



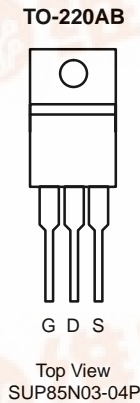
New Product

**SUP/SUB85N03-04P**  
Vishay Siliconix

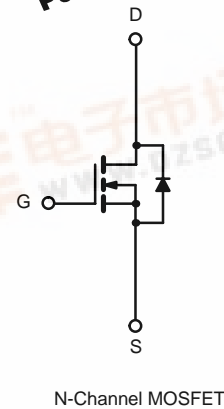
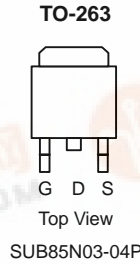
**N-Channel 30-V (D-S) 175 °C MOSFET**

PRODUCT SUMMARY		
V <sub>(BR)DSS</sub> (V)	r <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A) <sup>a</sup>
30	0.0043 @ V <sub>GS</sub> = 10 V	85 <sup>a</sup>
	0.007 @ V <sub>GS</sub> = 4.5 V	85 <sup>a</sup>

**175 °C Rated**  
Maximum Junction Temperature  
**TrenchFET<sup>®</sup>**  
Power MOSFETS



DRAIN connected to TAB



ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> = 25 °C UNLESS OTHERWISE NOTED)			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	30	V
Gate-Source Voltage	V <sub>GS</sub>	±20	
Continuous Drain Current (T <sub>J</sub> = 175 °C)	I <sub>D</sub>	T <sub>C</sub> = 25 °C	85 <sup>a</sup>
		T <sub>C</sub> = 100 °C	85 <sup>a</sup>
Pulsed Drain Current	I <sub>DM</sub>	240	A
Avalanche Current	I <sub>AR</sub>	75	
Repetitive Avalanche Energy <sup>b</sup>	E <sub>AR</sub>	280	mJ
Maximum Power Dissipation <sup>b</sup>	P <sub>D</sub>	T <sub>C</sub> = 25 °C (TO-220AB and TO-263)	166 <sup>c</sup>
		T <sub>A</sub> = 25 °C (TO-263) <sup>d</sup>	3.75
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to 175	°C

THERMAL RESISTANCE RATINGS			
Parameter	Symbol	Limit	Unit
Junction-to-Ambient	R <sub>thJA</sub>	PCB Mount (TO-263) <sup>d</sup>	40
		Free Air (TO-220AB)	62.5
Junction-to-Case	R <sub>thJC</sub>	0.9	°C/W

Notes  
 a. Package limited.  
 b. Duty cycle ≤ 1%.  
 c. See SOA curve for voltage derating.  
 d. When mounted on 1" square PCB (FR-4 material).



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	30			V
Gate-Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	1	2		
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> = 24 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 24 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C			50	
		V <sub>DS</sub> = 24 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		0.0035	0.0043	Ω
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 30 A, T <sub>J</sub> = 125 °C			0.0065	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 30 A, T <sub>J</sub> = 175 °C			0.008	
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 20 A		0.0055	0.007	
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		4500		pF
Output Capacitance	C <sub>oss</sub>			1380		
Reverse Transfer Capacitance	C <sub>rss</sub>			615		
Total Gate Charge <sup>b</sup>	Q <sub>g</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 85 A		71	90	nC
Gate-Source Charge <sup>b</sup>	Q <sub>gs</sub>			15		
Gate-Drain Charge <sup>b</sup>	Q <sub>gd</sub>			16		
Turn-On Delay Time <sup>b</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = 15 V, R <sub>L</sub> = 0.18 Ω I <sub>D</sub> ≅ 85 A, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 2.5 Ω		15	23	ns
Rise Time <sup>b</sup>	t <sub>r</sub>			12	18	
Turn-Off Delay Time <sup>b</sup>	t <sub>d(off)</sub>			50	75	
Fall Time <sup>b</sup>	t <sub>f</sub>			22	35	
<b>Source-Drain Diode Ratings and Characteristics (T<sub>C</sub> = 25 °C)<sup>c</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		1.1	1.5	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 85 A, di/dt = 100 A/μs		42	70	ns
Peak Reverse Recovery Current	I <sub>RM</sub>			1.4	2.1	A
Reverse Recovery Charge	Q <sub>rr</sub>			0.03	0.06	μC

**Notes**

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

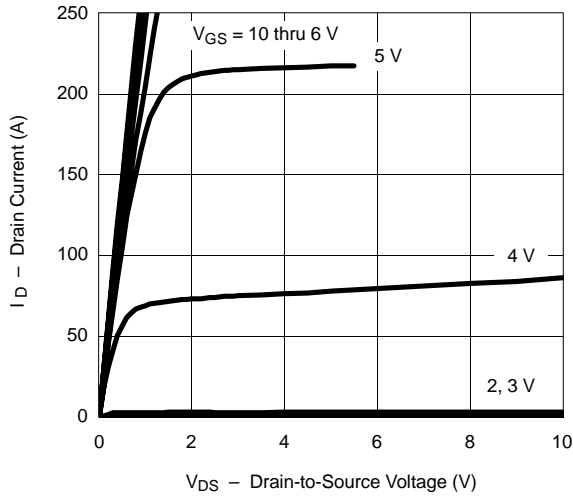


New Product

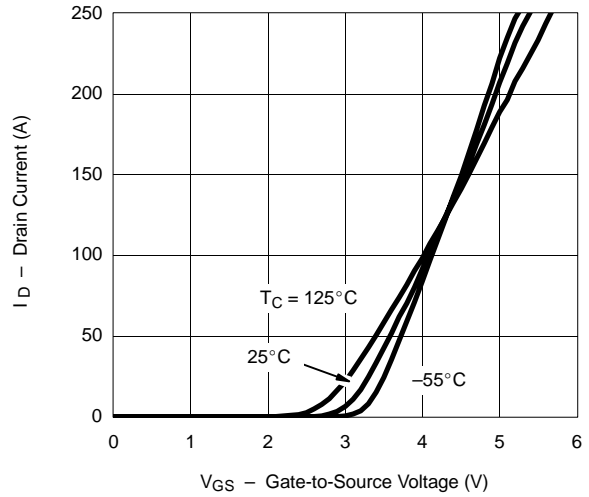
**SUP/SUB85N03-04P**  
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**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

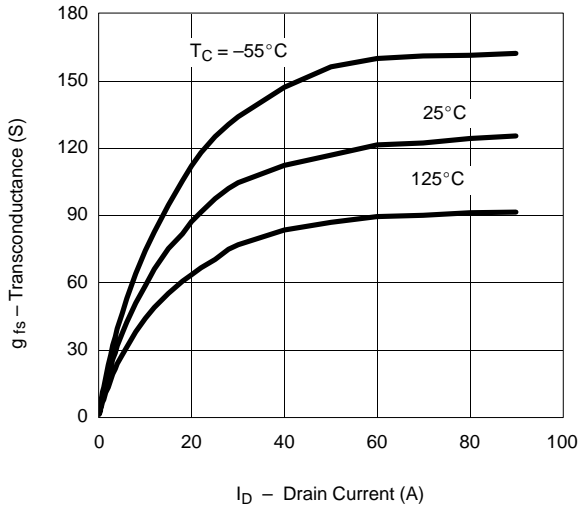
**Output Characteristics**



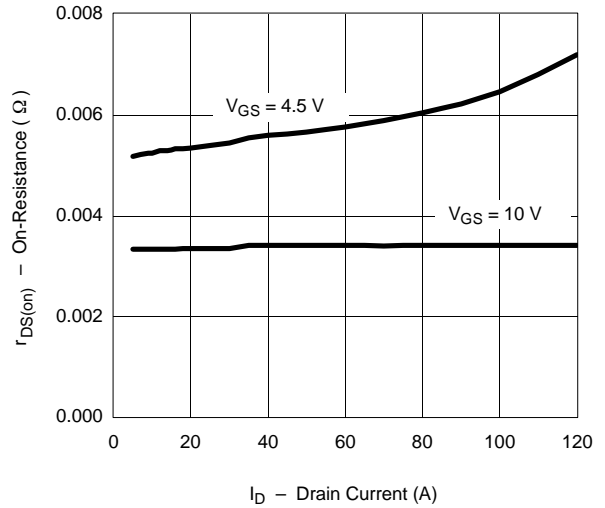
**Transfer Characteristics**



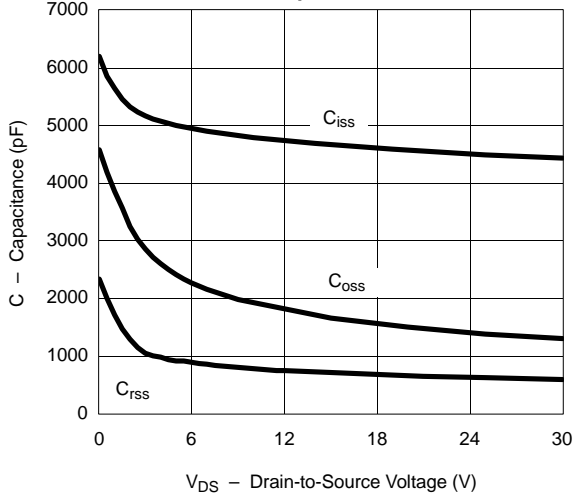
**Transconductance**



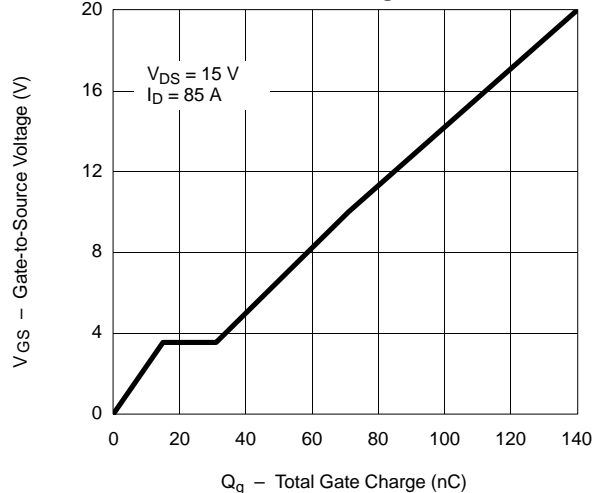
**On-Resistance vs. Drain Current**



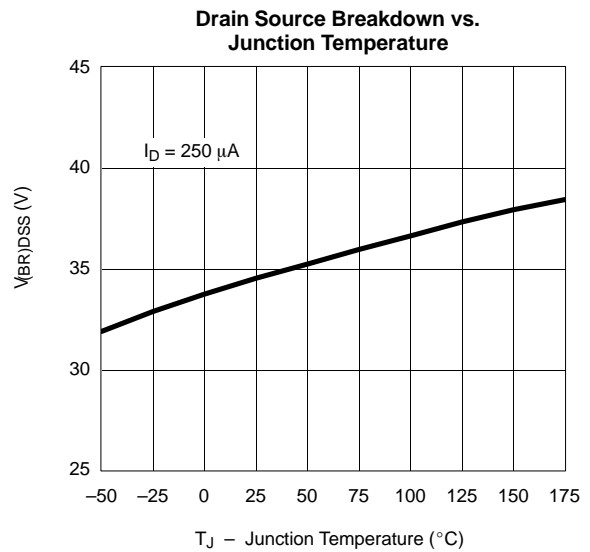
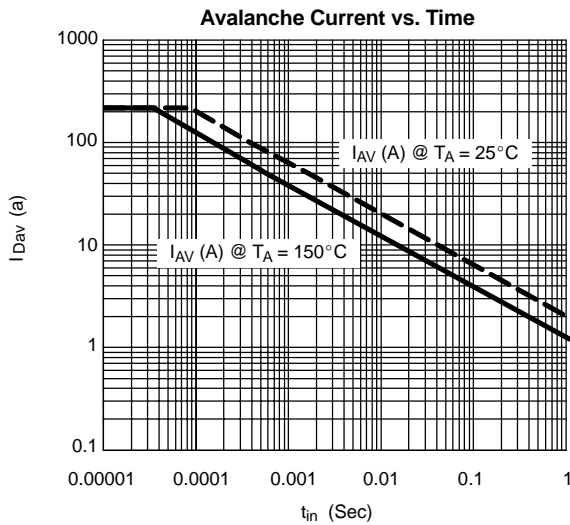
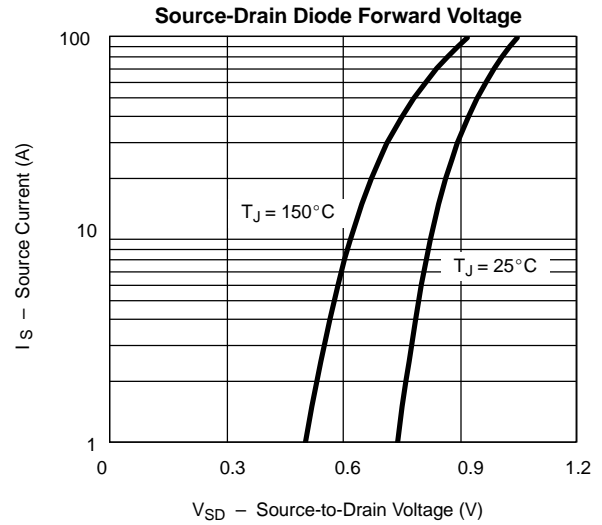
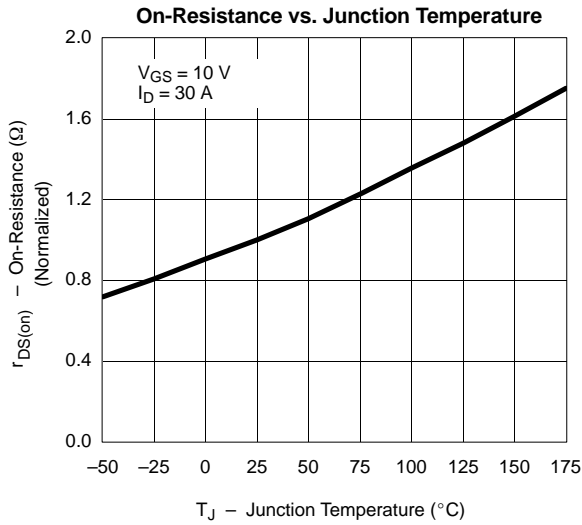
**Capacitance**



**Gate Charge**



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



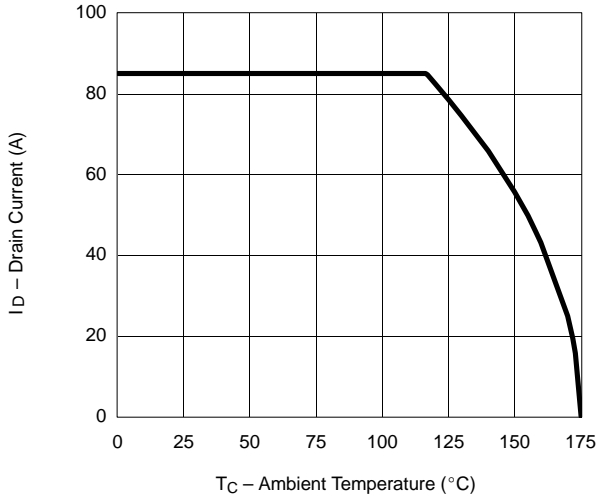


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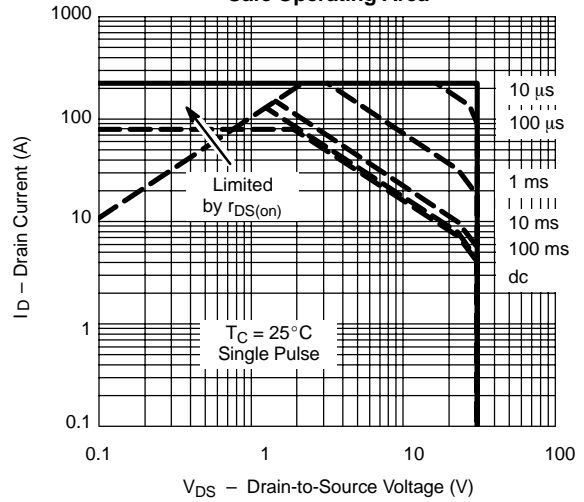
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**THERMAL RATINGS**

Maximum Avalanche and Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

