N-Channel 30-V (D-S), 175 °C MOSFET

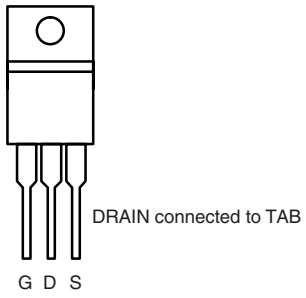
PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.004	75[a]

FEATURES

- TrenchFET® Power MOSFETs
- 175 °C Rated Maximum Junction Temperature

Pb Available
RoHS* COMPLIANT

TO-220AB

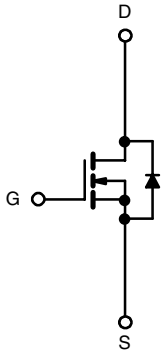


Top View
SUP75N03-04

TO-263

Top View
SUB75N03-04

Ordering Information: SUP75N03-04
SUP75N03-04-E3 (Lead (Pb)-free)
SUB75N03-04
SUB75N03-04-E3 (Lead (Pb)-free)



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	
Pulse Diode Forward Current		I_{SM}	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.

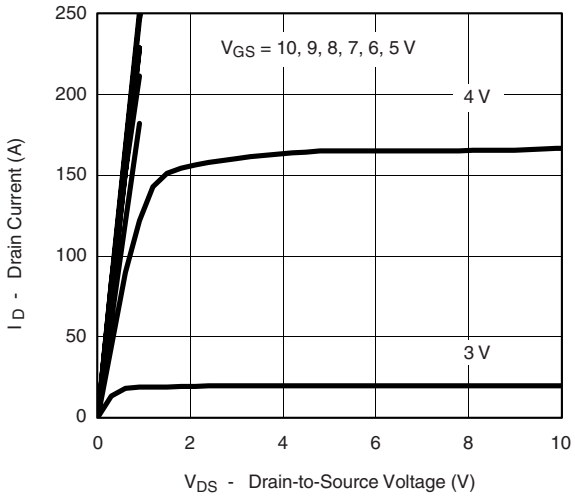
* Pb containing terminations are not RoHS compliant, exemptions may apply

SPECIFICATIONS T_J = 25 °C, unless otherwise noted						
Parameter	**Symbol**	**Test Conditions**	**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 $I_D \cong$ 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

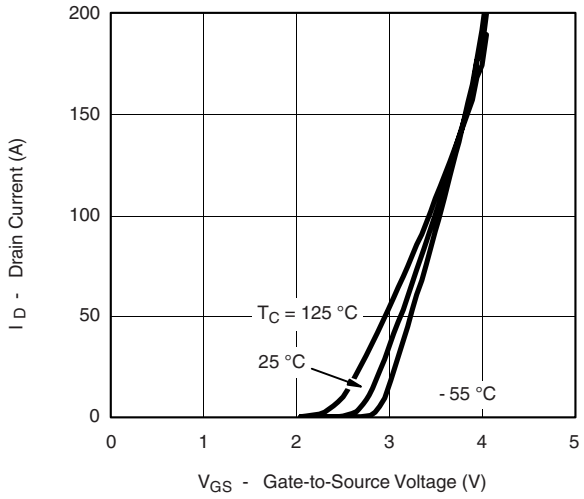
Notes:
a. For design aid only; not subject to production testing.
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

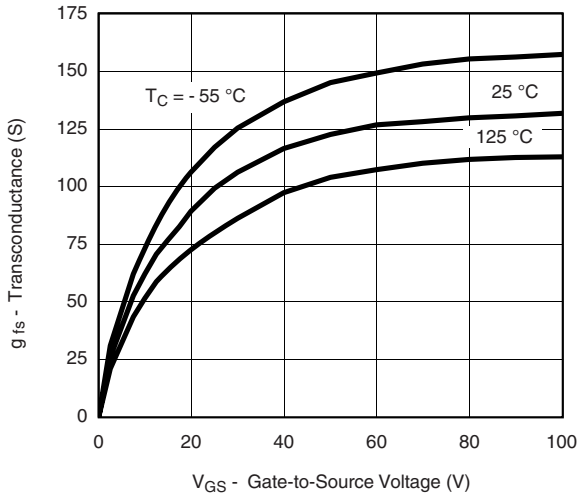
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



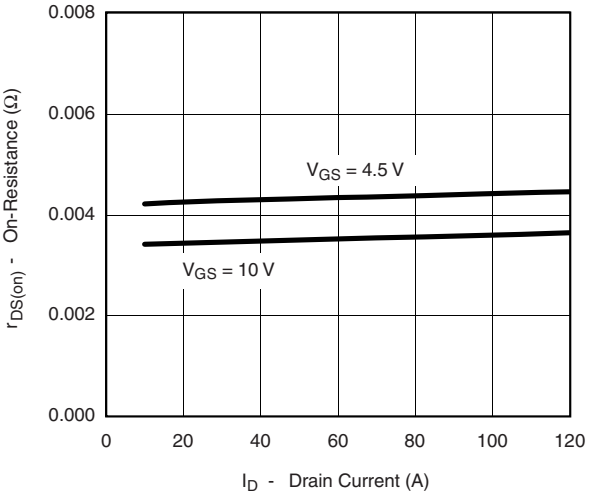
Output Characteristics



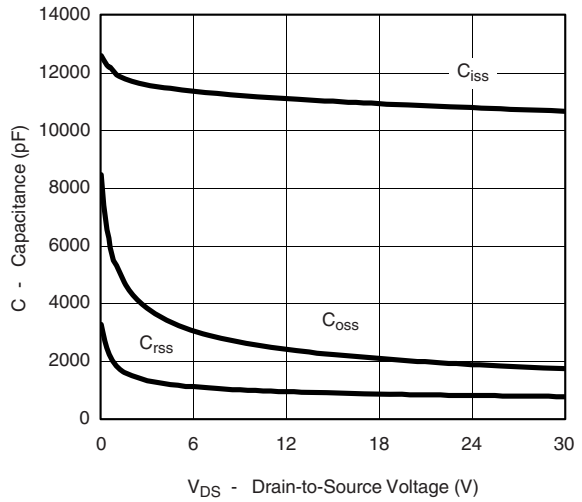
Transfer Characteristics



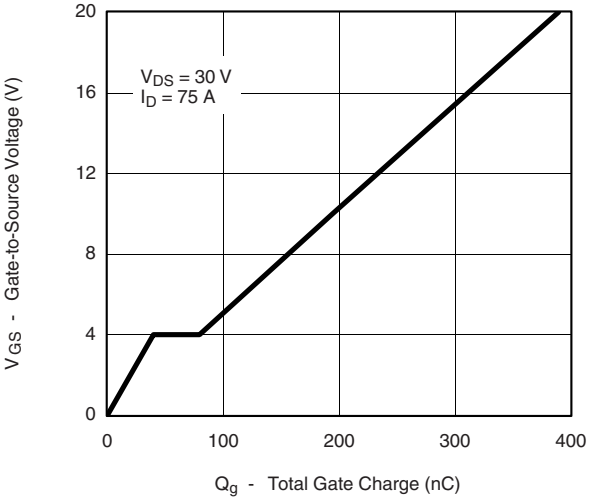
Transconductance



On-Resistance vs. Drain Current

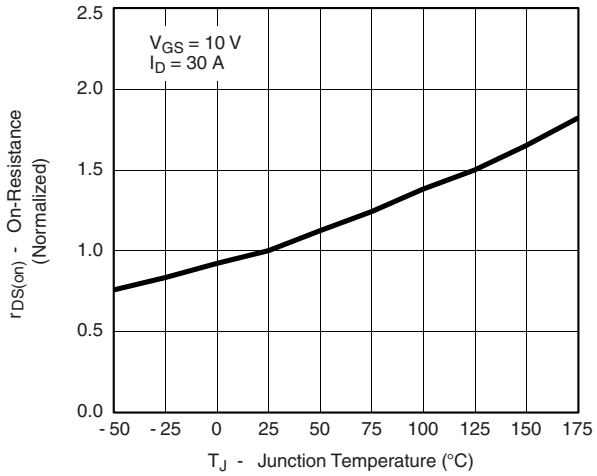


Capacitance

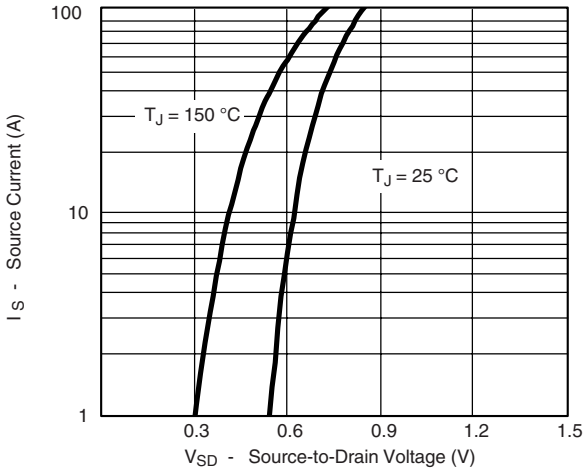


Gate Charge

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

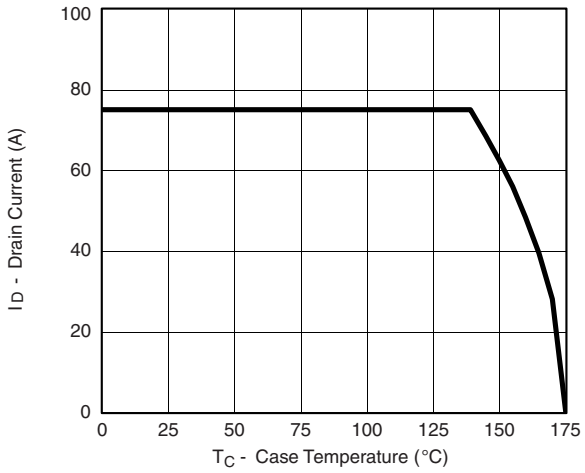


On-Resistance vs. Junction Temperature

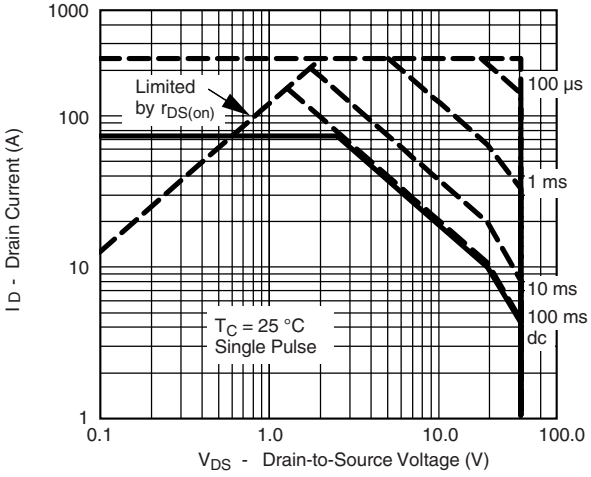


Source-Drain Diode Forward Voltage

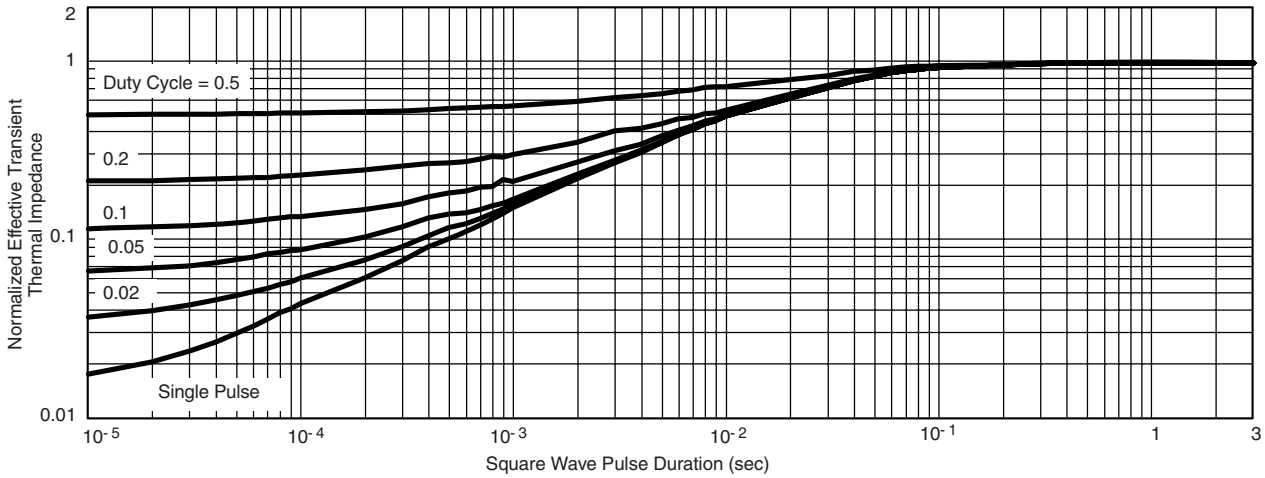
THERMAL RATINGS



Maximum Avalanche and Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

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