

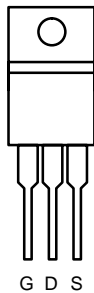


## N-Channel 55-V (D-S), 175 °C MOSFET

PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
55	0.007 @ $V_{GS} = 10$ V	$\pm 75^a$
	0.009 @ $V_{GS} = 4.5$ V	

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

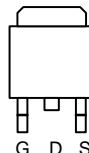
TO-220AB



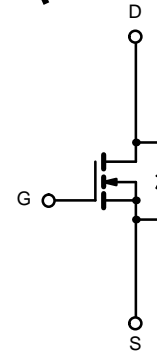
Top View  
SUP75N05-07

DRAIN connected to TAB

TO-263



Top View  
SUB75N05-07



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	55	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 175^\circ\text{C}$ )	$I_D$	$T_C = 25^\circ\text{C}$	$\pm 75^a$
		$T_C = 125^\circ\text{C}$	$\pm 60$
Pulsed Drain Current	$I_{DM}$	$\pm 240$	A
Avalanche Current	$I_{AR}$	$\pm 60$	
Repetitive Avalanche Energy <sup>b</sup>	$E_{AR}$	180	mJ
Maximum Power Dissipation	$P_D$	$T_C = 25^\circ\text{C}$ (TO-220AB and TO-263)	158 <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	$R_{thJC}$	0.95	$^\circ\text{C/W}$

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).



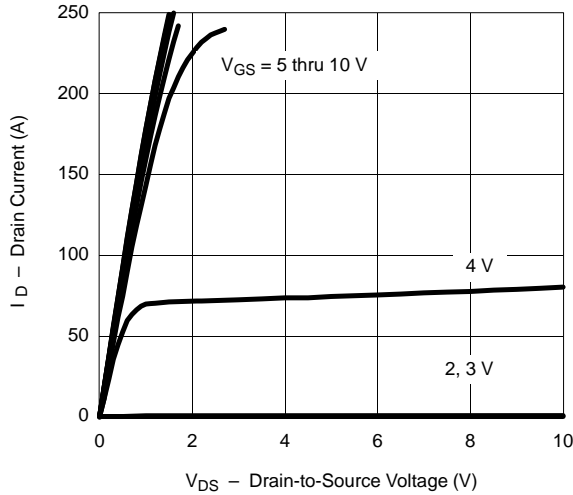
SPECIFICATIONS (T <sub>J</sub> = 25°C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>DS</sub> = 0 V, I <sub>D</sub> = 250 μA	55			V
Gate-Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	1		3	
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> = 44 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 44 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125°C			50	
		V <sub>DS</sub> = 44 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		0.0056	0.007	Ω
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 20 A		0.0072	0.009	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 30 A, T <sub>J</sub> = 125°C			0.011	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 30 A, T <sub>J</sub> = 175°C			0.015	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 30 A	40			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		6830		pF
Output Capacitance	C <sub>oss</sub>			720		
Reverse Transfer Capacitance	C <sub>rss</sub>			350		
Total Gate Charge <sup>c</sup>	Q <sub>g</sub>	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 75 A		135	170	nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>			25		
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			34		
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = 30 V, R <sub>L</sub> = 0.47 Ω I <sub>D</sub> ≅ 75 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>			11	20	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>			90	160	
Fall Time <sup>c</sup>	t <sub>f</sub>			25	40	
<b>Source-drain Diode Ratings and Characteristics (T<sub>c</sub> = 25°C)<sup>b</sup></b>						
Continuous Current	I <sub>S</sub>				75	A
Pulsed Current	I <sub>SM</sub>				240	
Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>F</sub> = 75 A, V <sub>GS</sub> = 0 V		1.0	1.3	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 75 A, di/dt = 100 A/μs		45	80	ns
Peak Reverse Recovery Current	I <sub>RM(REC)</sub>			2	5	A
Reverse Recovery Charge	Q <sub>rr</sub>			0.09	0.4	μC

Notes

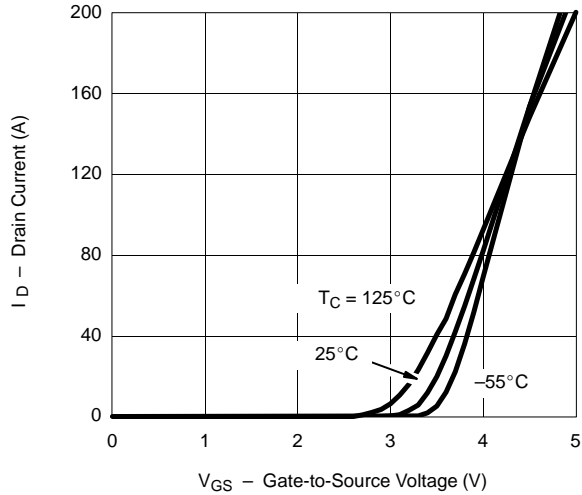
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

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

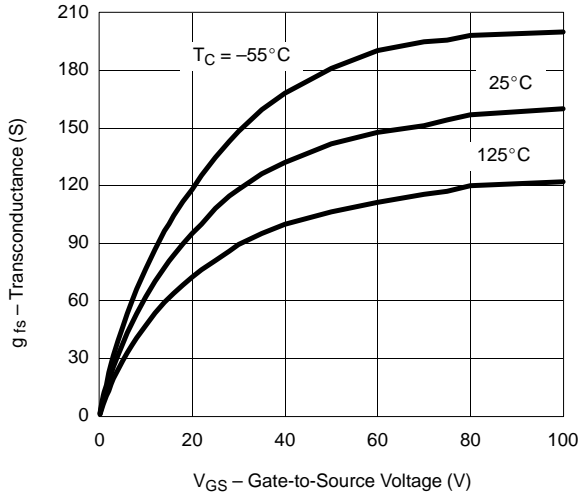
**Output Characteristics**



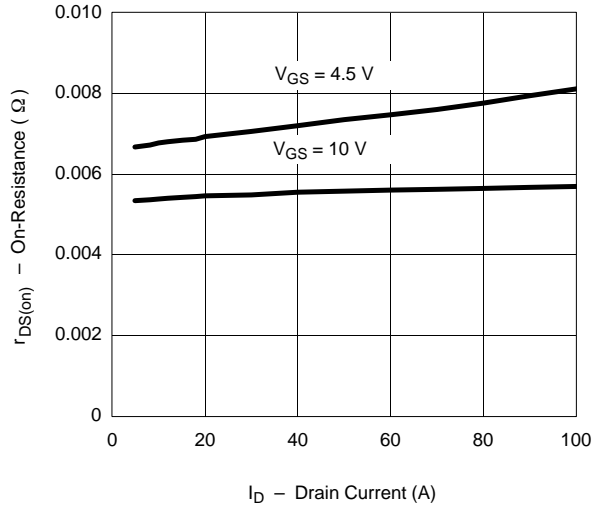
**Transfer Characteristics**



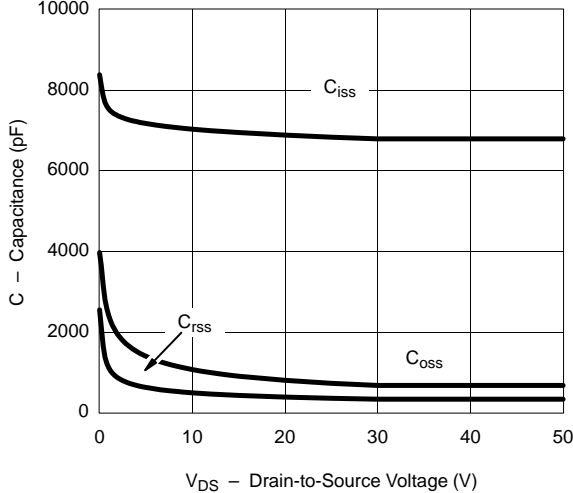
**Transconductance**



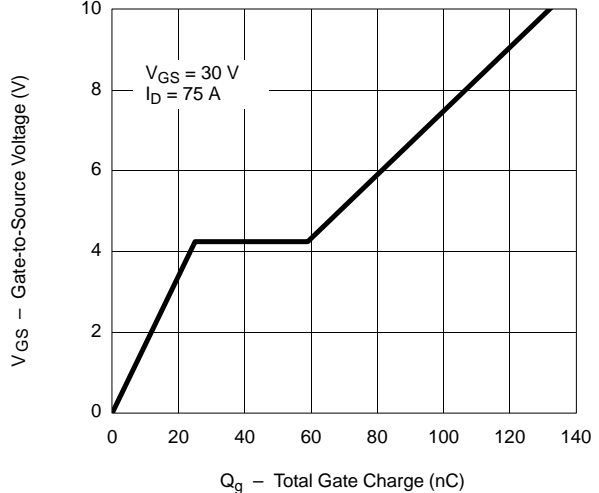
**On-Resistance vs. Drain Current**



**Capacitance**

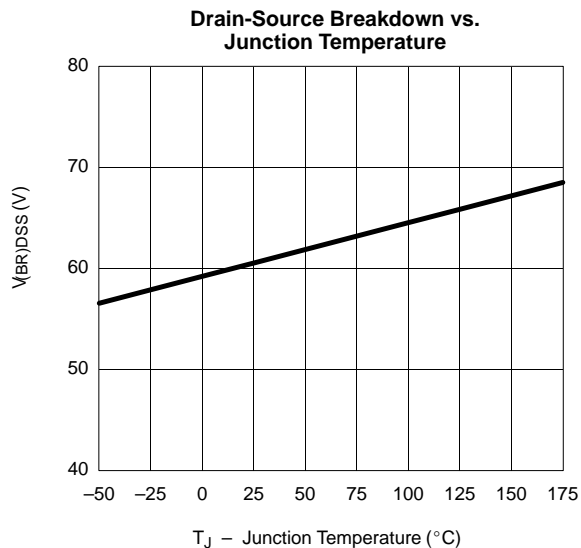
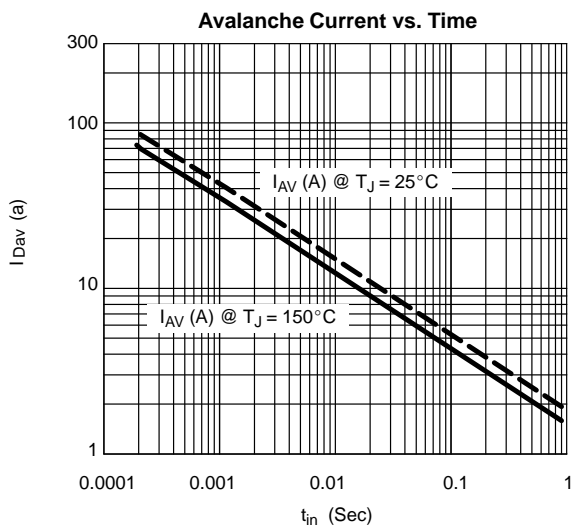
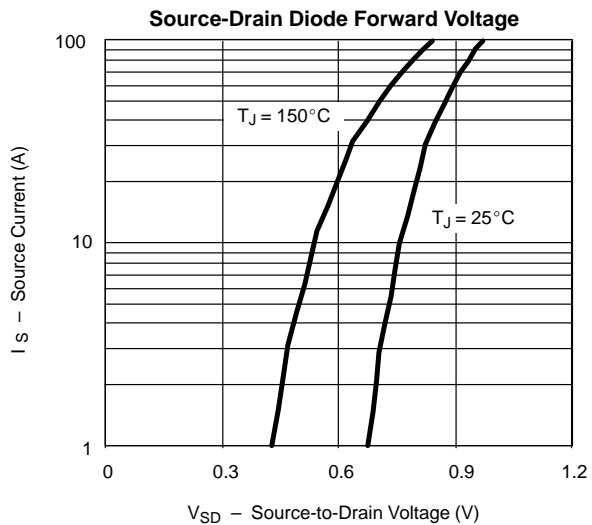
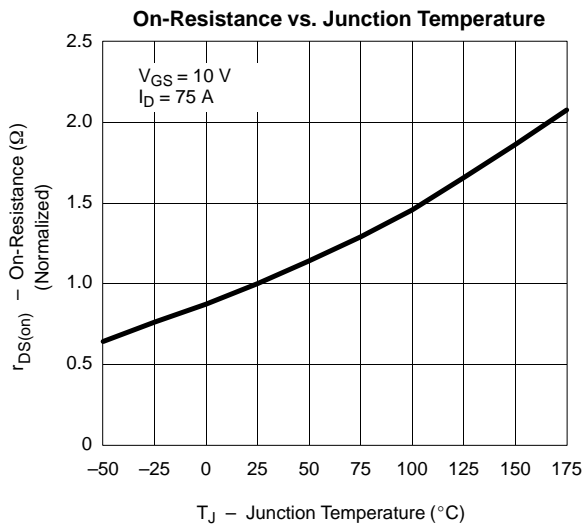


**Gate Charge**





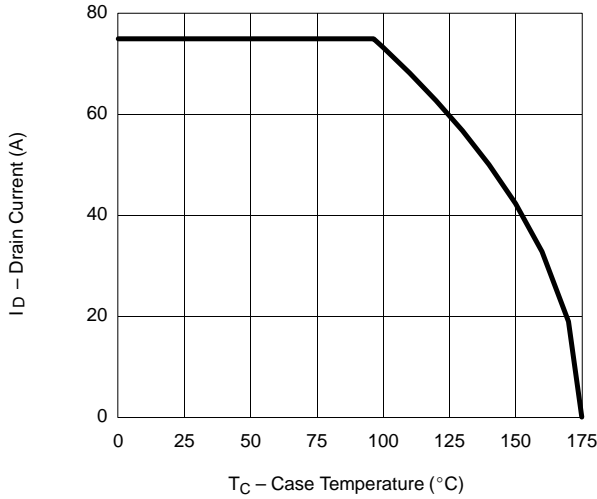
**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**



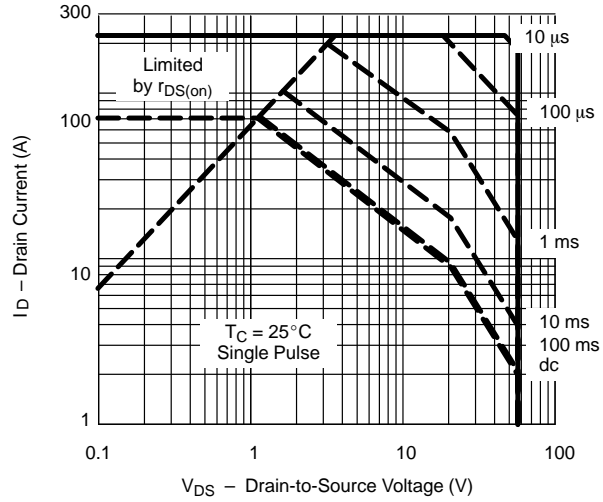


**THERMAL RATINGS**

Maximum Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

