

## N-Channel 150-V (D-S) 175 °C MOSFET

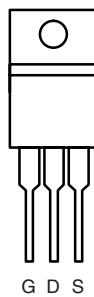
**PRODUCT SUMMARY**

$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
150	0.095 at $V_{GS} = 10$ V	18
	0.100 at $V_{GS} = 6$ V	17.5

**FEATURES**

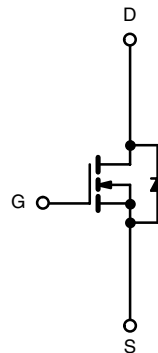
- TrenchFET<sup>®</sup> Power MOSFET
- 175 °C Junction Temperature


 Available  
**RoHS\***  
 COMPLIANT

**TO-220AB**


Top View

DRAIN connected to TAB



N-Channel MOSFET

**Ordering Information:** SUP18N15-95  
 SUP18N15-95-E3 (Lead (Pb)-free)

**ABSOLUTE MAXIMUM RATINGS**  $T_C = 25$  °C, unless otherwise noted

Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	$V_{DS}$	150	V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$		
Continuous Drain Current ( $T_J = 175$ °C)	$I_D$	$T_C = 25$ °C	18	A
		$T_C = 125$ °C	10.3	
Pulsed Drain Current	$I_{DM}$	25		
Avalanche Current	$I_{AS}$	15		
Single Pulse Avalanche Energy <sup>a</sup>	$E_{AS}$	16.2	mJ	
Maximum Power Dissipation <sup>a</sup>	$P_D$	88 <sup>b</sup>	W	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to 175	°C	

**THERMAL RESISTANCE RATINGS**

Parameter	Symbol	Limit	Unit
Junction-to-Ambient (Free Air)	$R_{thJA}$	85	°C/W
Junction-to-Case	$R_{thJC}$	1.7	

Notes:

- Duty cycle  $\leq 1$  %.
- See SOA curve for voltage derating.

\* Pb containing terminations are not RoHS compliant, exemptions may apply.



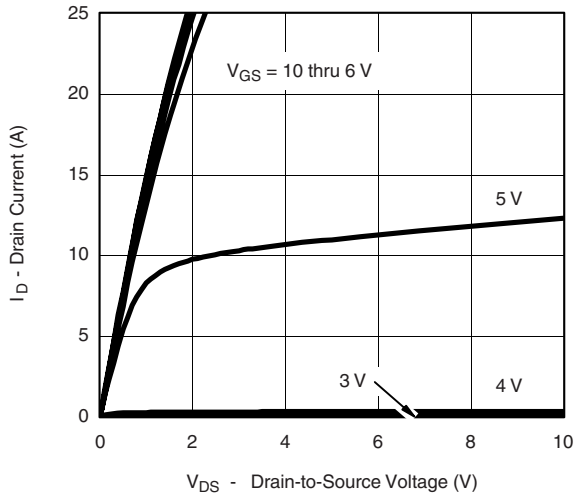
<b>SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ <sup>a</sup>	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	150			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	2			
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 120\text{ V}, V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
		$V_{DS} = 120\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			50	
		$V_{DS} = 120\text{ V}, V_{GS} = 0\text{ V}, T_J = 175\text{ }^\circ\text{C}$			250	
On-State Drain Current <sup>b</sup>	$I_{D(on)}$	$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	25			A
Drain-Source On-State Resistance <sup>b</sup>	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 15\text{ A}$		0.077	0.095	$\Omega$
		$V_{GS} = 10\text{ V}, I_D = 15\text{ A}, T_J = 125\text{ }^\circ\text{C}$			0.190	
		$V_{GS} = 10\text{ V}, I_D = 15\text{ A}, T_J = 175\text{ }^\circ\text{C}$			0.250	
		$V_{GS} = 6\text{ V}, I_D = 10\text{ A}$		0.081	0.100	
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = 15\text{ V}, I_D = 15\text{ A}$		25		S
<b>Dynamic<sup>a</sup></b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		900		$\text{pF}$
Output Capacitance	$C_{oss}$			115		
Reverse Transfer Capacitance	$C_{rss}$			70		
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{DS} = 75\text{ V}, V_{GS} = 10\text{ V}, I_D = 15\text{ A}$		20	25	nC
Gate-Source Charge <sup>c</sup>	$Q_{gs}$			5.5		
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$			7		
Turn-On Delay Time <sup>c</sup>	$t_{d(on)}$	$V_{DD} = 75\text{ V}, R_L = 5\text{ }\Omega$ $I_D \cong 15\text{ A}, V_{GEN} = 10\text{ V}, R_G = 2.5\text{ }\Omega$		8	12	ns
Rise Time <sup>c</sup>	$t_r$			35	55	
Turn-Off Delay Time <sup>c</sup>	$t_{d(off)}$			17	25	
Fall Time <sup>c</sup>	$t_f$			30	45	
<b>Source-Drain Diode Ratings and Characteristics</b> ( $T_C = 25\text{ }^\circ\text{C}$ ) <sup>b</sup>						
Continuous Current	$I_S$				15	A
Pulsed Current	$I_{SM}$				25	
Forward Voltage <sup>a</sup>	$V_{SD}$	$I_F = 15\text{ A}, V_{GS} = 0\text{ V}$		0.9	1.5	V
Reverse Recovery Time	$t_{rr}$	$I_F = 15\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		55	85	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			5	8	A
Reverse Recovery Charge	$Q_{rr}$			0.13	0.34	$\mu\text{C}$

Notes:

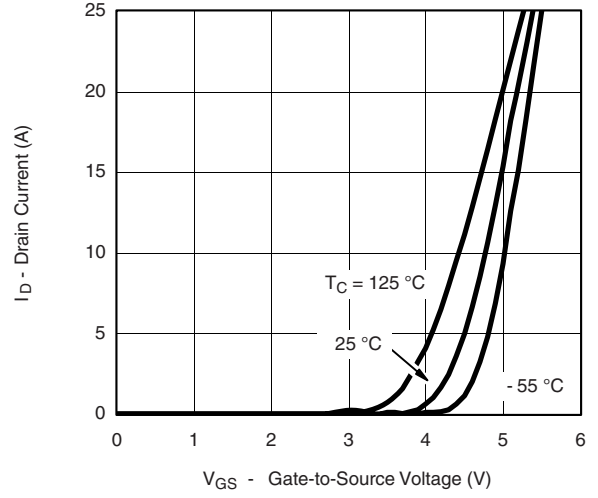
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

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.

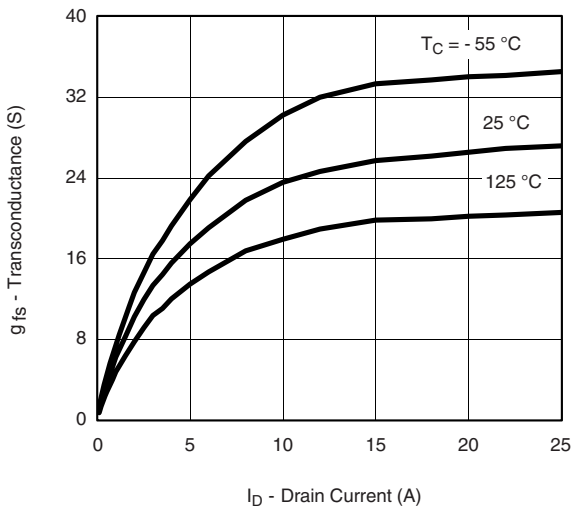
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



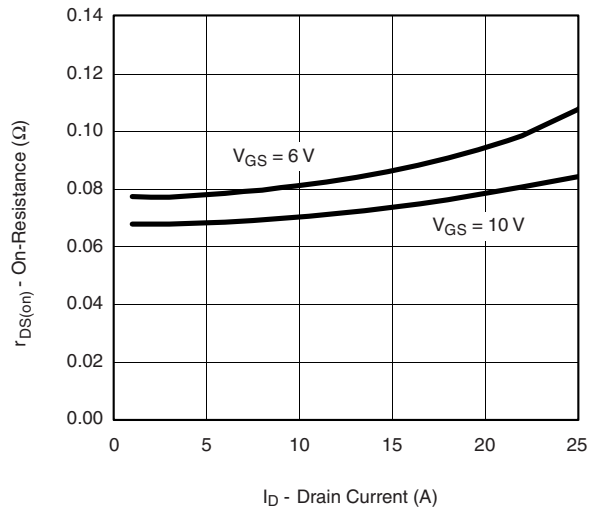
**Output Characteristics**



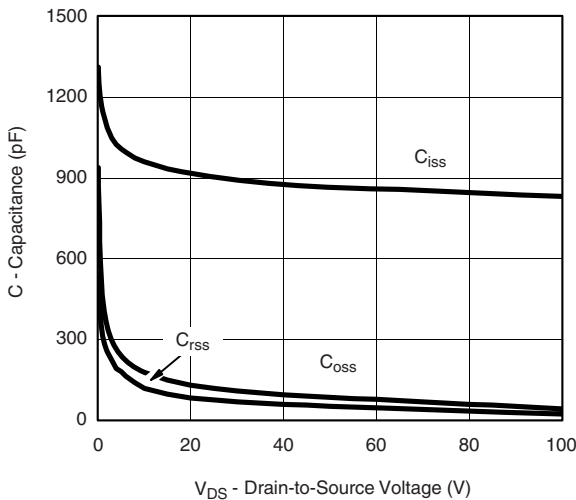
**Transfer Characteristics**



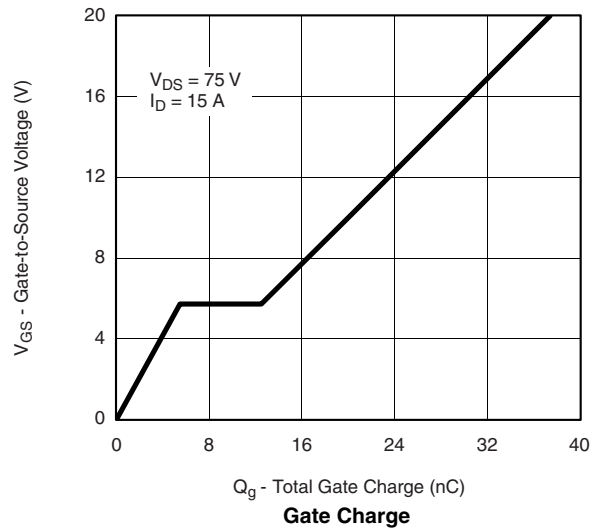
**Transconductance**



**On-Resistance vs. Drain Current**

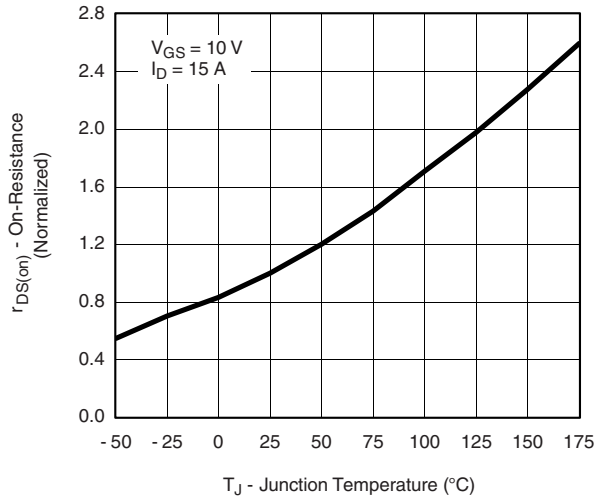


**Capacitance**

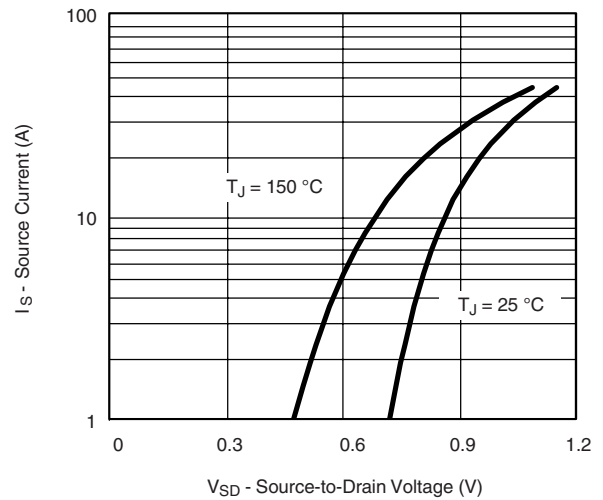


**Gate Charge**

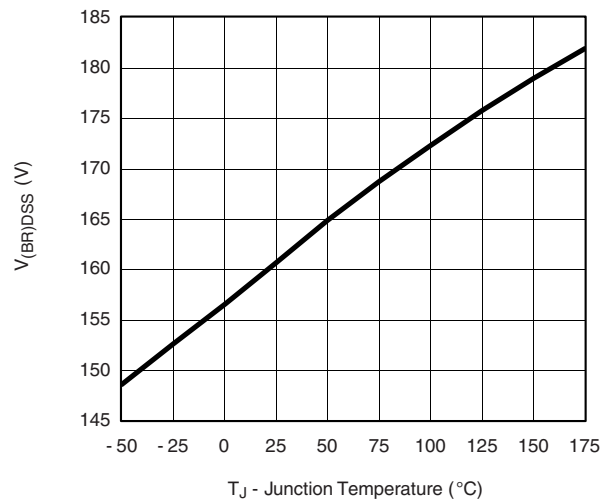
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



**On-Resistance vs. Junction Temperature**

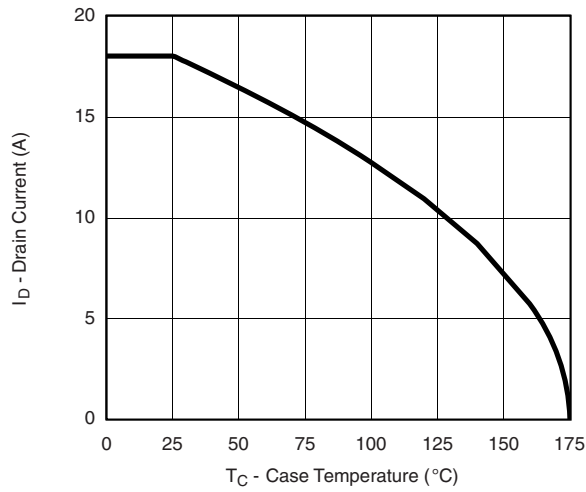


**Source-Drain Diode Forward Voltage**

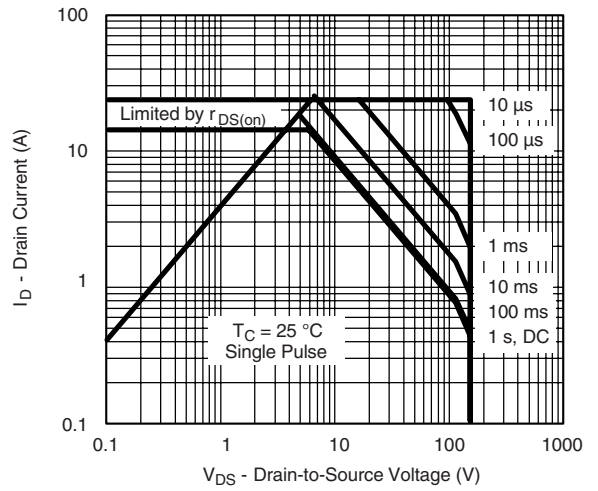


**Drain-Source Voltage Breakdown vs. Junction Temperature**

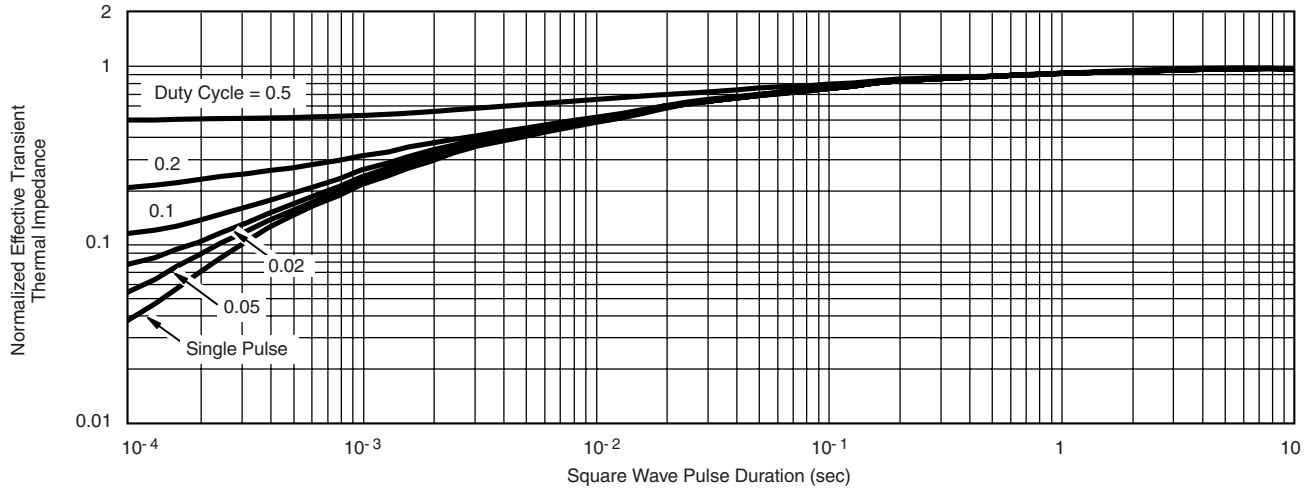
**THERMAL RATINGS**



**Maximum Avalanche Drain Current vs. Case Temperature**



**Safe Operating Area**



**Normalized Thermal Transient Impedance, Junction-to-Case**

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