

TO-252 Plastic-Encapsulate MOSFETS

SUD25N15-52

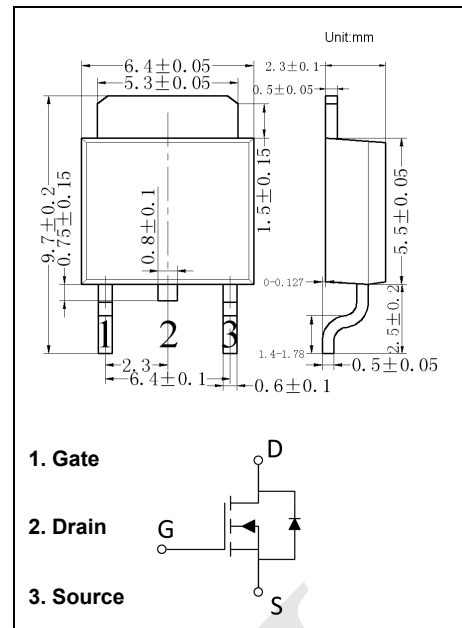
N-Channel 150-V (D-S) 175 °C MOSFET

Features

- TrenchFET® Power MOSFET
- 175 °C Junction Temperature
- PWM Optimized
- 100 % R_g Tested
- Compliant to RoHS Directive 2002/95/EC

Applications

- Primary Side Switch



Maximum Ratings (T_a=25°C unless otherwise specified)

Symbol	Parameter	Value	Unit
V _{DS}	Drain-Source voltage	150	V
V _{GS}	Gate-Source voltage	±20	
I _D	Continuous Drain Current (T _J = 175 °C) ²	T _C = 25 °C	25
		T _C = 125 °C	14.5
I _{DM}	Pulsed Drain Current	50	A
I _S	Continuous Source Current (Diode Conduction)	25	
I _{AR}	Avalanche Current	25	
E _{AR}	Repetitive Avalanche Energy (Duty Cycle ≤ 1 %)	31	mJ
P _D	Maximum Power Dissipation	T _C = 25 °C	136 ²⁾
		T _A = 25 °C	3 ¹⁾
T _J , T _{STG}	Operating Junction and Storage Temperature Range	-55 to +170	°C

Thermal Resistance Ratings

Symbol	Parameter	Typical	Max	Unit
R _{θJA}	Junction-to-Ambient ¹⁾	t ≤ 10 s	15	18
		Steady State	40	50
R _{θJC}	Junction-to-Case (Drain)	0.85	1.1	°C/W

Notes

1. Surface Mounted on 1" x 1" FR4 board.
2. See SOA curve for voltage derating.

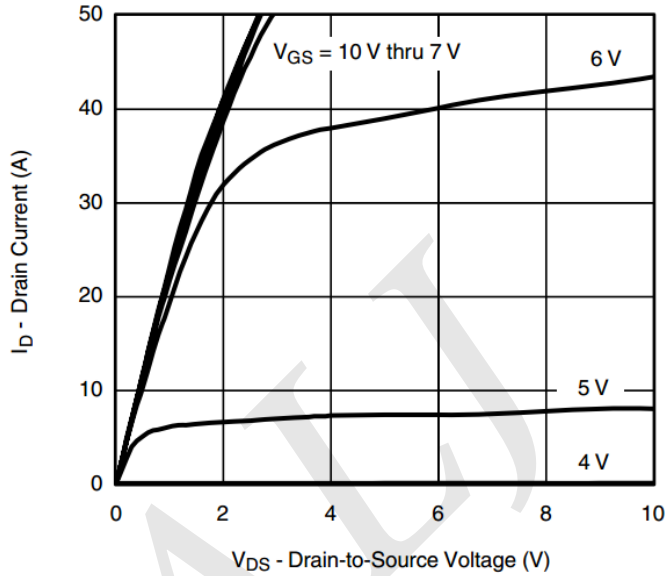
Electrical Characteristics (T_J=25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Static						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	150			V
V _{GS(th)}	Gate-Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2		4	V
I _{GSS}	Gate-body Leakage current	V _{DS} = 0V, V _{GS} = ±20V			±100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 150V, V _{GS} = 0V			1	μA
		V _{DS} = 150V, V _{GS} = 0V, T _J = 125°C			50	
		V _{DS} = 150V, V _{GS} = 0V, T _J = 175°C			250	
I _{D(on)}	On-State Drain Current ²⁾	V _{DS} = 5V, V _{GS} = 10V	50			A
R _{DS(on)}	Drain-Source On-Resistance	V _{GS} = 10V, I _D = 5A		42	52	mΩ
		V _{GS} = 10V, I _D = 5A, T _J = 125°C			109	
		V _{GS} = 10V, I _D = 5A, T _J = 175°C			145	
		V _{GS} = 6V, I _D = 5A		47	60	
g _{fs}	Forward Trans conductance	V _{DS} = 15V, I _D = 25A		40		S
Dynamic²⁾						
C _{iss}	Input Capacitance	V _{GS} = 0V		1725		pF
C _{oss}	Output Capacitance	V _{DS} = 25V		216		
C _{rss}	Reverse Transfer Capacitance	f = 1.0MHz		100		
Q _g	Total Gate Charge ³⁾	V _{DS} = 75V, V _{GS} = 10V, I _D = 25A		33	40	nC
Q _{gs}	Gate-Source Charge ³⁾			9		
Q _{gd}	Gate-Drain Charge ³⁾			12		
R _g	Gate Resistance		1		3	Ω
t _{d(on)}	Turn-On Delay Time ³⁾	V _{DD} = 50V, R _L = 3 Ω, I _D ≈ 25A, V _{GEN} = 10V, R _g = 2.5 Ω		15	25	ns
t _r	Rise Time ³⁾			70	100	
t _{d(off)}	Turn-Off Delay Time ³⁾			25	40	
t _f	Fall Time ³⁾			60	90	
Source-Drain Diode Ratings and Characteristics T_C = 25 °C						
I _{SM}	Pulsed Current				50	A
V _{SD}	Diode Forward Voltage ²⁾	I _F = 25 A, V _{GS} = 0 V		0.9	1.5	V
t _{rr}	Source-Drain Reverse Recovery Time	I _F = 25A, dI/dt = 100A/μs		95	140	ns

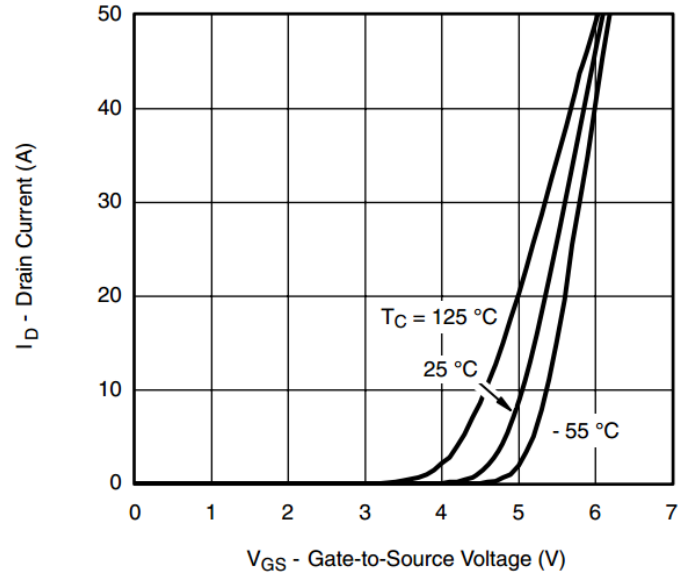
Notes:

1. Guaranteed by design, not subject to production testing.
2. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
3. Independent of operating temperature.

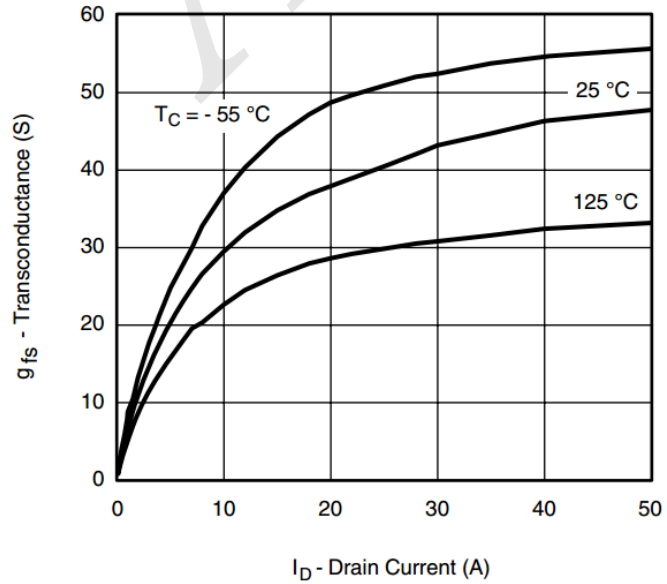
Typical Characteristics



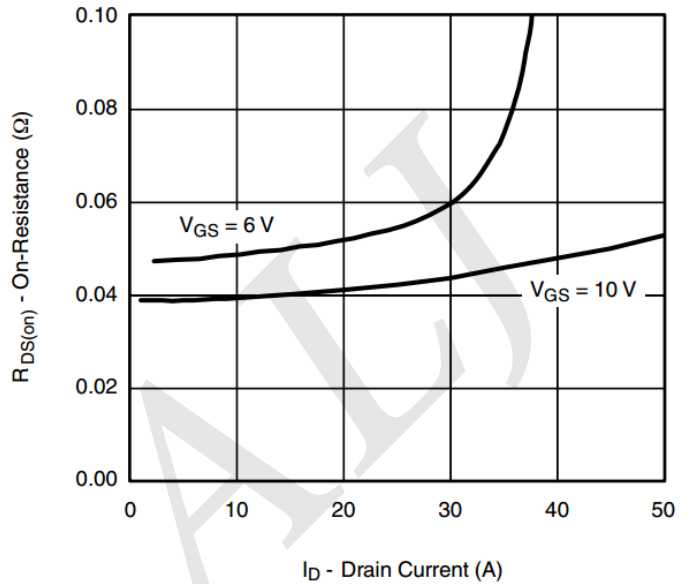
Output Characteristics



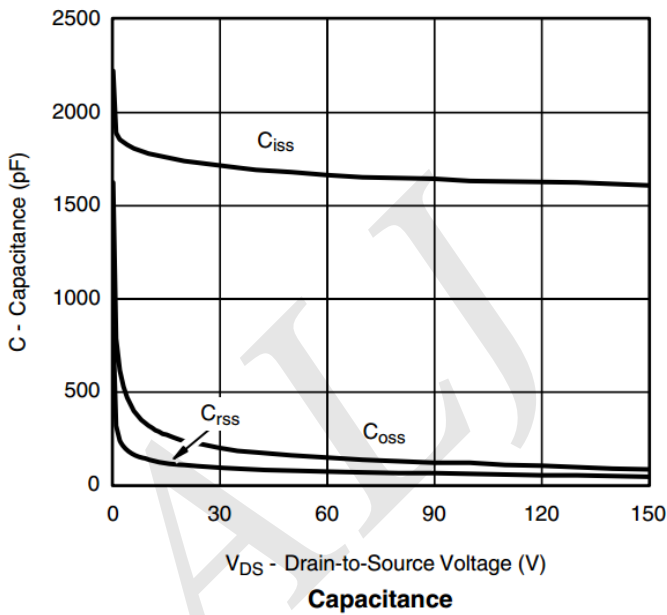
Transfer Characteristics



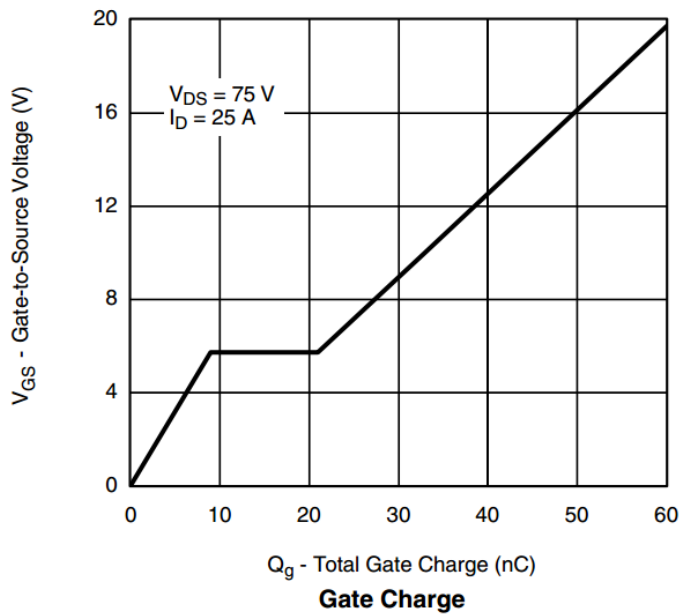
Transconductance



On-Resistance vs. Drain Current

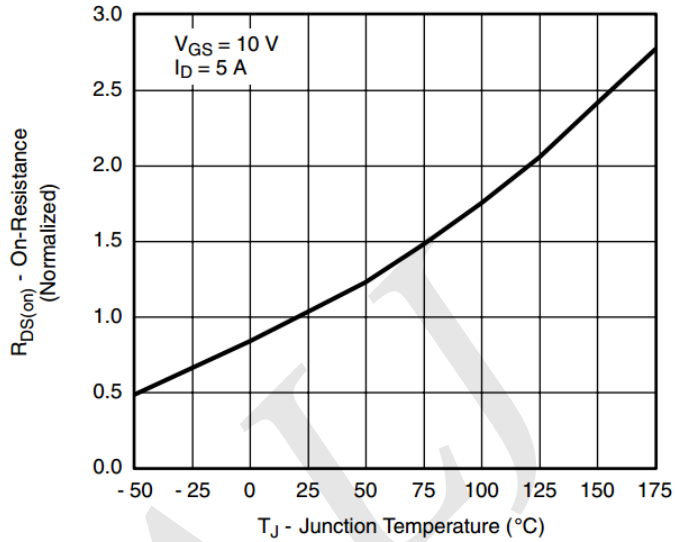


Capacitance

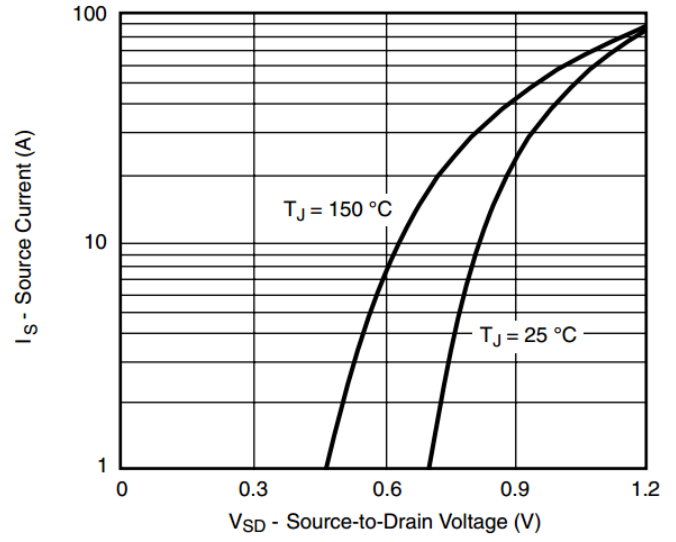


Gate Charge

Typical Characteristics (Cont.)

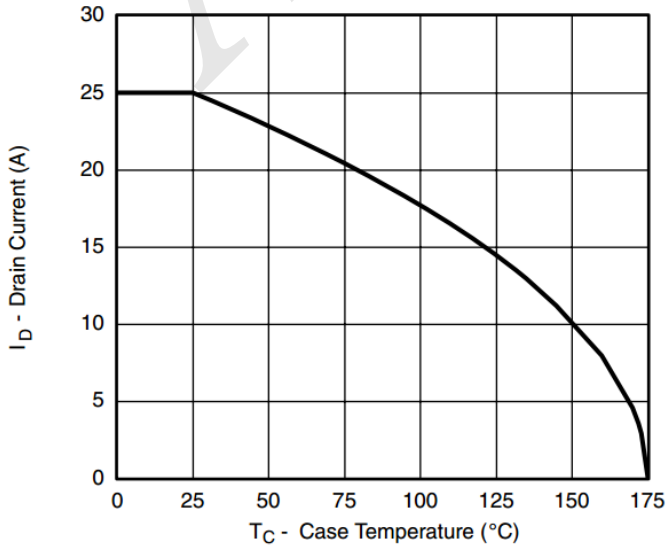


On-Resistance vs. Junction Temperature

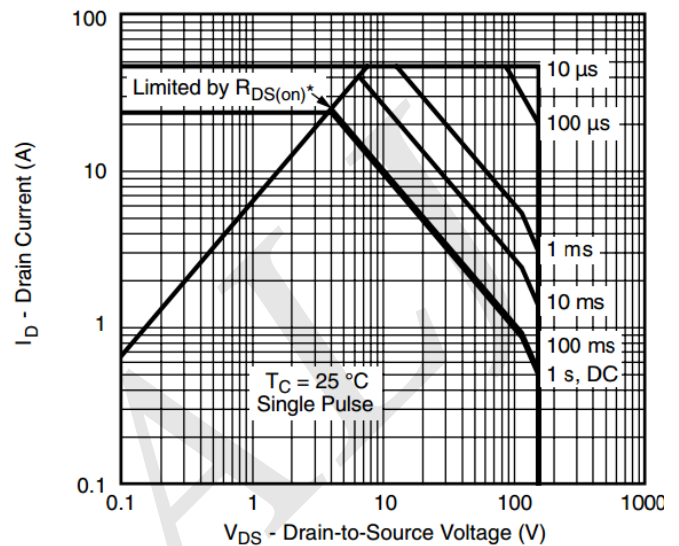


Source-Drain Diode Forward Voltage

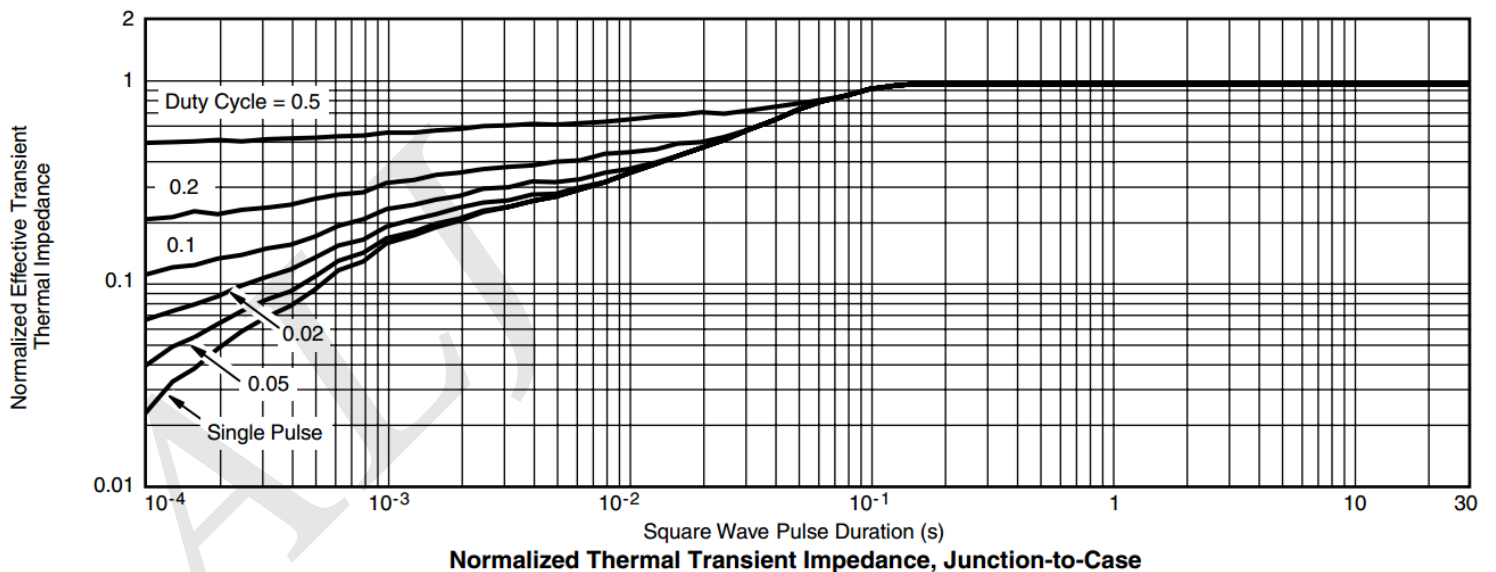
Thermal Ratings



Maximum Avalanche Drain Current vs. Case Temperature



Safe Operating Area
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified



Normalized Thermal Transient Impedance, Junction-to-Case