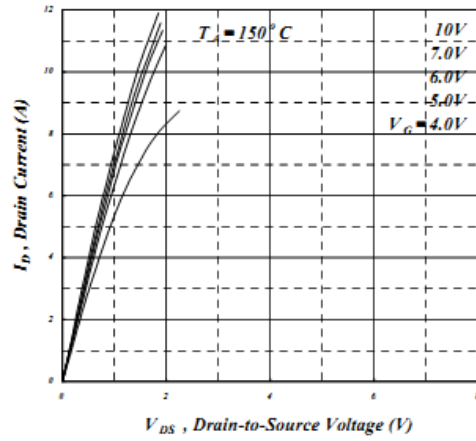


Fig 2. Typical Output Characteristics

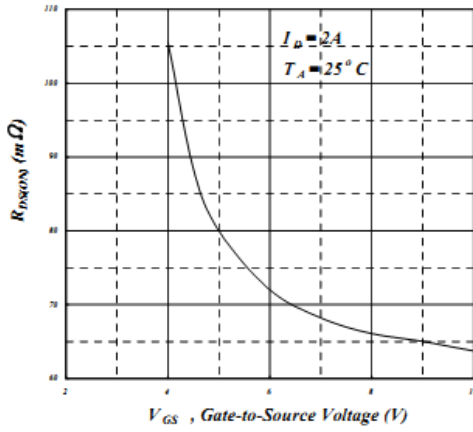


Fig 3. On-Resistance v.s. Gate Voltage

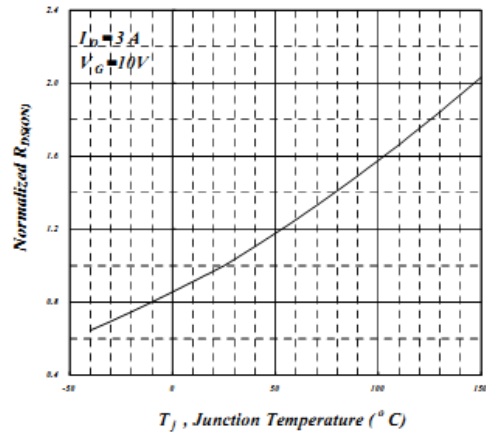


Fig 4. Normalized On-Resistance v.s. Junction Temperature

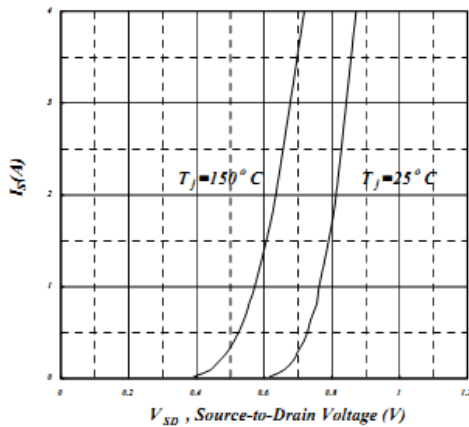


Fig 5. Forward Characteristic of Reverse Diode

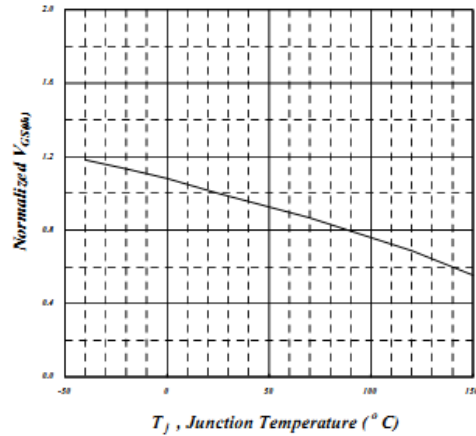


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

Typical Characteristics

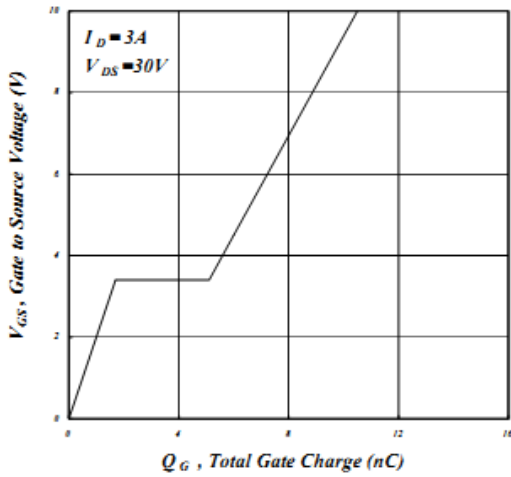


Fig 7. Gate Charge Characteristics

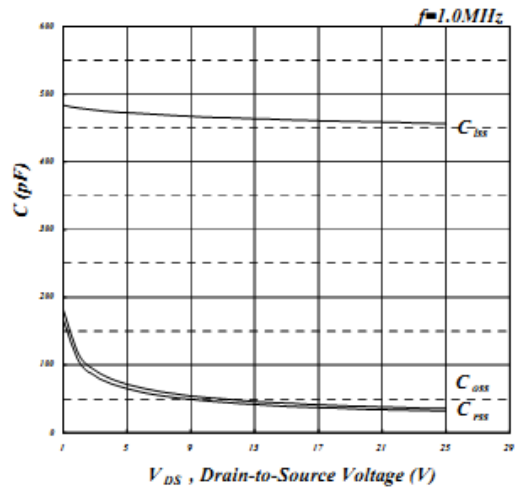


Fig 8. Typical Capacitance Characteristics

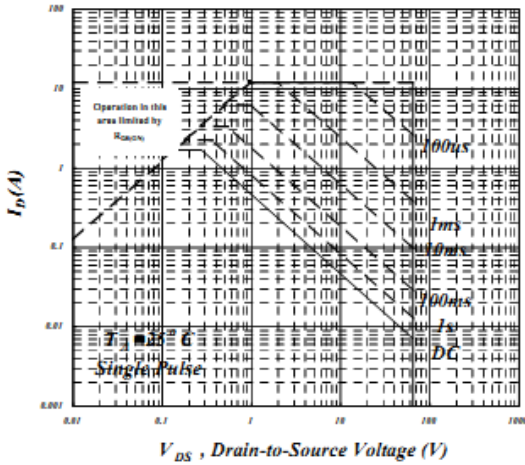


Fig 9. Maximum Safe Operating Area

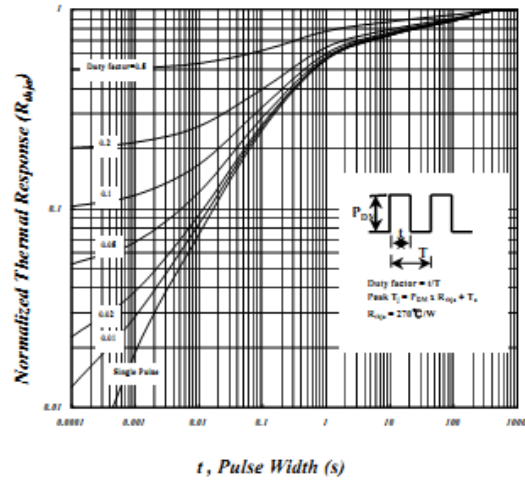


Fig 10. Effective Transient Thermal Impedance

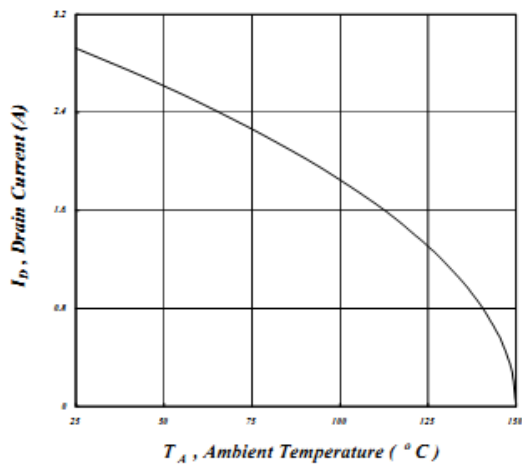


Fig 11. Maximum Continuous Drain Current v.s. Ambient Temperature

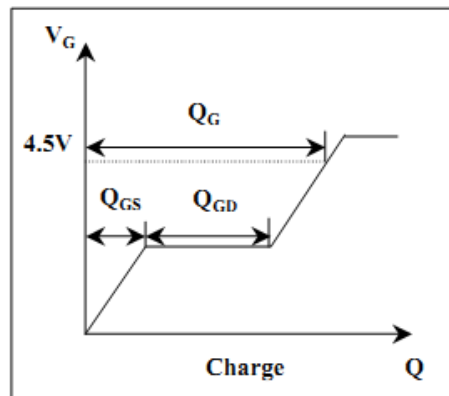
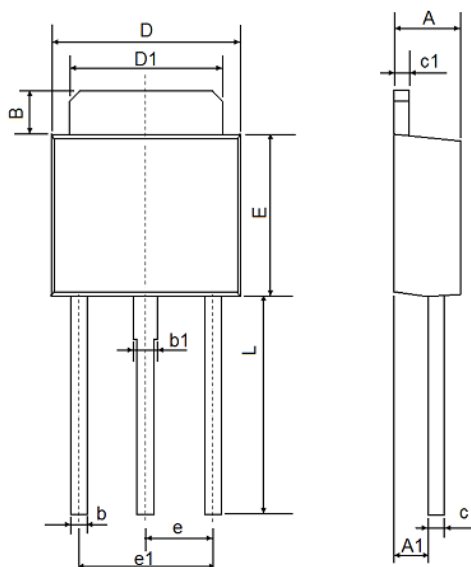


Fig 12. Gate Charge Waveform

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Package Outline Dimension

TO-251



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	1.050	1.350	0.042	0.054
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP.		0.091 TYP.	
e1	4.500	4.700	0.177	0.185
L	7.500	7.900	0.295	0.311

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