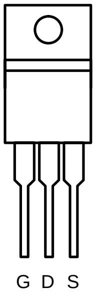
N-Channel 55-V (D-S), 175°C MOSFET

PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
55	0.007 @ V_{GS} = 10 V	± 75 [a]
	0.009 @ V_{GS} = 4.5 V	

175°C Rated
Maximum Junction Temperature
TrenchFET®
Power MOSFETs

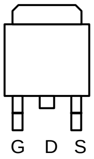
TO-220AB



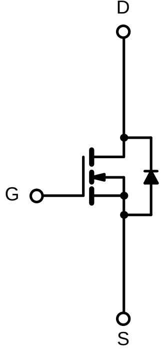
DRAIN connected to TAB

Top View
SUP75N05-07

TO-263



Top View
SUB75N05-07



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_C = 25°C UNLESS OTHERWISE NOTED)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	55	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 175°C)	T_C = 25°C	I_D	± 75[a]	A
	T_C = 125°C		± 60	
Pulsed Drain Current		I_{DM}	± 240	
Avalanche Current		I_{AR}	± 60	
Repetitive Avalanche Energy[b]	L = 0.1 mH	E_{AR}	180	mJ
Maximum Power Dissipation	T_C = 25°C (TO-220AB and TO-263)	P_D	158[c]	W
	T_A = 25°C (TO-263)[d]		3.7	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 175	°C

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Limit	Unit
Junction-to-Ambient	PCB Mount (TO-263)[d]	R_{thJA}	40	°C/W
	Free Air (TO-220AB)		62.5	
Junction-to-Case		R_{thJC}	0.95	

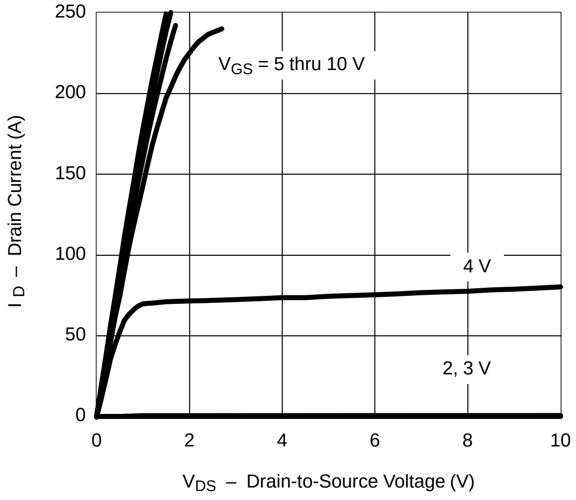
Notes
a. Package limited.
b. Duty cycle ≤ 1%.
c. See SOA curve for voltage derating.
d. When mounted on 1” square PCB (FR-4 material).

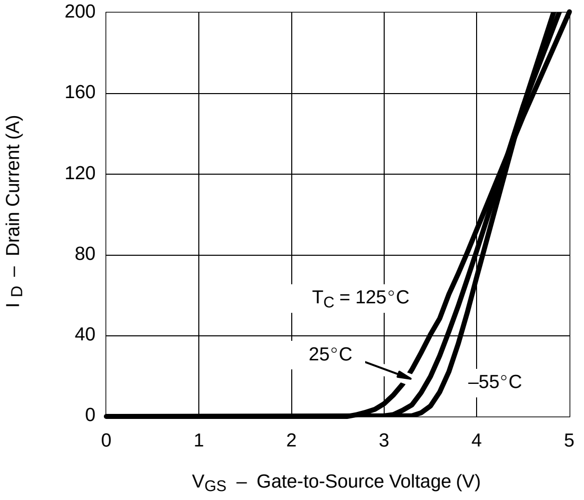
SPECIFICATIONS (T_J =25°C UNLESS OTHERWISE NOTED)

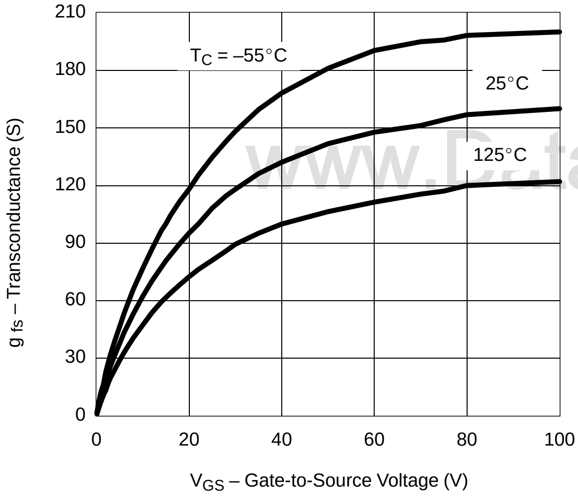
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{DS} = 0 V, I_D = 250 µA	55			V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	1		3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 44 V, V_{GS} = 0 V			1	µA
		V_{DS} = 44 V, V_{GS} = 0 V, T_J = 125°C			50	
		V_{DS} = 44 V, V_{GS} = 0 V, T_J = 175°C			250	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq 5$ V, V_{GS} = 10 V	120			A
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 30 A		0.0056	0.007	Ω
		V_{GS} = 4.5 V, I_D = 20 A		0.0072	0.009	
		V_{GS} = 10 V, I_D = 30 A, T_J = 125°C			0.011	
		V_{GS} = 10 V, I_D = 30 A, T_J = 175°C			0.015	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 30 A	40			S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		6830		pF
Output Capacitance	C_{oss}			720		
Reverse Transfer Capacitance	C_{rss}			350		
Total Gate Charge[c]	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 75 A		135	170	nC
Gate-Source Charge[c]	Q_{gs}			25		
Gate-Drain Charge[c]	Q_{gd}			34		
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 30 V, R_L = 0.47 Ω $I_D \cong$ 75 A, V_{GEN} = 10 V, R_G = 2.5 Ω		13	20	ns
Rise Time[c]	t_r			11	20	
Turn-Off Delay Time[c]	$t_{d(off)}$			90	160	
Fall Time[c]	t_f			25	40	
Source-drain Diode Ratings and Characteristics (T_c = 25°C)[b]						
Continuous Current	I_S				75	A
Pulsed Current	I_{SM}				240	
Forward Voltage[a]	V_{SD}	I_F = 75 A, V_{GS} = 0 V		1.0	1.3	V
Reverse Recovery Time	t_{rr}	I_F = 75 A, di/dt = 100 A/µs		45	80	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			2	5	A
Reverse Recovery Charge	Q_{rr}			0.09	0.4	µC

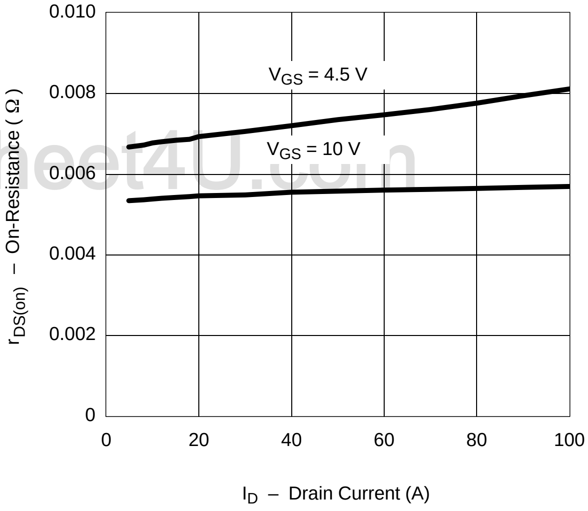
Notes
- a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

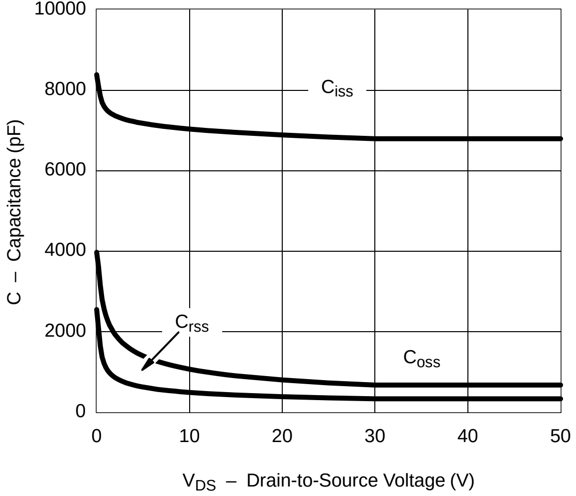
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

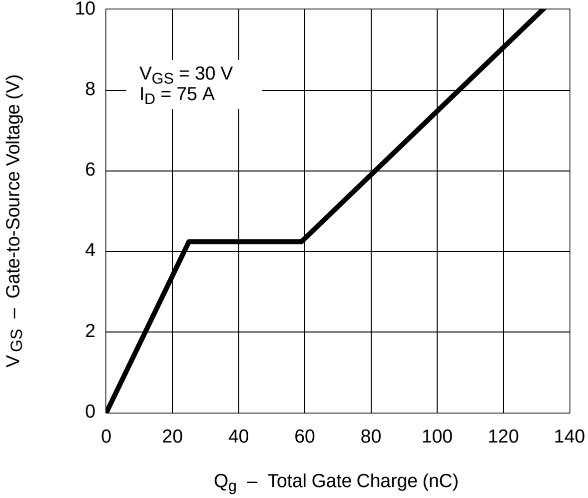

Output Characteristics


Transfer Characteristics

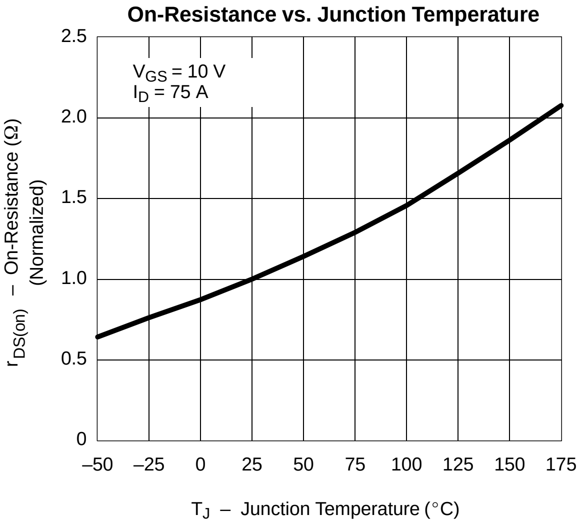

Transconductance

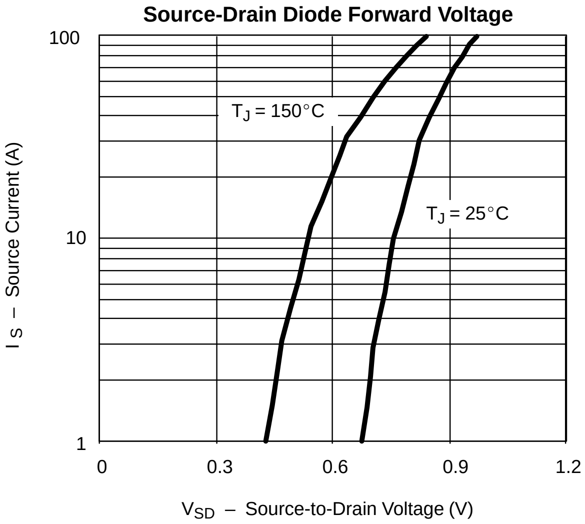

On-Resistance vs. Drain Current

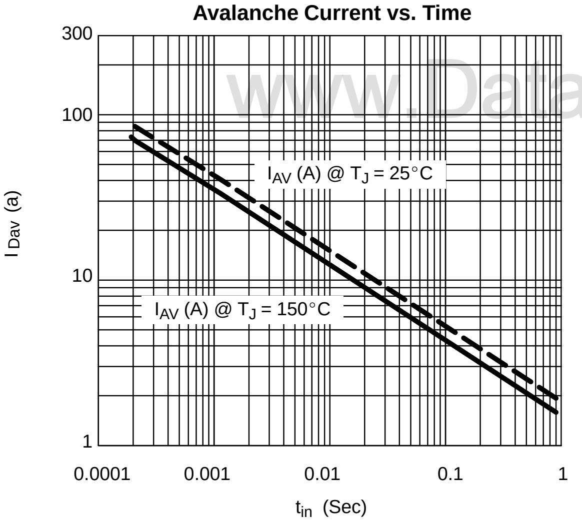

Capacitance

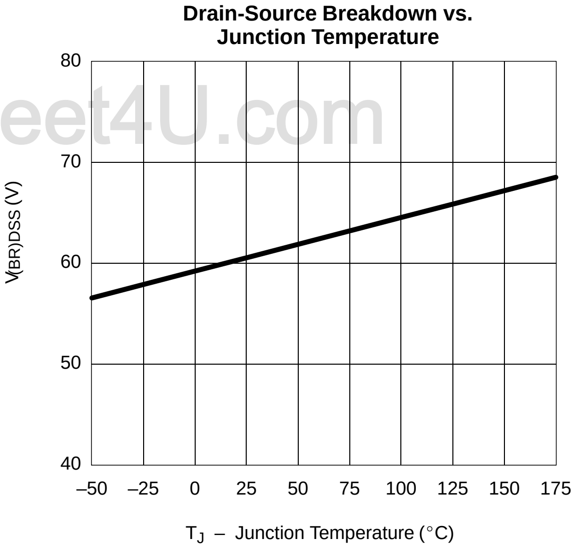

Gate Charge

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

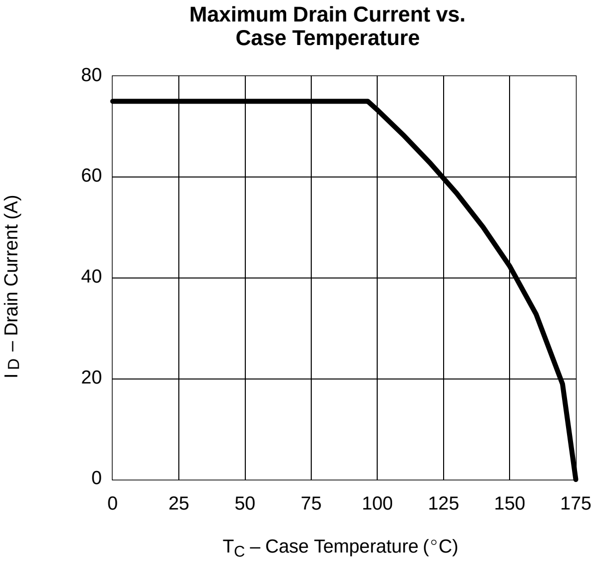


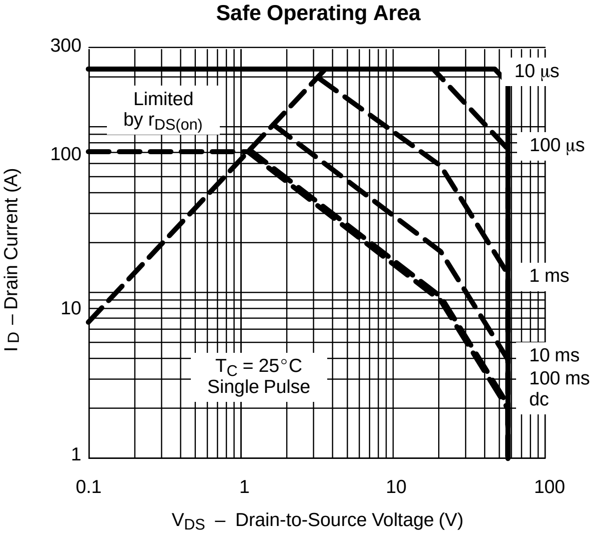


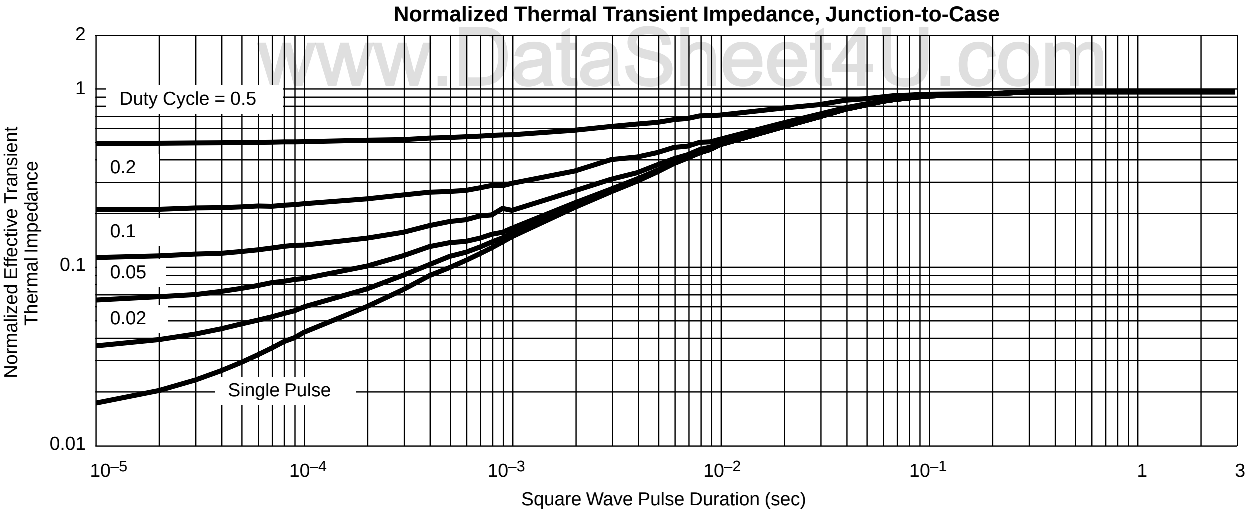




THERMAL RATINGS







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