



**SUP/SUB70N03-09P**

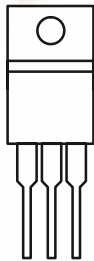
Vishay Siliconix

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

PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
30	0.009 @ $V_{GS} = 10$ V	$\pm 70^a$
	0.015 @ $V_{GS} = 4.5$ V	$\pm 55$

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

TO-220AB

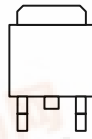


G D S

Top View

SUP70N03-09

TO-263

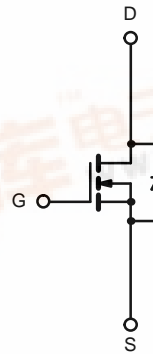


G D S

Top View

SUB70N03-09

DRAIN connected to TAB



N-Channel MOSFET

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	$\pm 30$	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 175^\circ\text{C}$ )	$I_D$	$T_C = 25^\circ\text{C}$	$\pm 70^a$
		$T_C = 100^\circ\text{C}$	$\pm 50$
Pulsed Drain Current	$I_{DM}$	$\pm 180$	A
Avalanche Current	$I_{AR}$	$\pm 45$	
Repetitive Avalanche Energy <sup>b</sup>	$E_{AR}$	101	mJ
Power Dissipation	$P_D$	93 <sup>c</sup>	W
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	$R_{thJC}$	1.6	$^\circ\text{C/W}$

Notes:

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



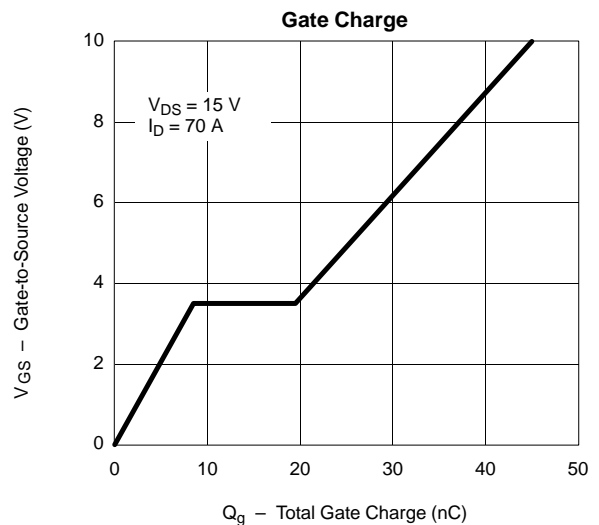
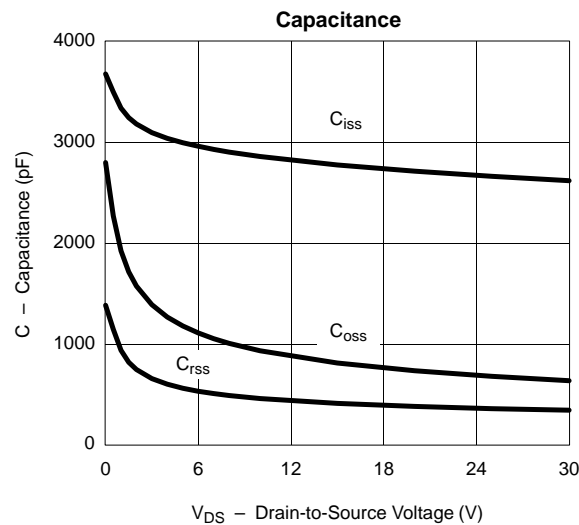
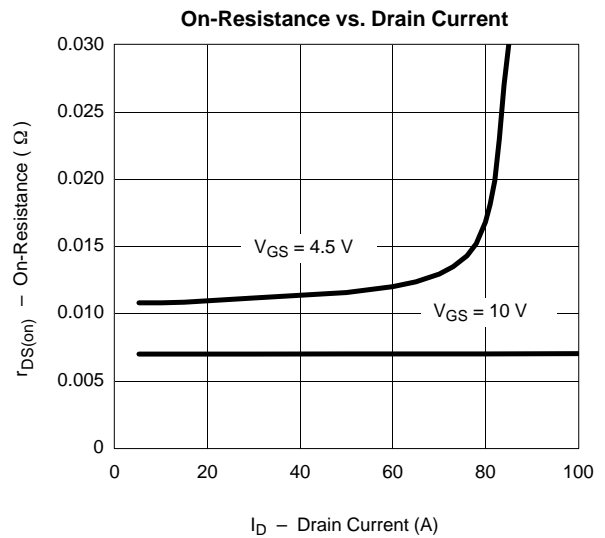
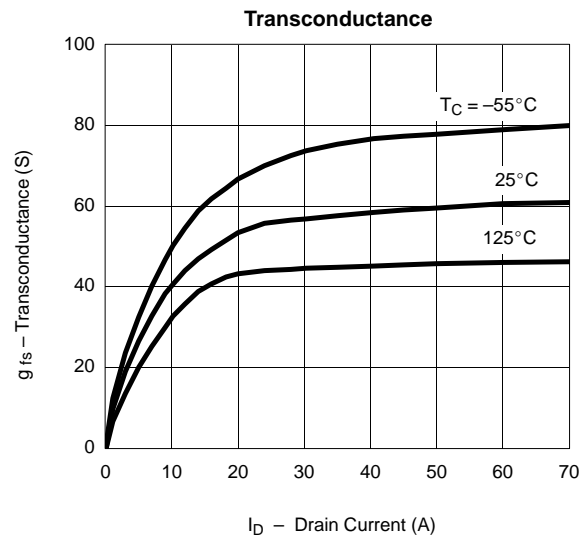
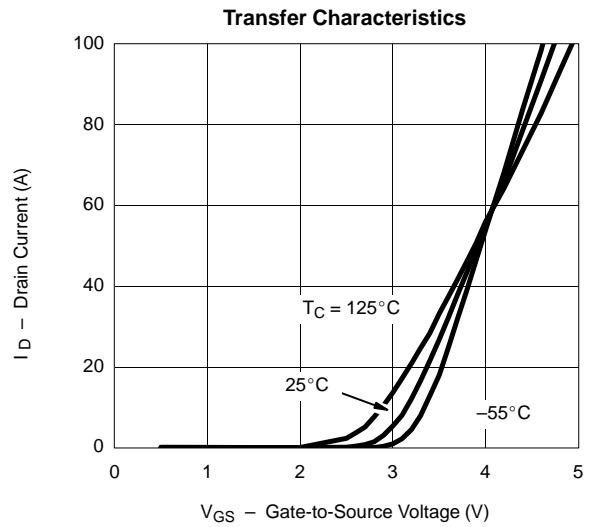
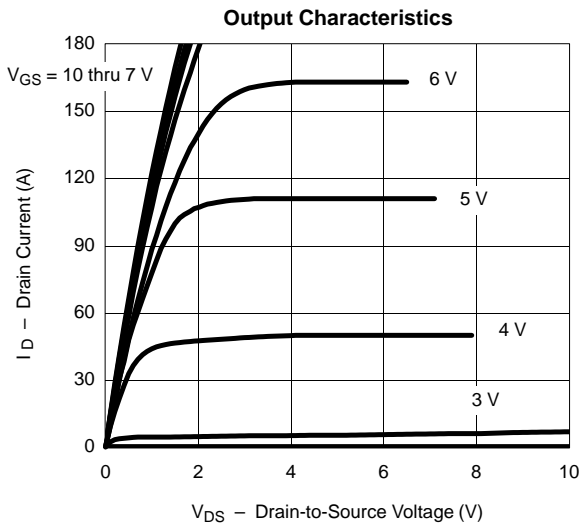
MOSFET SPECIFICATIONS (T <sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	30			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>DS</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			150	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 10 V	70			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		0.007	0.009	Ω
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 30 A, T <sub>J</sub> = 125 °C			0.0135	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 30 A, T <sub>J</sub> = 175 °C			0.017	
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 20 A		0.011	0.015	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 30 A	30	60		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		2700		pF
Output Capacitance	C <sub>oss</sub>			680		
Reverse Transfer Capacitance	C <sub>rss</sub>			360		
Total Gate Charge <sup>c</sup>	Q <sub>g</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 70 A		45	70	nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>			8.5		
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			11		
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = 15 V, R <sub>L</sub> = 0.21 Ω I <sub>D</sub> = 70 A, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 2.5 Ω		13	20	ns
Rise Time <sup>c</sup>	t <sub>r</sub>			7	15	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>			35	60	
Fall Time <sup>c</sup>	t <sub>f</sub>			12	20	
<b>Source-Drain Diode Ratings and Characteristics (T<sub>C</sub> = 25 °C)<sup>b</sup></b>						
Continuous Current	I <sub>S</sub>				70	A
Pulsed Current	I <sub>SM</sub>				180	
Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>F</sub> = 70 A, V <sub>GS</sub> = 0 V		1.2	1.5	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 70 A, di/dt = 100 A/μs		35	70	ns

Notes:

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



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

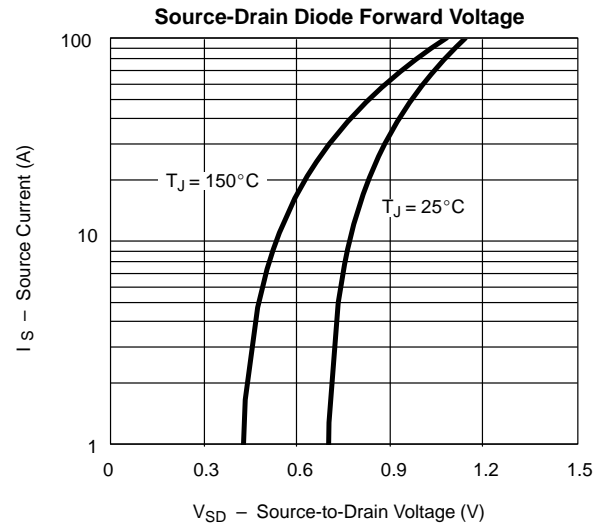
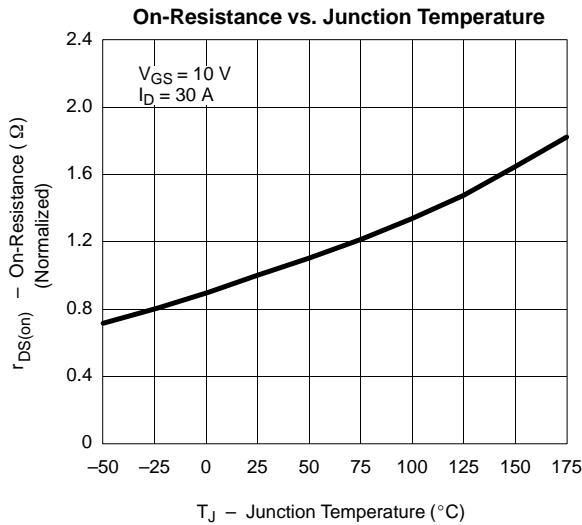


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## TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



## THERMAL RATINGS

