SUP/SUB75N03-07

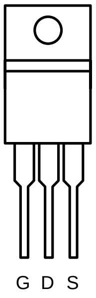
Vishay Siliconix

N-Channel 30-V (D-S) 175°C MOSFET

175°C Rated
Maximum Junction Temperature
TrenchFET®
Power MOSFETs

PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.007 @ V_{GS} = 10 V	75[a]
	0.01 @ V_{GS} = 4.5 V	70

TO-220AB

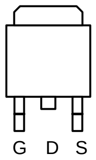


Top View

SUP75N03-07

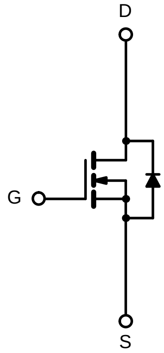
DRAIN connected to TAB

TO-263



Top View

SUB75N03-07



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	30	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 = 100°C		64	
Pulsed Drain Current		I_{DM}	240	
Avalanche Current		I_{AR}	75	
Repetitive Avalanche Energy[b]	L = 0.1 mH	E_{AR}	280	mJ
Power Dissipation	T_C = 25°C	P_D	120[c]	W
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}	1.25	

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).

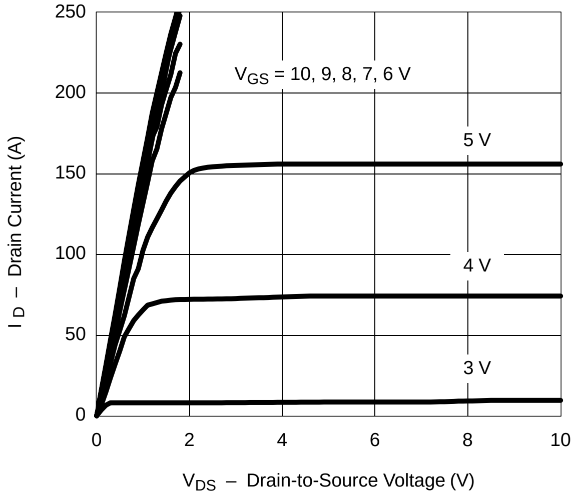
MOSFET SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0$ V, $I_D = 250$ µA	30			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_{DS} = 250$ µA	1	2		
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = \pm 20$ V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30$ V, $V_{GS} = 0$ V			1	µA
		$V_{DS} = 30$ V, $V_{GS} = 0$ V, $T_J = 125$°C			50	
		$V_{DS} = 30$ V, $V_{GS} = 0$ V, $T_J = 175$°C			150	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} = 5$ V, $V_{GS} = 10$ V	120			A
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	$V_{GS} = 10$ V, $I_D = 30$ A		0.006	0.007	Ω
		$V_{GS} = 10$ 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	
		$V_{GS} = 4.5$ V, $I_D = 20$ A			0.01	
Forward Transconductance[a]	g_{fs}	$V_{DS} = 15$ V, $I_D = 30$ A	20			S
Dynamic[b]						
Input Capacitance	C_{iss}	$V_{GS} = 0$ V, $V_{DS} = 25$ V, f = 1 MHz		5600		pF
Output Capacitance	C_{oss}			1100		
Reversen Transfer Capacitance	C_{rss}			450		
Total Gate Charge[c]	Q_g	$V_{DS} = 15$ V, $V_{GS} = 10$ V, $I_D = 75$ A		70	130	nC
Gate-Source Charge[c]	Q_{gs}			18		
Gate-Drain Charge[c]	Q_{gd}			10		
Turn-On Delay Time[c]	$t_{d(on)}$	$V_{DD} = 15$ V, $R_L = 0.2$ Ω $I_D \simeq 75$ A, $V_{GEN} = 10$ V, $R_G = 2.5$ Ω		18	30	ns
Rise Time[c]	t_r			12	20	
Turn-Off Delay Time[c]	$t_{d(off)}$			60	120	
Fall Time[c]	t_f			22	40	
Source-Drain Diode Ratings and Characteristics (T_C = 25°C)[b]						
Continuous Current	I_S				75	A
Pulsed Current	I_{SM}				200	
Forward Voltage[a]	V_{SD}	$I_F = 75$ A, $V_{GS} = 0$ V		1.2	1.5	V
Reverse Recovery Time	t_{rr}	$I_F = 75$ A, di/dt = 100 A/µs		55	100	ns

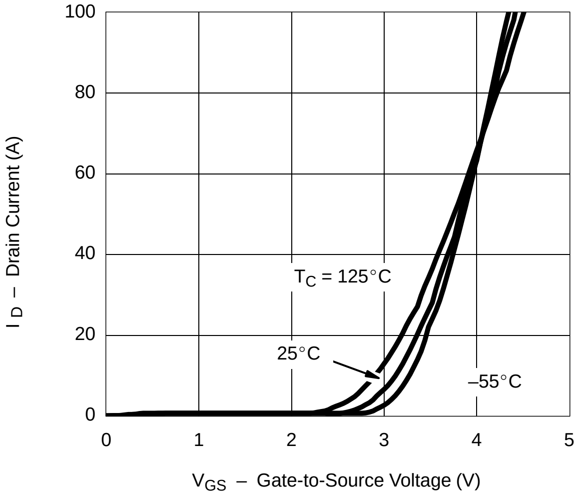
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

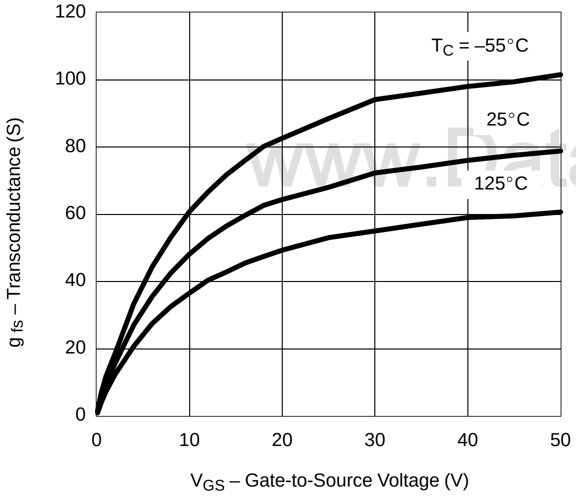
Output Characteristics



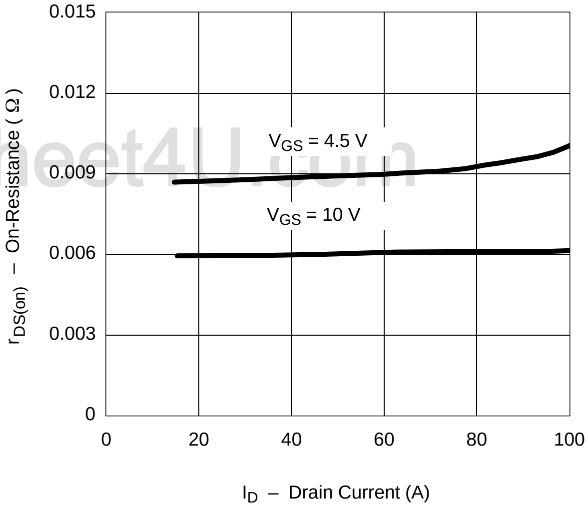
Transfer Characteristics



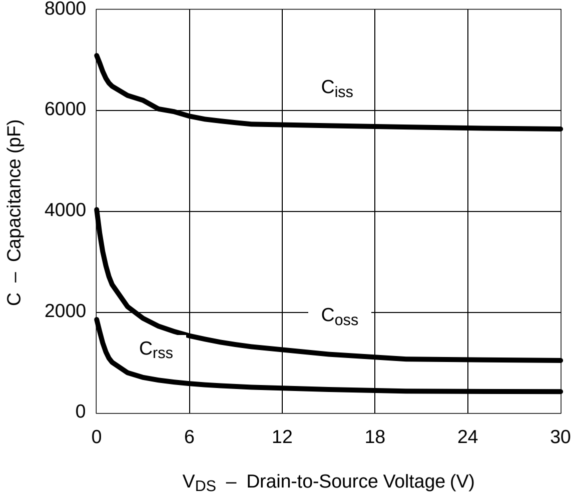
Transconductance



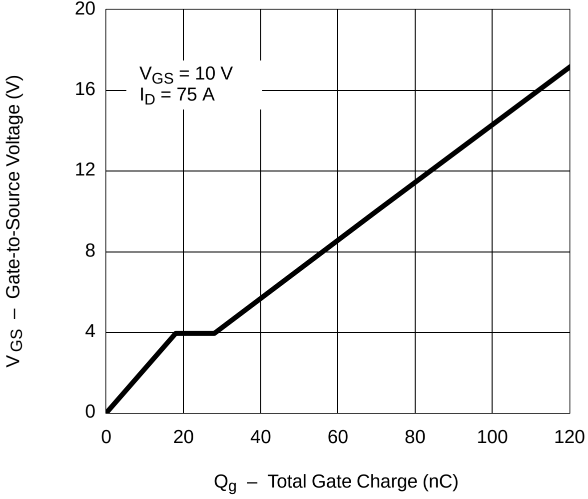
On-Resistance vs. Drain Current



Capacitance

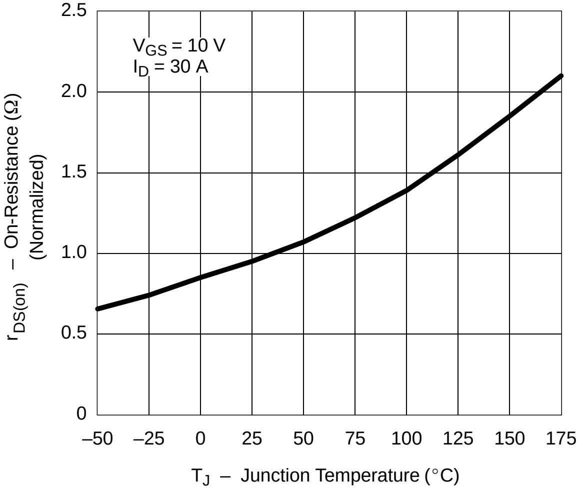


Gate Charge

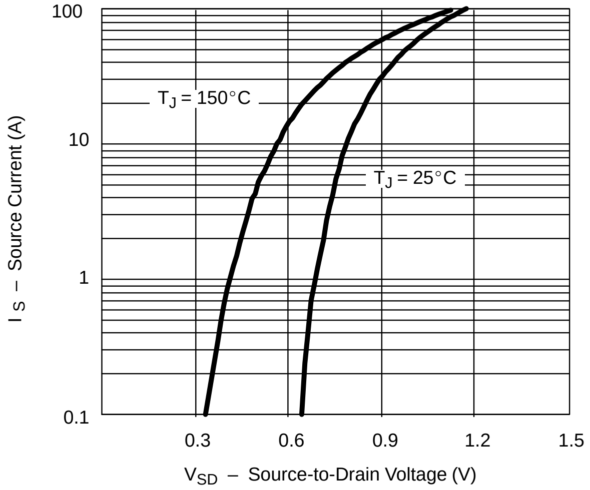


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

On-Resistance vs. Junction Temperature

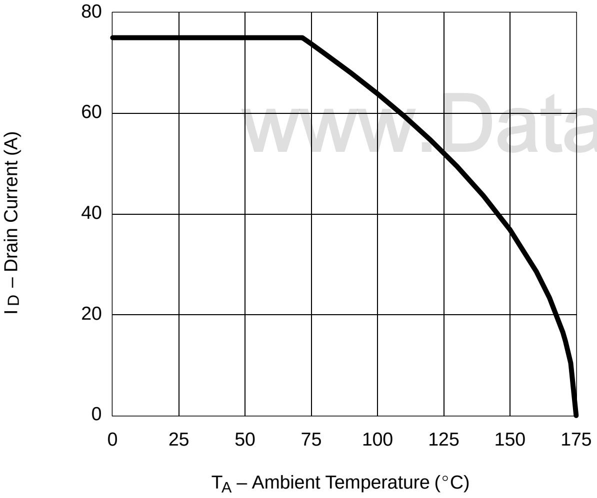


Source-Drain Diode Forward Voltage

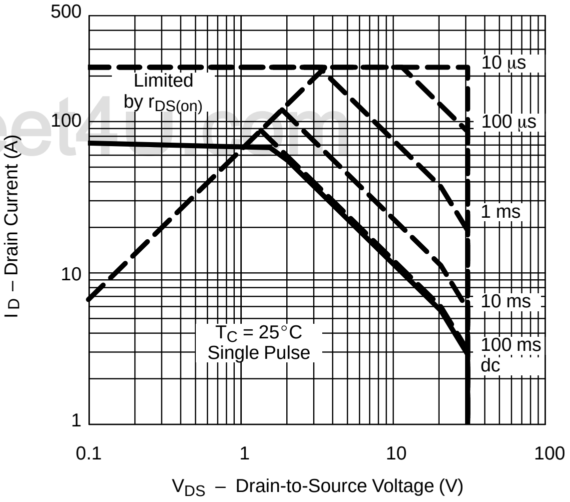


THERMAL RATINGS

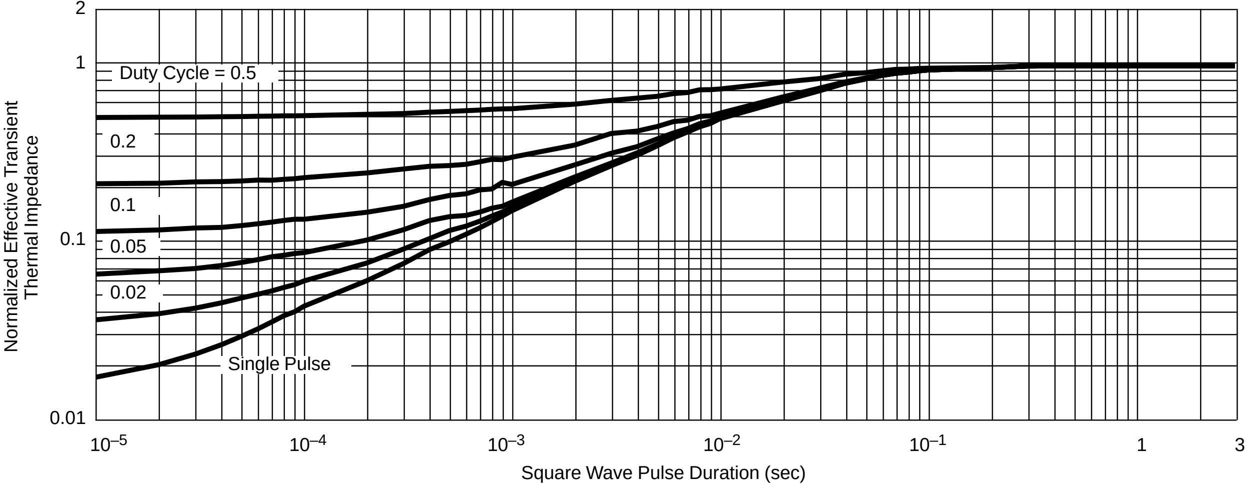
Maximum Drain Current vs. Ambiemt Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case



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