



New Product

SUP/SUB85N08-08

Vishay Siliconix

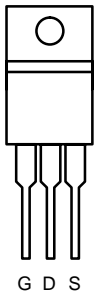
## N-Channel 75-V (D-S) 175°C MOSFET

## PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
75	0.008 @ $V_{GS} = 10$ V	85 <sup>a</sup>

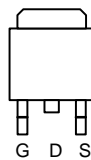
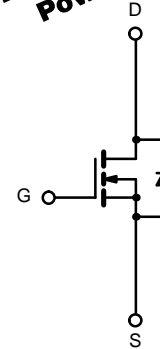
**175°C Rated**  
Maximum Junction Temperature  
**TrenchFET®**  
Power MOSFETs

TO-220AB

Top View  
SUP85N08-08

DRAIN connected to TAB

TO-263

Top View  
SUB85N08-08

N-Channel MOSFET

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ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$  UNLESS OTHERWISE NOTED)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	75	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 175^\circ\text{C}$ )	$I_D$	$T_C = 25^\circ\text{C}$	85 <sup>a</sup>
		$T_C = 125^\circ\text{C}$	67 <sup>a</sup>
Pulsed Drain Current	$I_{DM}$	240	A
Avalanche Current	$I_{AR}$	75	
Repetitive Avalanche Energy <sup>b</sup>	$E_{AR}$	$L = 0.1$ mH	
Maximum Power Dissipation <sup>b</sup>		$T_C = 25^\circ\text{C}$ (TO-220AB and TO-263)	250 <sup>c</sup>
	$T_A = 25^\circ\text{C}$ (TO-263) <sup>d</sup>	3.7	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 175	$^\circ\text{C}$

## THERMAL RESISTANCE RATINGS

Parameter	Symbol	Limit	Unit
Junction-to-Ambient	$R_{thJA}$	PCB Mount (TO-263) <sup>d</sup>	40
		Free Air (TO-220AB)	62.5
Junction-to-Case	$R_{thJC}$	0.6	$^\circ\text{C/W}$

## Notes

- Package limited.
- Duty cycle  $\leq 1\%$ .
- See SOA curve for voltage derating.
- When mounted on 1" square PCB (FR-4 material).

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SPECIFICATIONS (T <sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>DS</sub> = 0 V, I <sub>D</sub> = 250 μA	75			V
Gate-Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	2.5			
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C			50	
		V <sub>DS</sub> = 60 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175 °C			250	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> ≥ 5 V, V <sub>GS</sub> = 10 V	120			A
Drain-Source On-State Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 30 A		0.0063	0.008	Ω
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 30 A, T <sub>J</sub> = 125 °C			0.014	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 30 A, T <sub>J</sub> = 175 °C			0.018	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 30 A	30			S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz		5800		pF
Output Capacitance	C <sub>oss</sub>			900		
Reverse Transfer Capacitance	C <sub>rss</sub>			285		
Total Gate Charge <sup>c</sup>	Q <sub>g</sub>	V <sub>DS</sub> = 35 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 85 A		100	150	nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>			35		
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			25		
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = 35 V, R <sub>L</sub> = 0.4 Ω I <sub>D</sub> ≅ 85 A, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 2.5 Ω		20	30	ns
Rise Time <sup>c</sup>	t <sub>r</sub>			115	175	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>			50	75	
Fall Time <sup>c</sup>	t <sub>f</sub>			80	120	
<b>Source-Drain Diode Ratings and Characteristics (T<sub>C</sub> = 25 °C)<sup>b</sup></b>						
Continuous Current	I <sub>S</sub>				85	A
Pulsed Current	I <sub>SM</sub>				240	
Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>F</sub> = 85 A, V <sub>GS</sub> = 0 V		1.0	1.5	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 85 A, di/dt = 100 A/μs		70	120	ns
Peak Reverse Recovery Current	I <sub>RM(REC)</sub>			4	7	A
Reverse Recovery Charge	Q <sub>rr</sub>				0.14	0.30

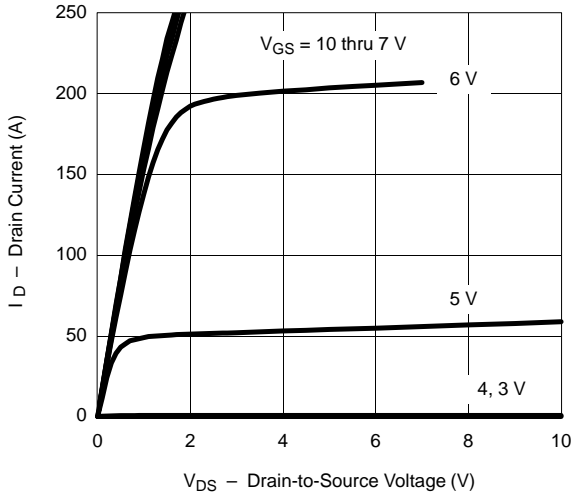
## Notes

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

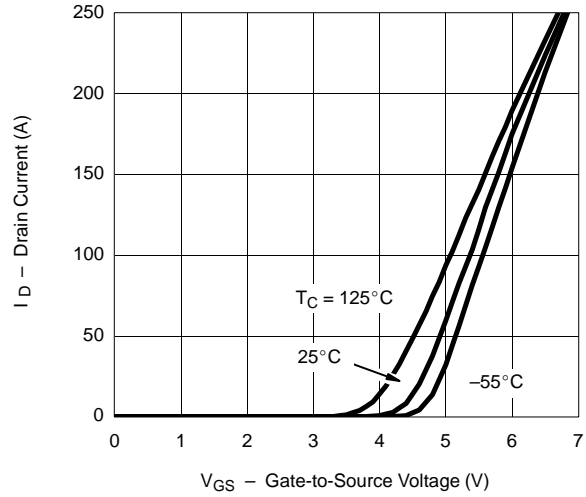


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

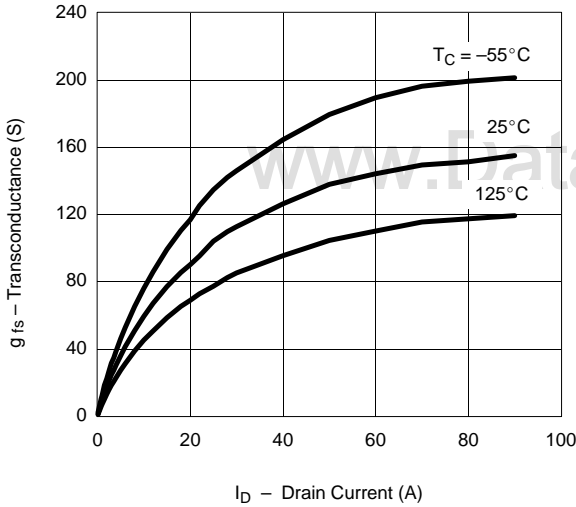
**Output Characteristics**



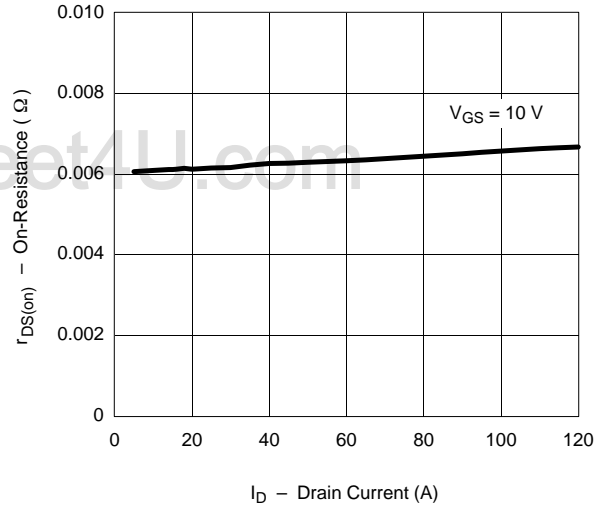
**Transfer Characteristics**



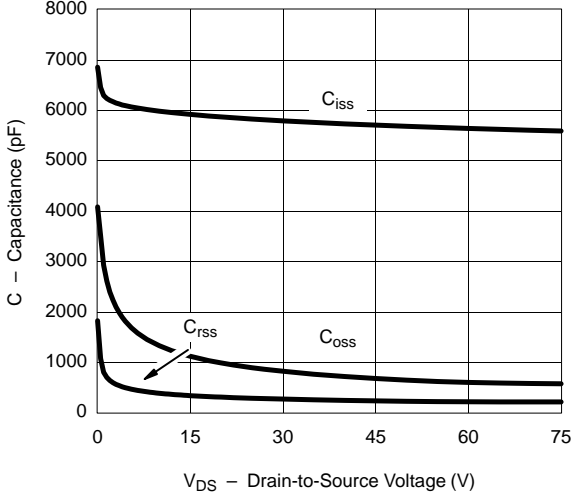
**Transconductance**



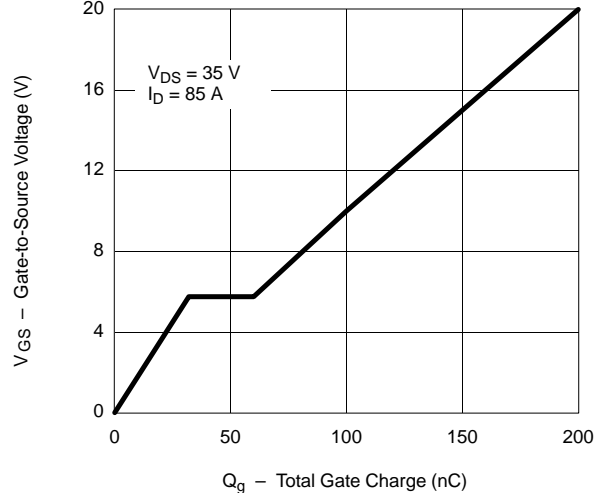
**On-Resistance vs. Drain Current**



**Capacitance**



**Gate Charge**



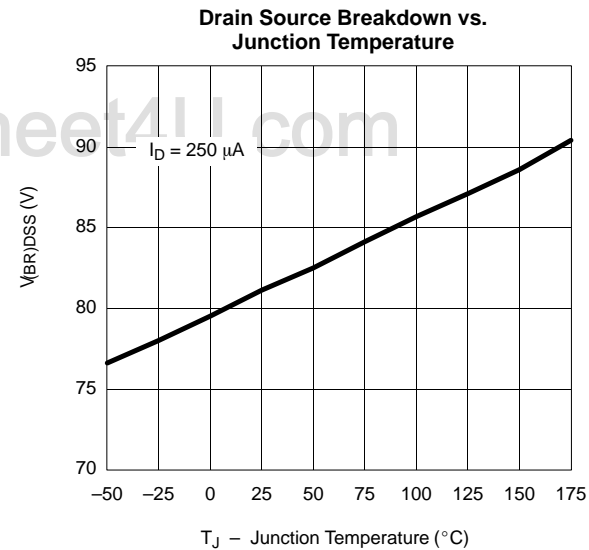
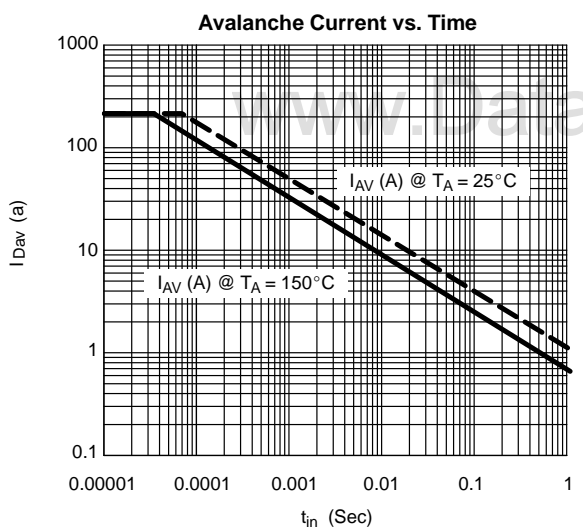
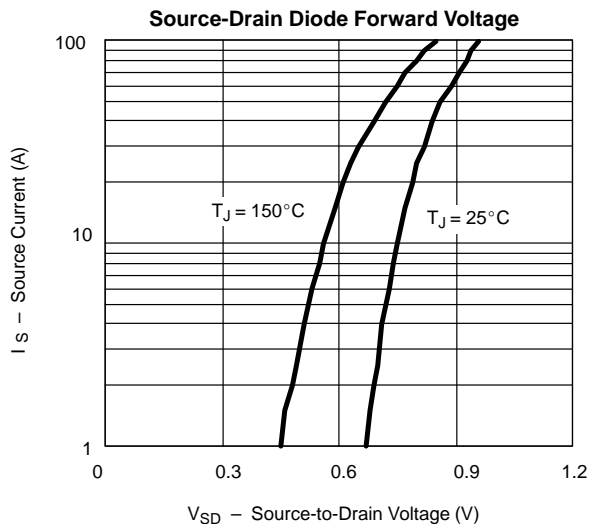
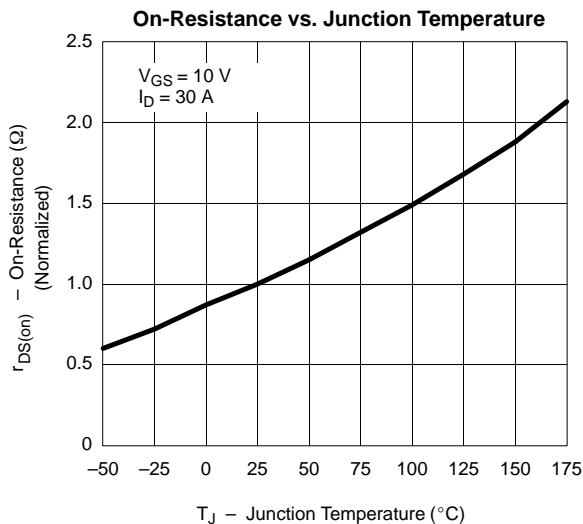
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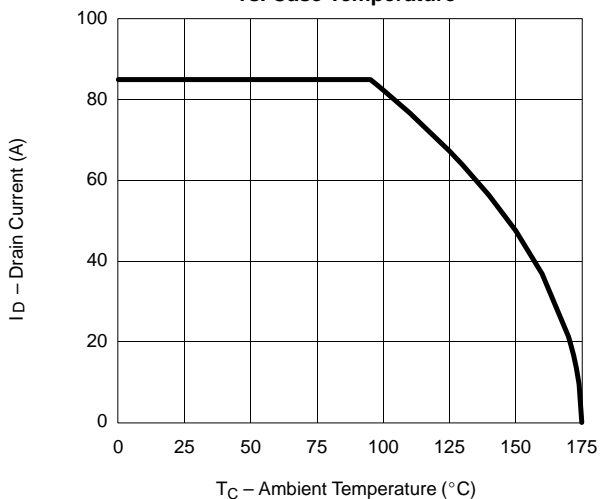
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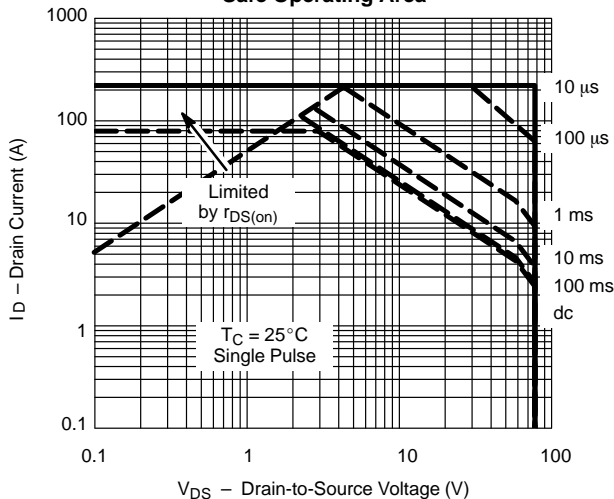


**THERMAL RATINGS**

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



**Safe Operating Area**



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

