

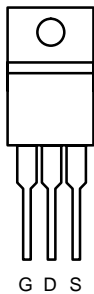


## N-Channel 30-V (D-S), 175°C, MOSFET PWM Optimized

PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
30	0.009 @ $V_{GS} = 10$ V	70 <sup>a</sup>
	0.013 @ $V_{GS} = 4.5$ V	60

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

TO-220AB

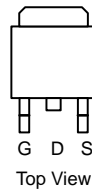


Top View

SUP70N03-09BP

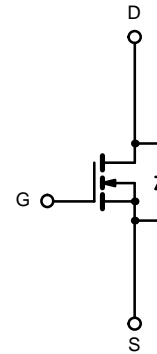
DRAIN connected to TAB

TO-263



Top View

SUB70N03-09BP



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	$V_{DS}$	30	V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$		
Continuous Drain Current ( $T_J = 175^\circ\text{C}$ )	$I_D$	$T_C = 25^\circ\text{C}$	70 <sup>b</sup>	A
		$T_C = 100^\circ\text{C}$	50	
Pulsed Drain Current	$I_{DM}$	200		
Avalanche Current	$I_{AR}$	30		
Repetitive Avalanche Energy <sup>a</sup>	$E_{AR}$	L = 0.1 mH	61	mJ
Power Dissipation			$T_C = 25^\circ\text{C}$	93 <sup>b</sup>
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>c</sup>	40	$^\circ\text{C/W}$
		Free Air (TO-220AB)	62.5	
Junction-to-Case	$R_{thJC}$	1.6		

Notes:

- a. Duty cycle  $\leq 1\%$ .
- b. See SOA curve for voltage derating.
- c. 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	0.8			
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		0.010	0.013	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 30 A	20	45		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		1500		pF
Output Capacitance	C <sub>oss</sub>			530		
Reverse Transfer Capacitance	C <sub>riss</sub>			240		
Total Gate Charge <sup>c</sup>	Q <sub>g</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 5 V, I <sub>D</sub> = 70 A		15.5	19	nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>			5		
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			6		
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		10	18	ns
Rise Time <sup>c</sup>	t <sub>r</sub>			8	15	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>			25	45	
Fall Time <sup>c</sup>	t <sub>f</sub>			9	16	
Gate Resistance	R <sub>g</sub>			2		Ω
<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>				200	
Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>F</sub> = 70 A, V <sub>GS</sub> = 0 V		1.1	1.5	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 70 A, di/dt = 100 A/μs		30	60	ns

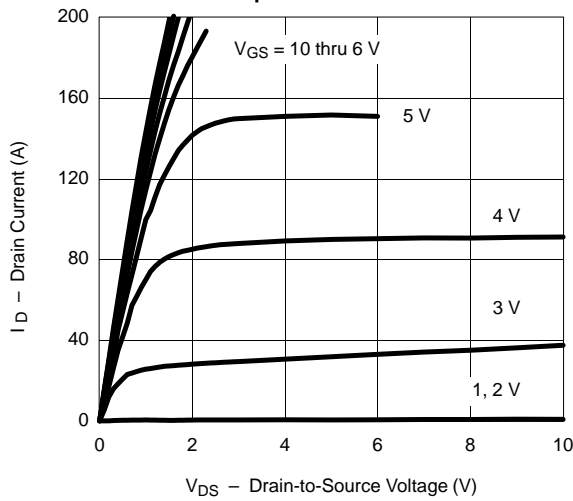
Notes:

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

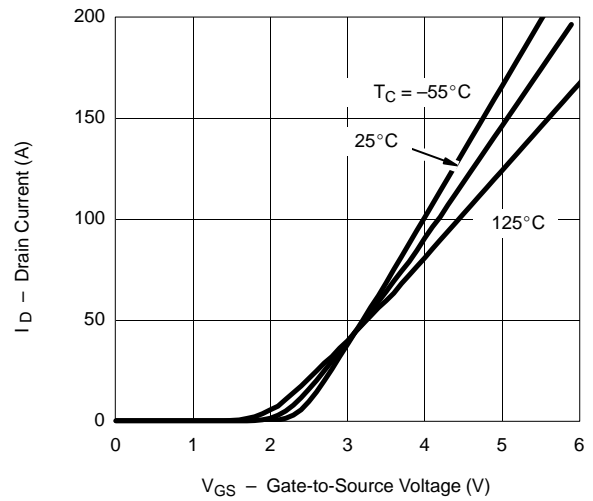


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

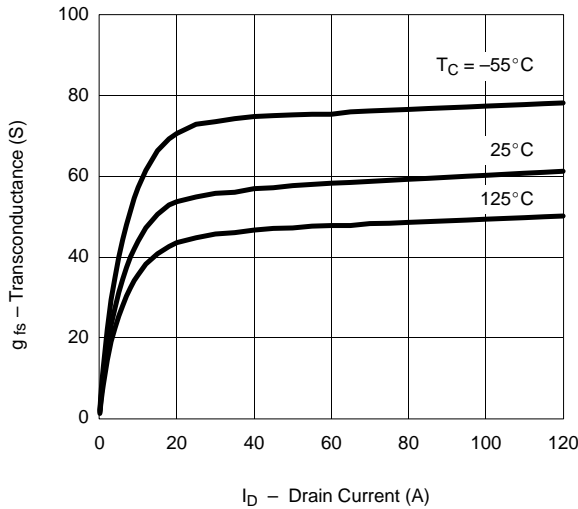
Output Characteristics



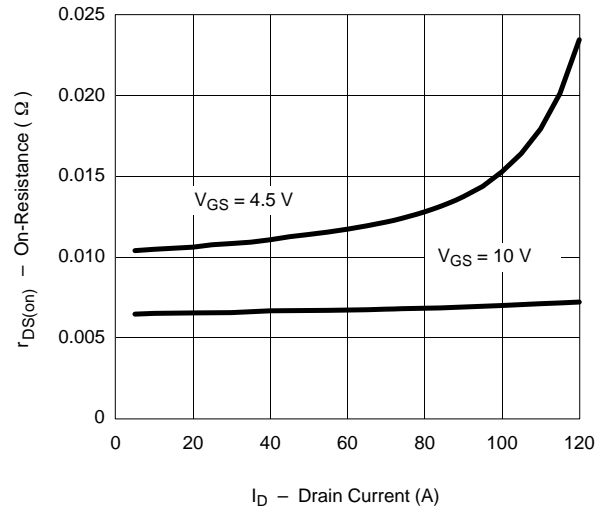
Transfer Characteristics



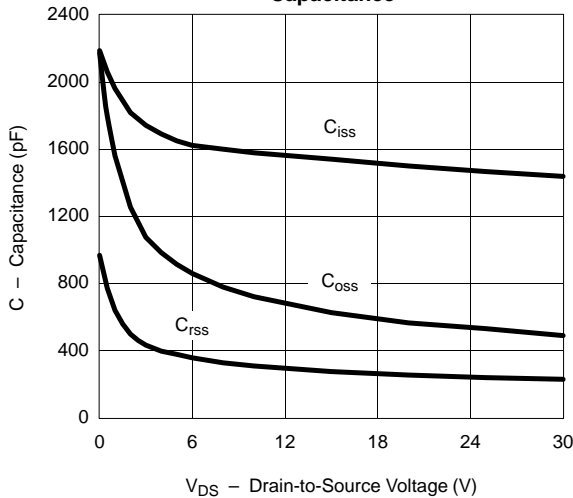
Transconductance



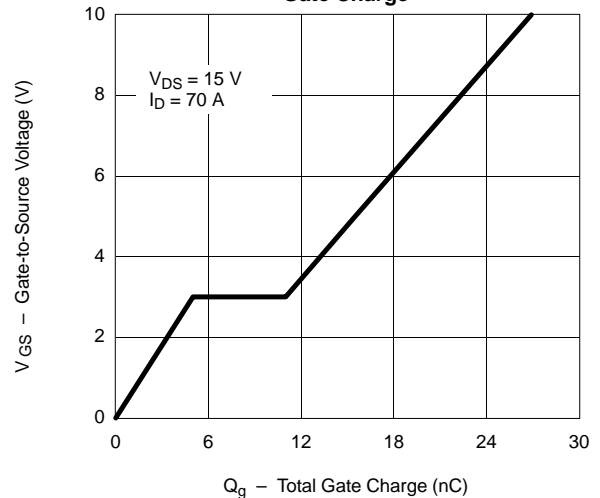
On-Resistance vs. Drain Current



Capacitance

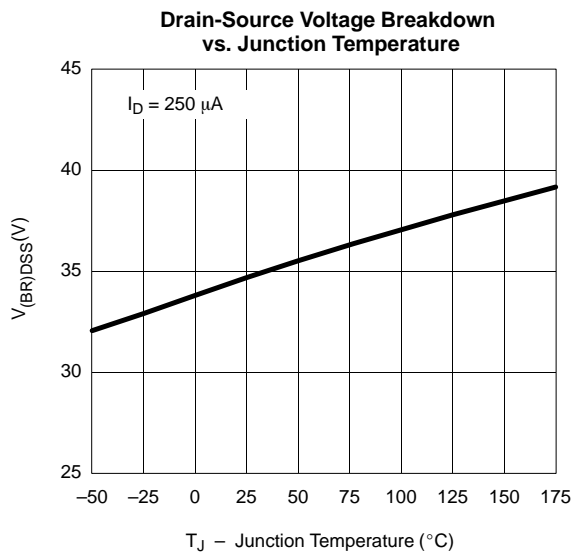
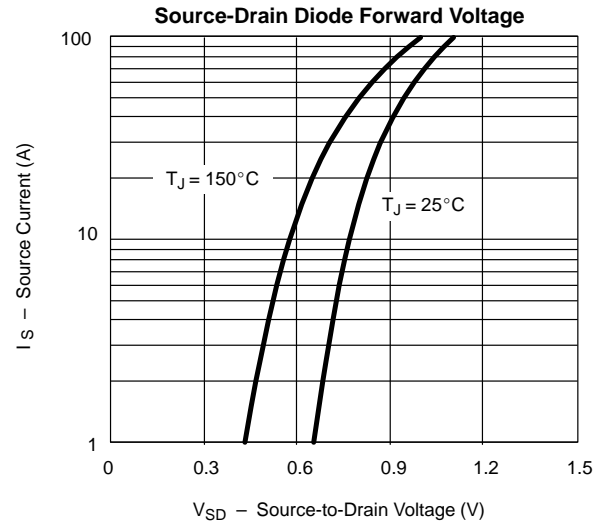
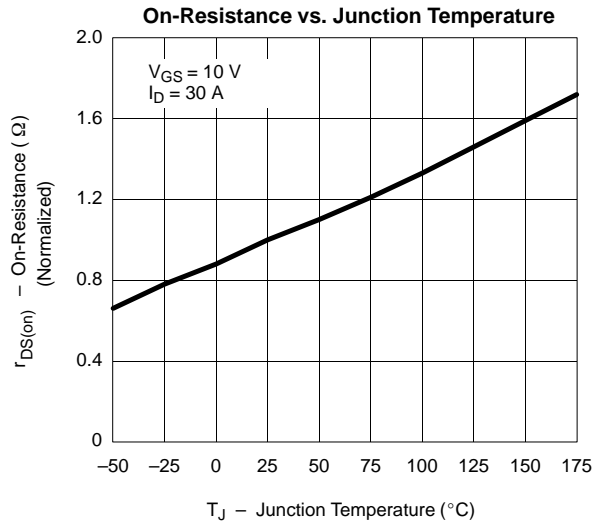


Gate Charge





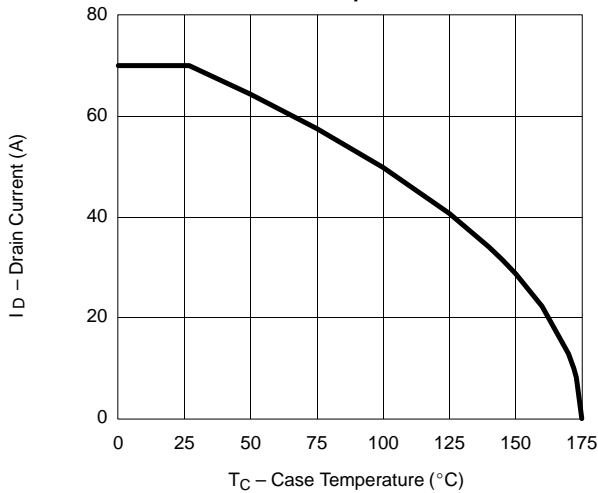
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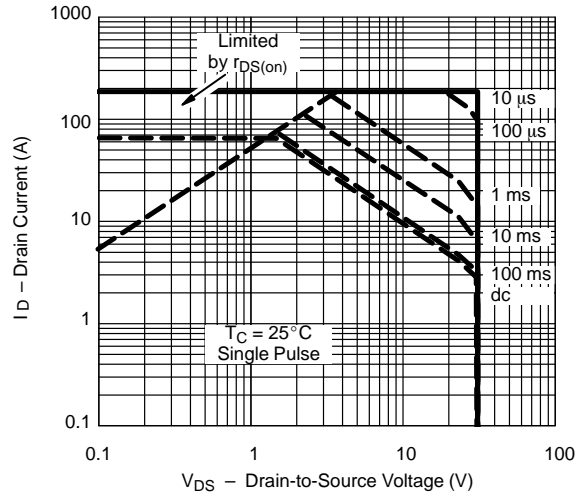


**THERMAL RATINGS**

Maximum Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

