

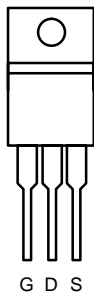


## N-Channel 50-V (D-S), 175°C MOSFET

### PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
50	0.006	75

TO-220AB

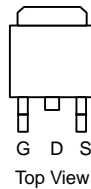


Top View

SUP75N05-06

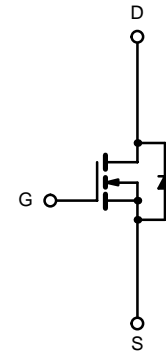
DRAIN connected to TAB

TO-263



Top View

SUB75N05-06



N-Channel MOSFET

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

Parameter	Symbol	Limit	Unit
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_J = 175^\circ\text{C}$ )	$I_D$	$T_C = 25^\circ\text{C}$	75 <sup>a</sup>
		$T_C = 125^\circ\text{C}$	70
Pulsed Drain Current	$I_{DM}$	240	A
Avalanche Current	$I_{AR}$	75	
Repetitive Avalanche Energy <sup>b</sup>	$E_{AR}$	280	mJ
Power Dissipation	$P_D$	$T_C = 25^\circ\text{C}$ (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

- 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).



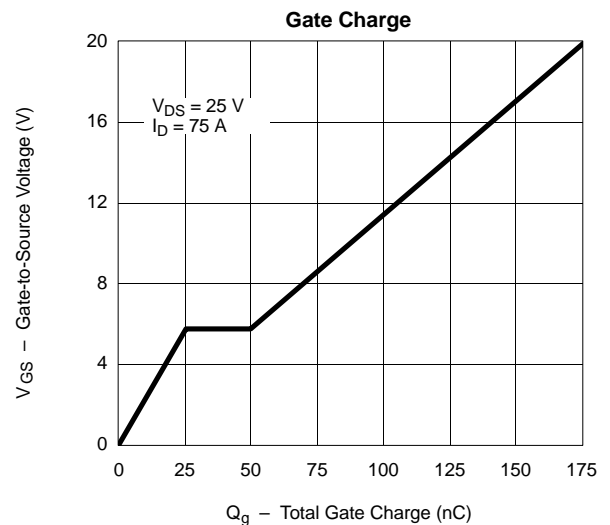
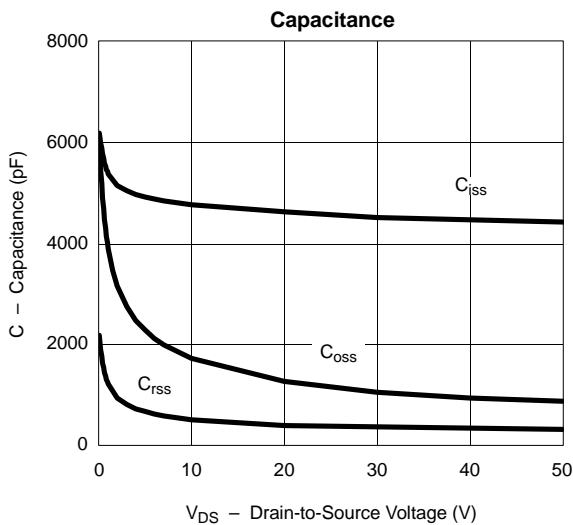
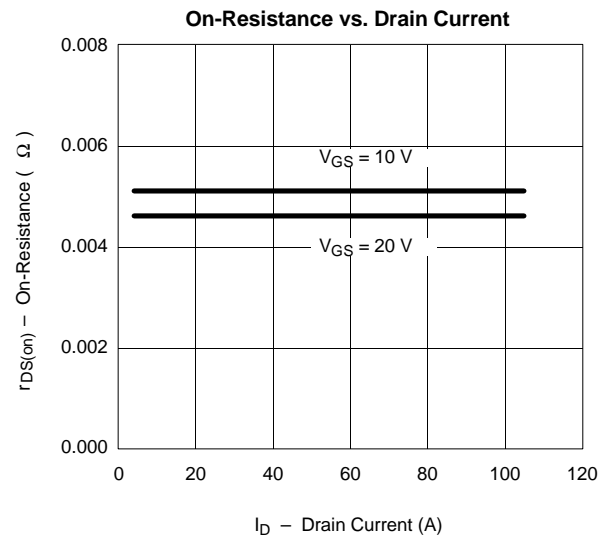
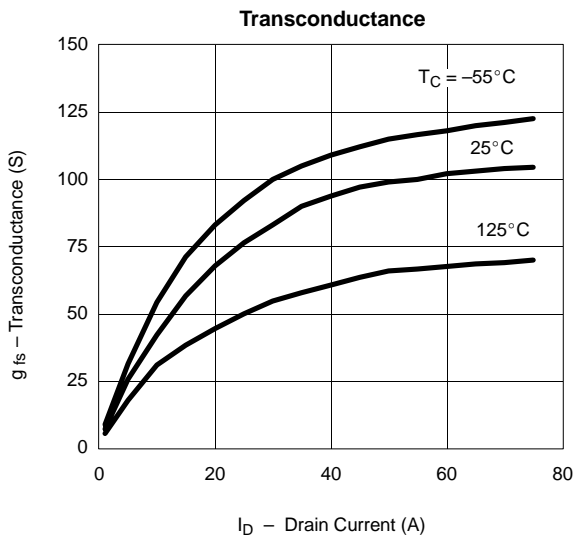
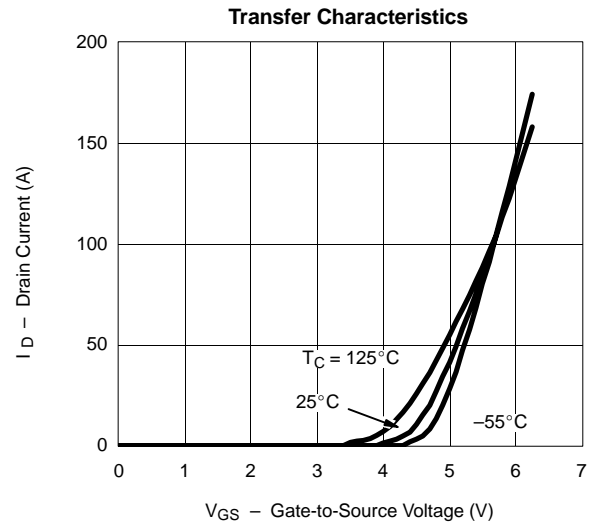
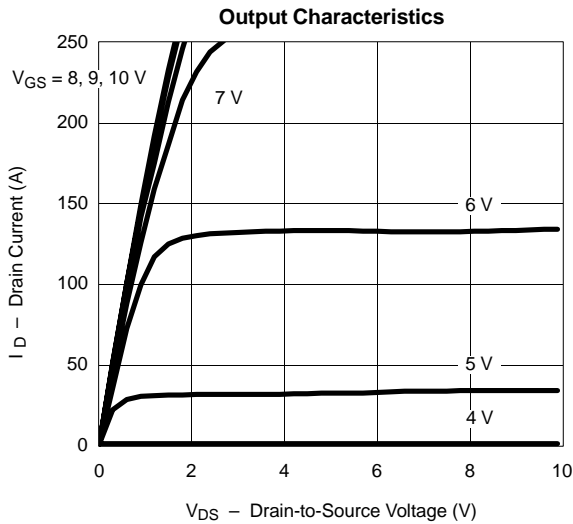
SPECIFICATIONS (T <sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	50			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	2.0		4.0	
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> = 50 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 50 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C			50	
		V <sub>DS</sub> = 50 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	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> = 75 A		0.005	0.006	Ω
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 75 A, T <sub>J</sub> = 125 °C			0.010	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 75 A, T <sub>J</sub> = 175 °C			0.012	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 60 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>			1100		
Reverse Transfer Capacitance	C <sub>rSS</sub>			360		
Total Gate Charge <sup>c</sup>	Q <sub>g</sub>	V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 75 A		85	120	nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>			25		
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> = 25 V, R <sub>L</sub> = 0.33 Ω I <sub>D</sub> = 75 A, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 2.5 Ω		20	40	ns
Rise Time <sup>c</sup>	t <sub>r</sub>			20	100	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>			50	100	
Fall Time <sup>c</sup>	t <sub>f</sub>			20	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>				200	
Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>F</sub> = 75 A, V <sub>GS</sub> = 0 V		1.0	1.4	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 75 A, di/dt = 100 A/μs		65	120	ns
Peak Reverse Recovery Current	I <sub>RM(REC)</sub>			5	8	A
Reverse Recovery Charge	Q <sub>rr</sub>			0.16	0.48	μC

Notes

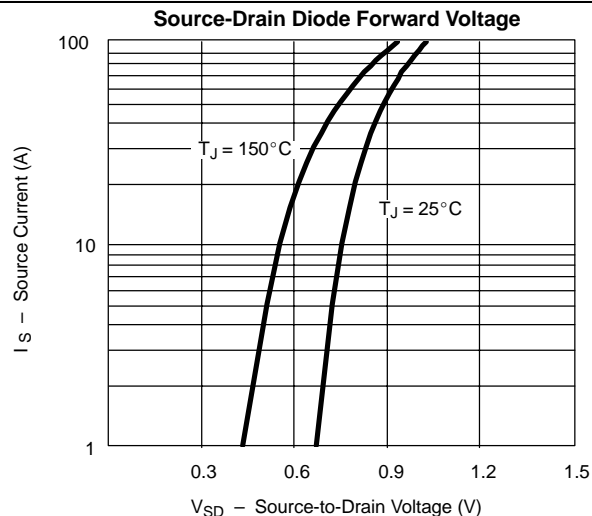
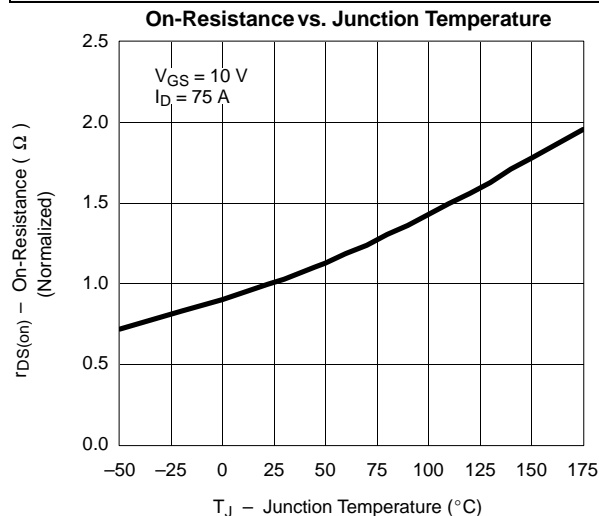
- a. Pulse test: pulse width ≤ 300 μsec, duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.



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



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**THERMAL RATINGS**

