

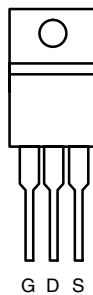
N-Channel 250-V (D-S) 175 °C MOSFET

PRODUCT SUMMARY

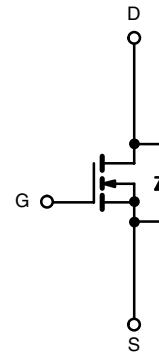
V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A)
250	0.165 at V _{GS} = 10 V	17

FEATURES

- TrenchFET® Power MOSFET
- 175 °C Junction Temperature

TO-220AB


Top View

Ordering Information: SUP17N25-165-E3


N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted

Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V _{DS}	250	V	
Gate-Source Voltage	V _{GS}	± 20		
Continuous Drain Current (T _J = 175 °C) ^b	I _D	T _C = 25 °C	17	
		T _C = 125 °C	9.8	
Pulsed Drain Current	I _{DM}	20	A	
Single Pulse Avalanche Current	I _{AS}	5		
Single Pulse Avalanche Energy	E _{AS}	L = 0.1 mH	1.25	mJ
Maximum Power Dissipation	P _D	T _C = 25 °C	136 ^b	W
		T _A = 25 °C	3.75 ^a	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 175	°C	

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Limit	Unit
Junction-to-Ambient ^a	R _{thJA}	40	°C/W
Junction-to-Case (Drain)	R _{thJC}	1.1	

Notes:

a. Surface Mounted on 1" x 1" FR4 Board.

b. See SOA curve for voltage derating.



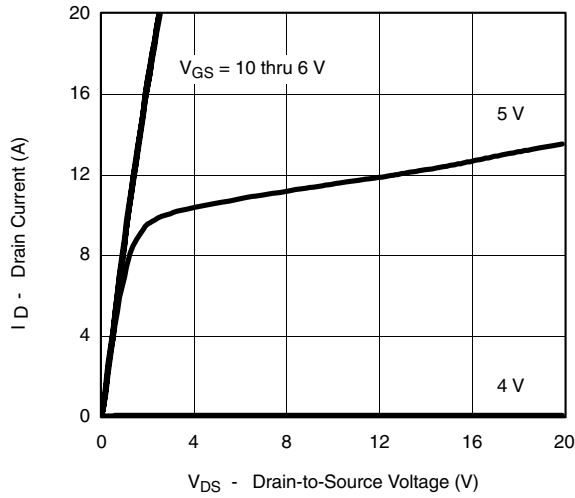
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ ^a	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	250			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	2.5		4.0	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 250\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 250\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			50	
		$V_{DS} = 250\text{ V}, V_{GS} = 0\text{ V}, T_J = 175\text{ }^\circ\text{C}$			250	
On-State Drain Current ^b	$I_{D(on)}$	$V_{DS} = 15\text{ V}, V_{GS} = 10\text{ V}$	17			A
Drain-Source On-State Resistance ^b	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 14\text{ A}$		0.130	0.165	Ω
		$V_{GS} = 10\text{ V}, I_D = 14\text{ A}, T_J = 125\text{ }^\circ\text{C}$			0.347	
		$V_{GS} = 10\text{ V}, I_D = 14\text{ A}, T_J = 175\text{ }^\circ\text{C}$			0.462	
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 17\text{ A}$		36		S
Dynamic^a						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		1950		μF
Output Capacitance	C_{oss}			160		
Reverse Transfer Capacitance	C_{rss}			70		
Total Gate Charge ^c	Q_g	$V_{DS} = 125\text{ V}, V_{GS} = 10\text{ V}, I_D = 17\text{ A}$		30	45	nC
Gate-Source Charge ^c	Q_{gs}			10		
Gate-Drain Charge ^c	Q_{gd}			10		
Gate Resistance	R_g	$f = 1\text{ MHz}$		1.6		Ω
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = 125\text{ V}, R_L = 7.35\text{ }\Omega$ $I_D \cong 17\text{ A}, V_{GEN} = 10\text{ V}, R_g = 2.5\text{ }\Omega$		15	25	ns
Rise Time ^c	t_r			130	195	
Turn-Off Delay Time ^c	$t_{d(off)}$			30	45	
Fall Time ^c	t_f			100	150	
Source-Drain Diode Ratings and Characteristics ($T_C = 25\text{ }^\circ\text{C}$)						
Continuous Current	I_S				17	A
Pulsed Current	I_{SM}				20	
Forward Voltage ^a	V_{SD}	$I_F = 17\text{ A}, V_{GS} = 0\text{ V}$		0.9	1.5	V
Reverse Recovery Time	t_{rr}	$I_F = 17\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		115	175	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			10	15	A
Reverse Recovery Charge	Q_{rr}			0.58	1.3	μC

Notes:

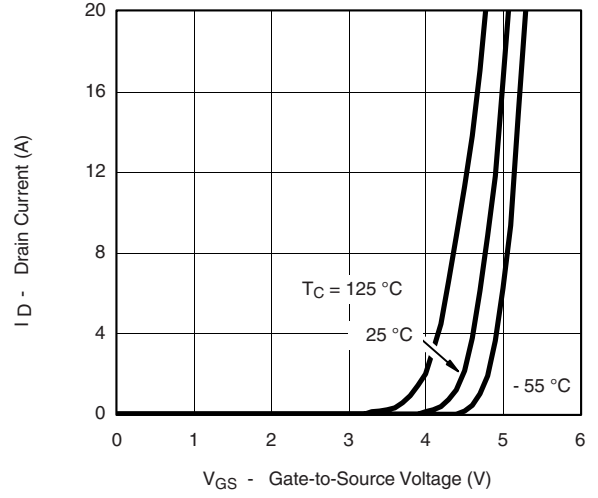
- a. Guaranteed by design, not subject to production testing.
- b. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- c. Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

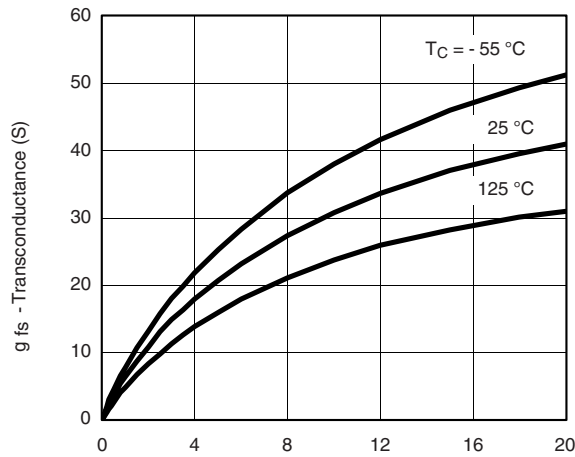
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



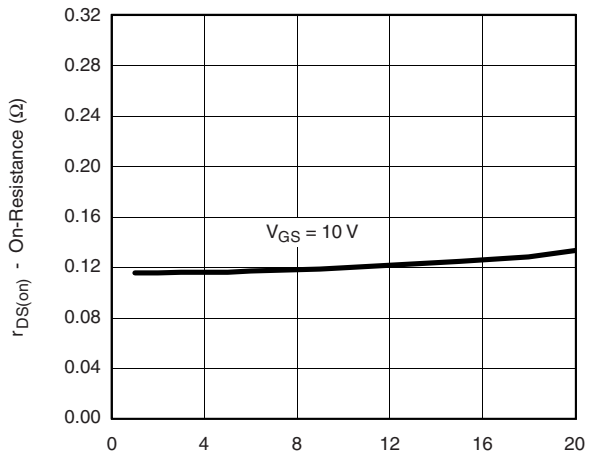
Output Characteristics



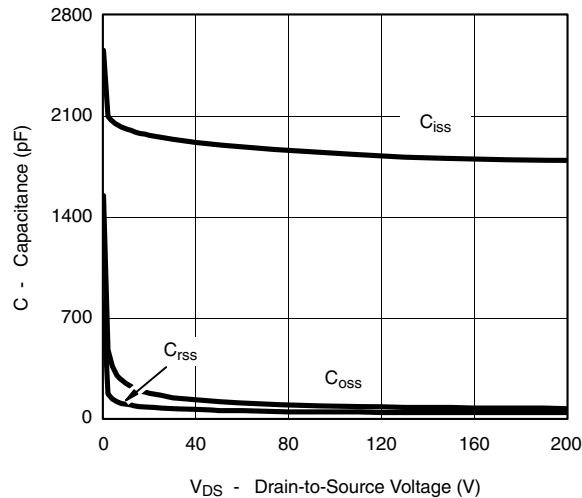
Transfer Characteristics



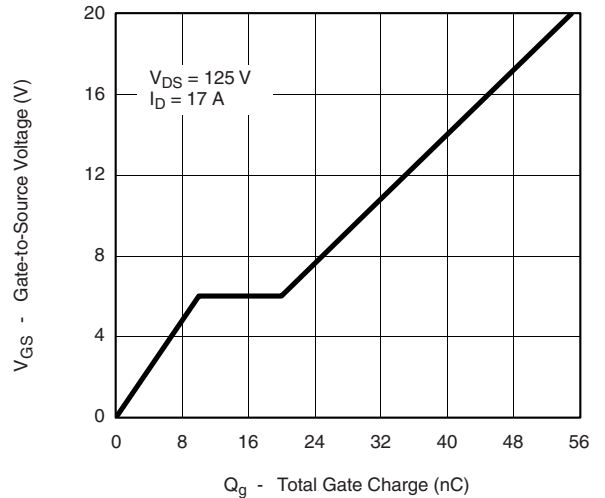
Transconductance



On-Resistance vs. Drain Current

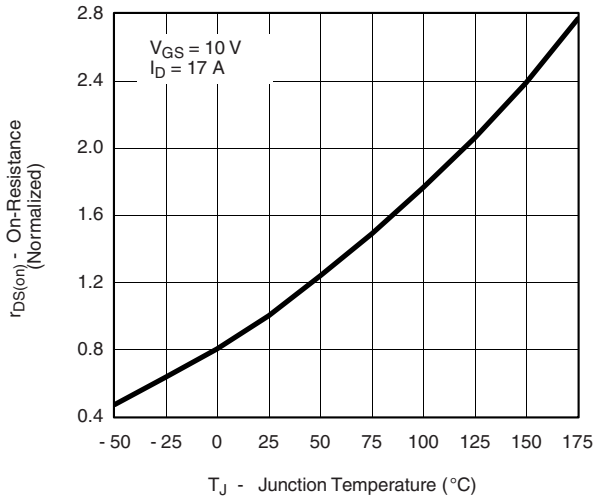


Capacitance

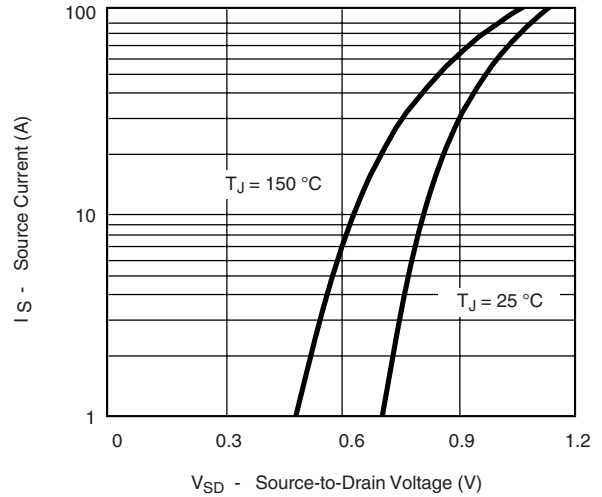


Gate Charge

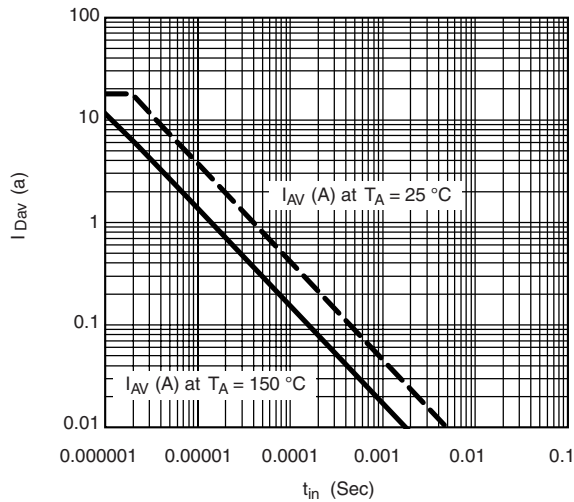
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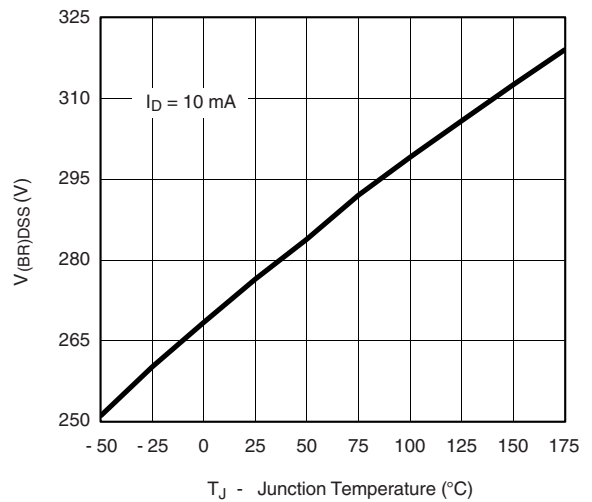
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

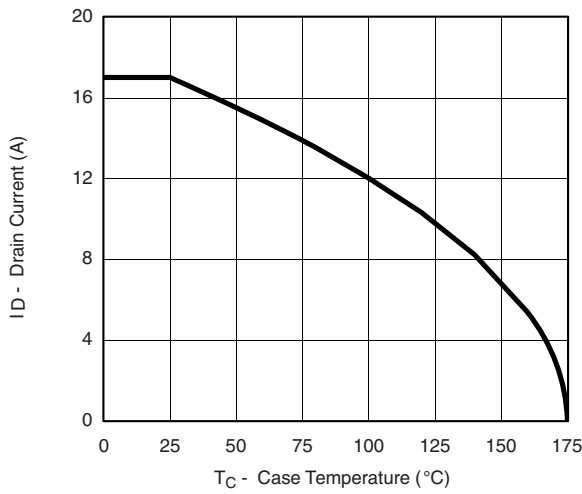


Avalanche Current vs. Time

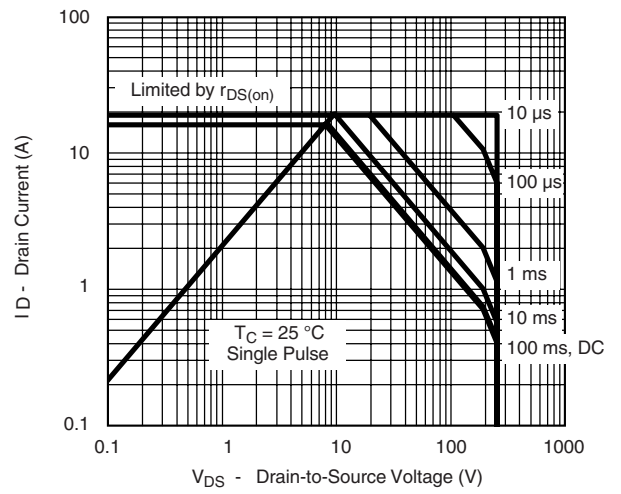


Drain Source Breakdown vs. Junction Temperature

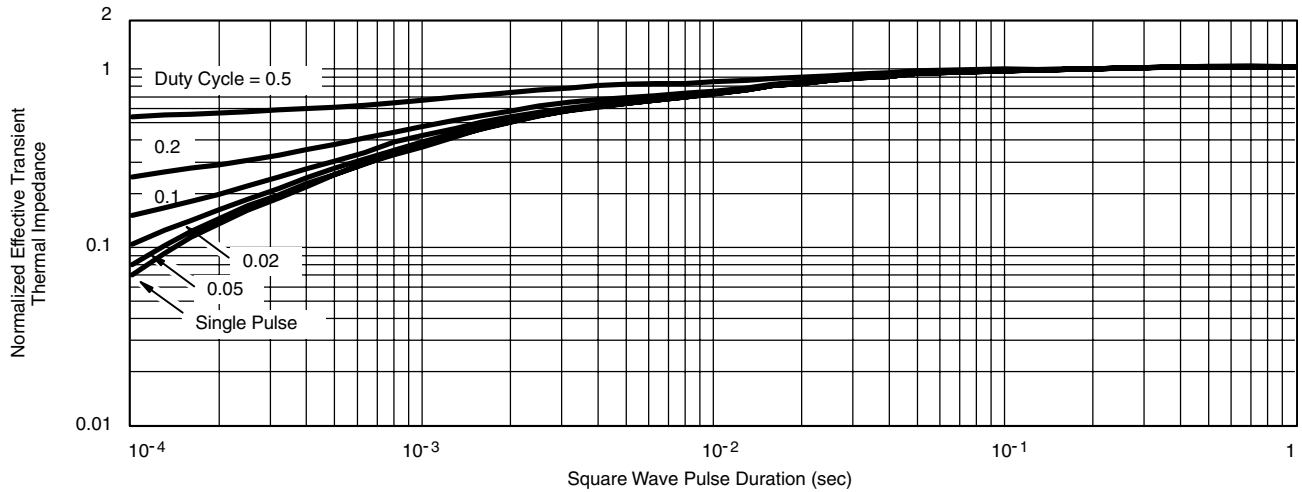
THERMAL RATINGS



Maximum Avalanche Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

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