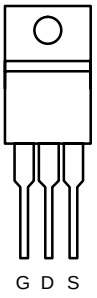
N-Channel 30-V (D-S), 175°C MOSFET

PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.004	75[a]

175°C Rated
Maximum Junction Temperature
TrenchFET®
Power MOSFETs

TO-220AB

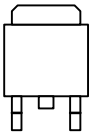


G D S

Top View
SUP75N03-04

DRAIN connected to TAB

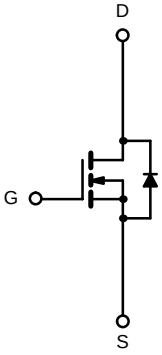
TO-263



G D S

Top View
SUB75N03-04

DRAIN connected to TAB



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_C = 25°C UNLESS OTHERWISE NOTED)				
Parameter		**Symbol**	**Limit**	**Unit**
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current (T_J = 175°C)	T_C = 25°C	I_D	75[a]	A
	T_C = 125°C		75[a]	
Pulsed Drain Current		I_{DM}	250	
Continuous Source Current (Diode Conduction)		I_S	75	
Avalanche Current		I_{AR}	75	
Avalanche Energy	L = 0.1 mH	E_{AS}	280	mJ
Repetitive Avalanche Energy[b]	L = 0.05 mH	E_{AR}	140	
Maximum Power Dissipation	T_C = 25°C (TO-220AB and TO-263)	P_D	187[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
Lead Temperature ($^1/_{16}$" from case for 10 sec.)	TO-220AB	T_L	300	

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}	0.6	

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).

For SPICE model information via the Worldwide Web: http://www.vishay.com/www/product/spice.htm

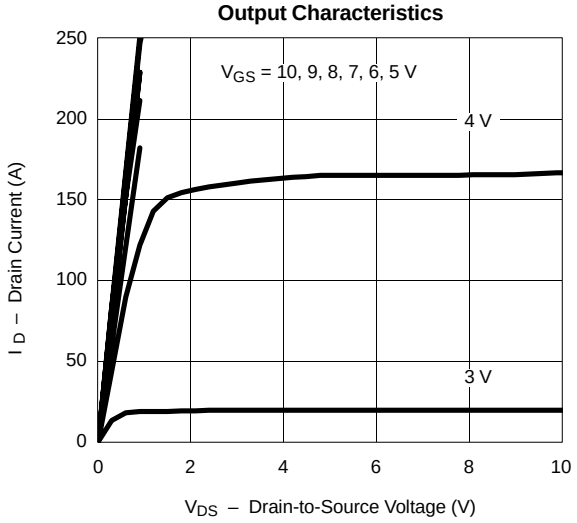
SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ[a]	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_D = 250 μA	1		3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±500	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			200	
On-State Drain Current[b]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V	120			A
Drain-Source On-State Resistance[b]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 75 A		0.0034	0.004	Ω
		V_{GS} = 4.5 V, I_D = 75 A		0.005	0.006	
		V_{GS} = 10 V, I_D = 25 A, T_J = 125°C			0.006	
		V_{GS} = 10 V, I_D = 25 A, T_J = 175°C			0.008	
Forward Transconductance[b]	g_{fs}	V_{DS} = 15 V, I_D = 25 A	30			S
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		10742		pF
Output Capacitance	C_{oss}			1811		
Reverse Transfer Capacitance	C_{rss}			775		
Total Gate Charge	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 75 A		200	250	nC
Gate-Source Charge	Q_{gs}			40		
Gate-Drain Charge	Q_{gd}			40		
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 30 V, R_L = 0.6 Ω I_D ≅ 50 A, V_{GEN} = 10 V, R_G = 2.5 Ω		20	40	ns
Rise Time	t_r			40		
Turn-Off Delay Time	$t_{d(off)}$			190		
Fall Time	t_f			95		
Source-Drain Diode Ratings and Characteristics						
Diode Forward Voltage[b]	V_{SD}	I_F = 75 A, V_{GS} = 0 V			1.3	V
Reverse Recovery Time	t_{rr}	I_F = 50 A, di/dt = 100 A/μs		70	120	ns
Peak Reverse Recovery Current	$I_{RM(rec)}$			2.8	6	A
Reverse Recovery Charge	Q_{rr}			0.1	0.36	μC

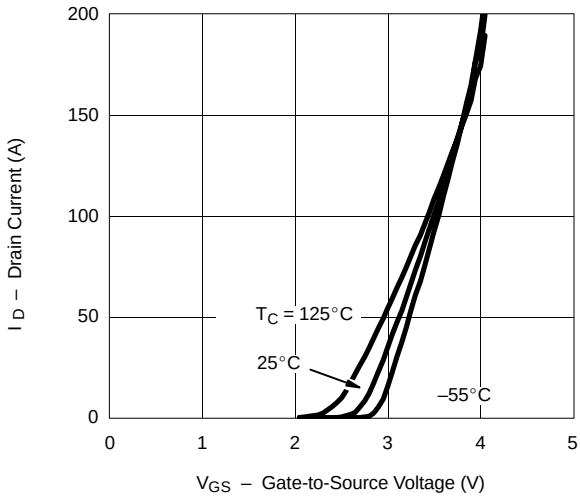
Notes:
a. For design aid only; not subject to production testing.
b. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

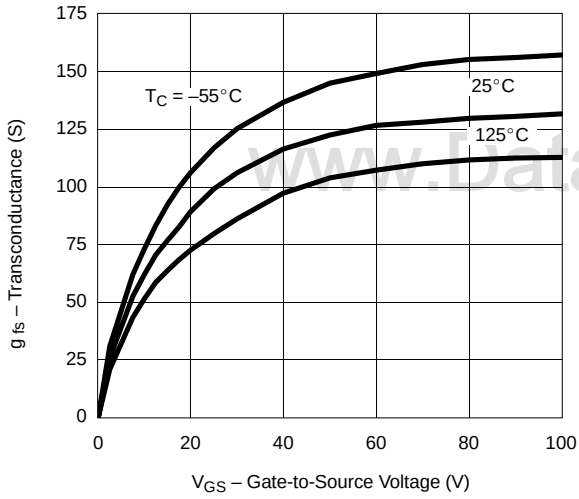
Output Characteristics



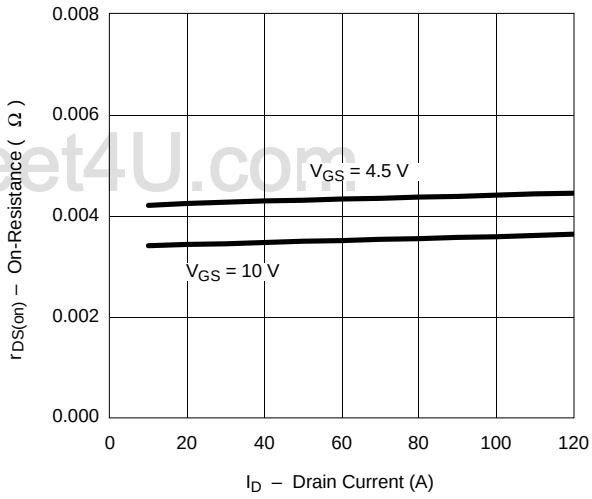
Transfer Characteristics



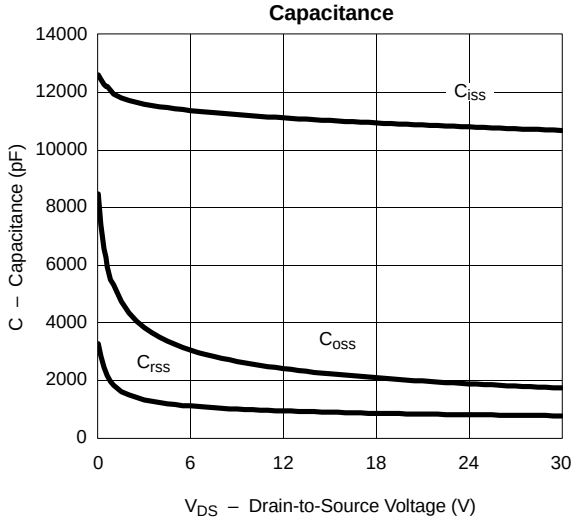
Transconductance



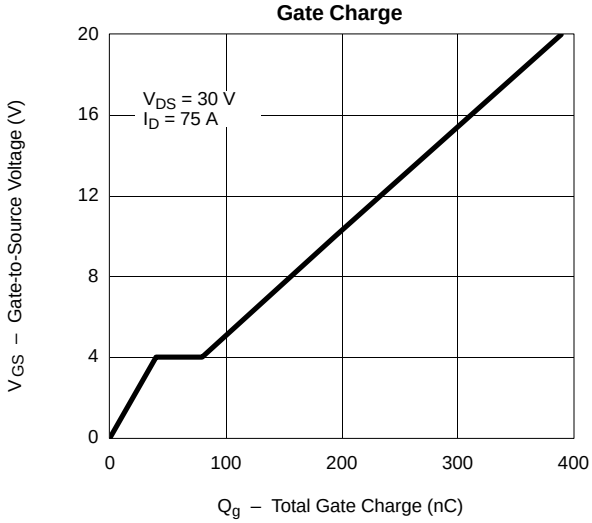
On-Resistance vs. Drain Current



Capacitance

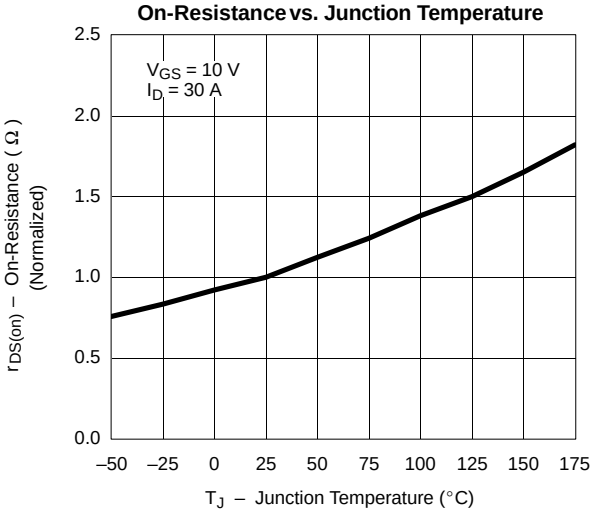


Gate Charge

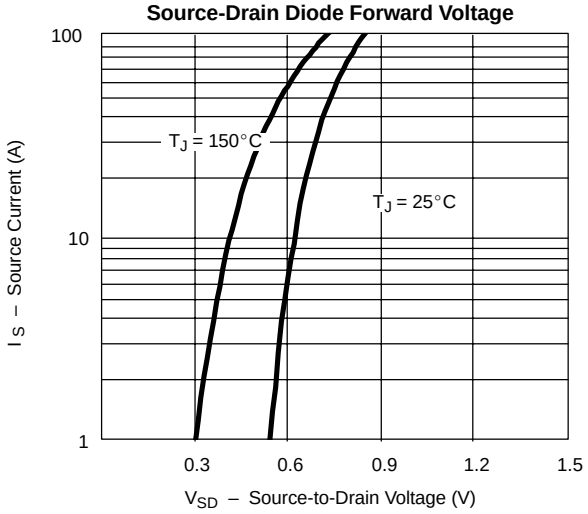


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

On-Resistance vs. Junction Temperature

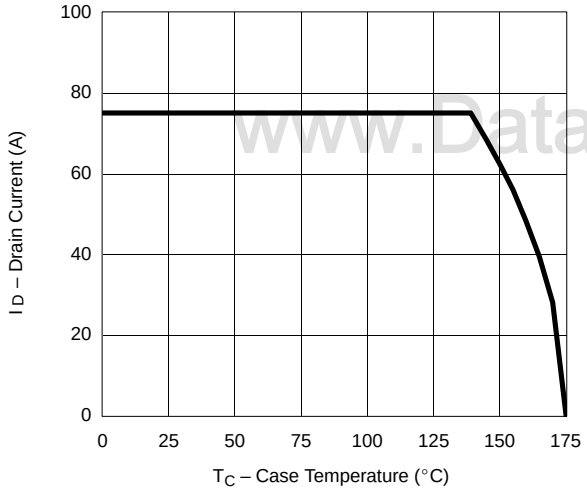


Source-Drain Diode Forward Voltage

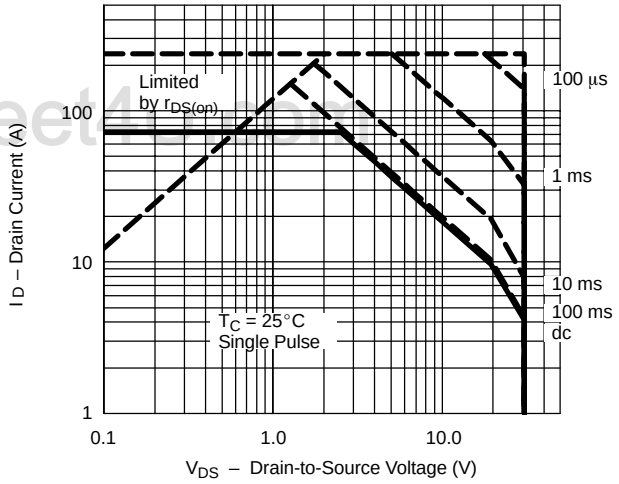


THERMAL RATINGS

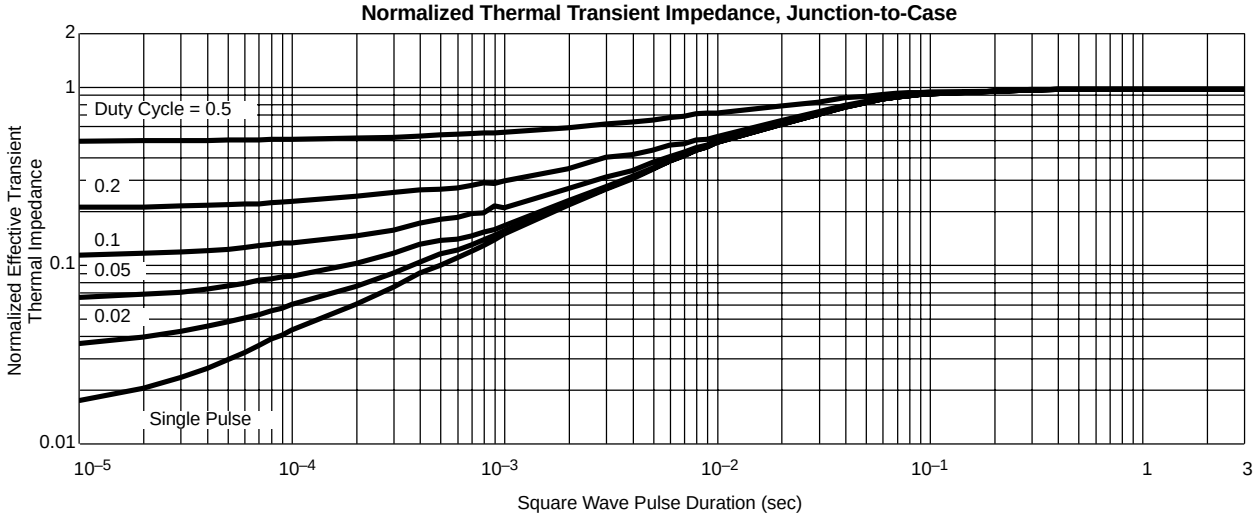
Maximum Avalanche and Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case



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