

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

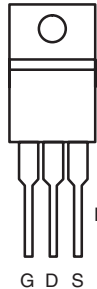
FEATURES

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



Available
RoHS*
COMPLIANT

TO-220AB

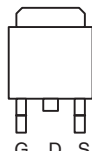


DRAIN connected to TAB

G D S

Top View
SUP75N03-04

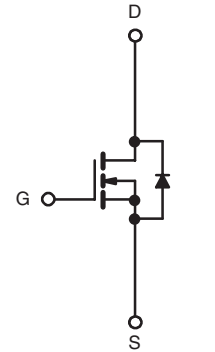
TO-263



DRAIN connected to TAB

Top View

SUB75N03-04



N-Channel MOSFET

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

ABSOLUTE MAXIMUM RATINGS $T_C = 25\text{ °C}$, unless otherwise noted

Parameter	Symbol	Limit	Unit
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_J = 175\text{ °C}$)	I_D	$T_C = 25\text{ °C}$ 75 ^a	A
		$T_C = 125\text{ °C}$ 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	E_{AS}	280	mJ
Repetitive Avalanche Energy ^b	E_{AR}	140	
Maximum Power Dissipation	P_D	$T_C = 25\text{ °C}$ (TO-220AB and TO-263) 187 ^c	W
		$T_A = 25\text{ °C}$ (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.)	T_L	300	

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Limit	Unit
Junction-to-Ambient	R_{thJA}	PCB Mount (TO-263) ^d 40	°C/W
		Free Air (TO-220AB) 62.5	
Junction-to-Case	R_{thJC}	0.6	

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).

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

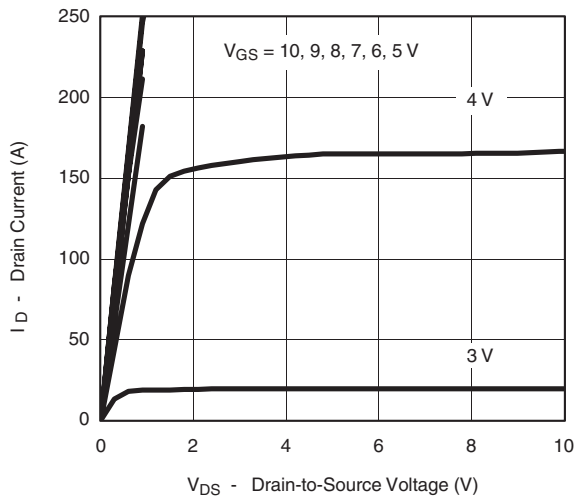
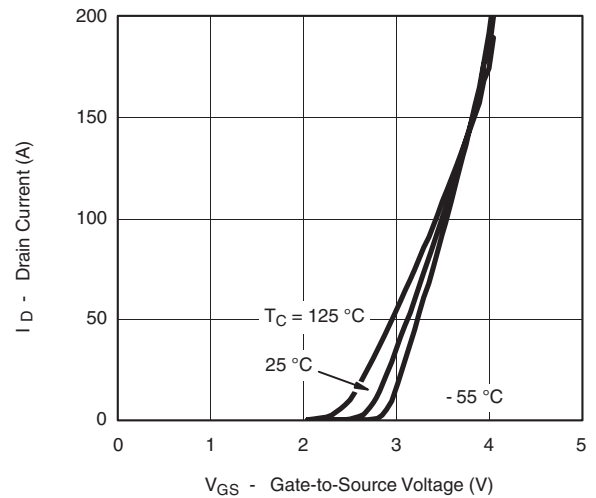
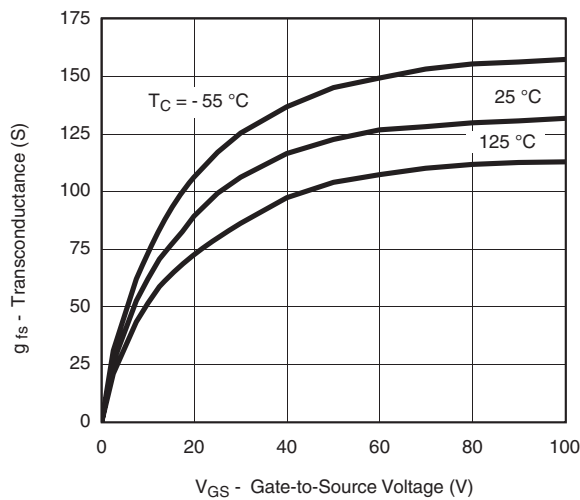
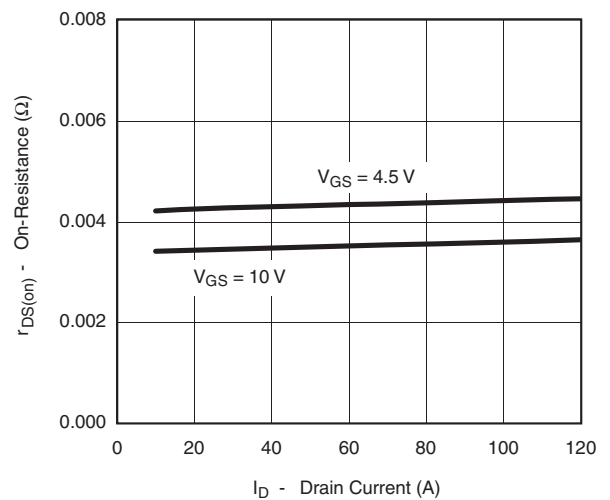
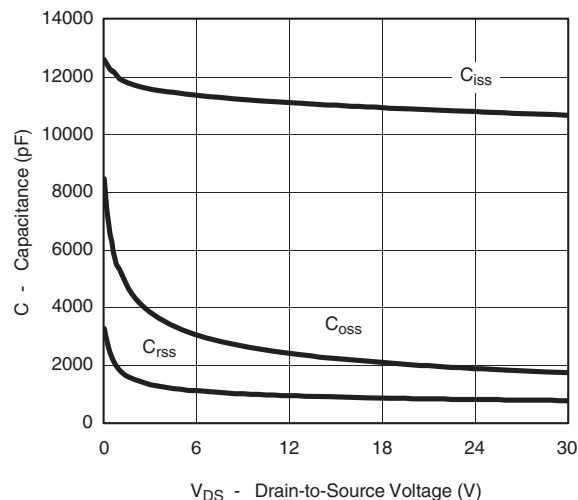
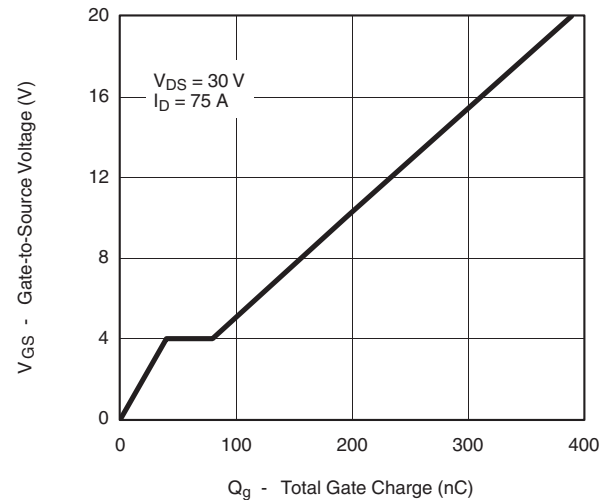
* Pb containing terminations are not RoHS compliant, exemptions may apply

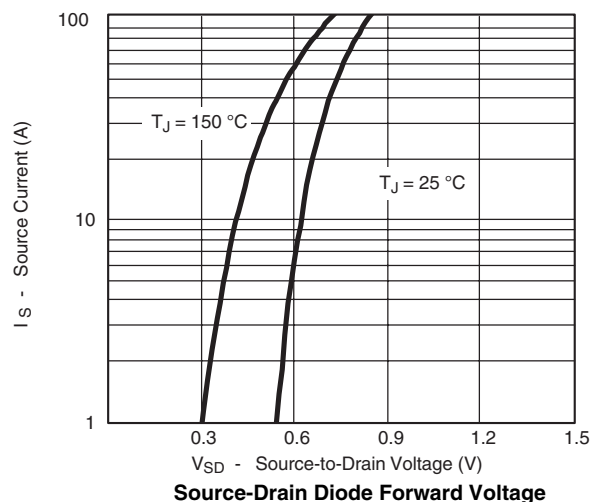
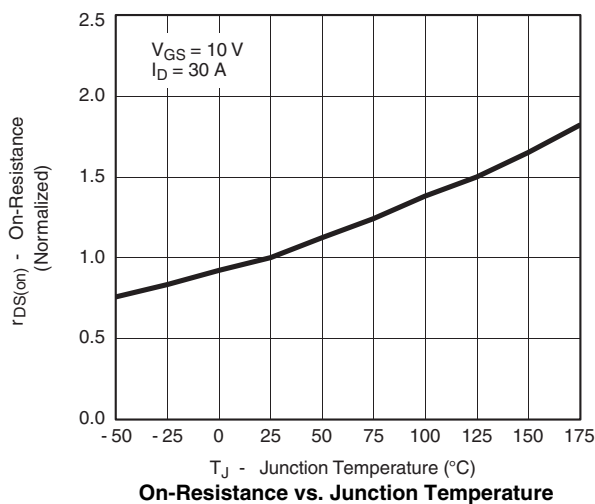
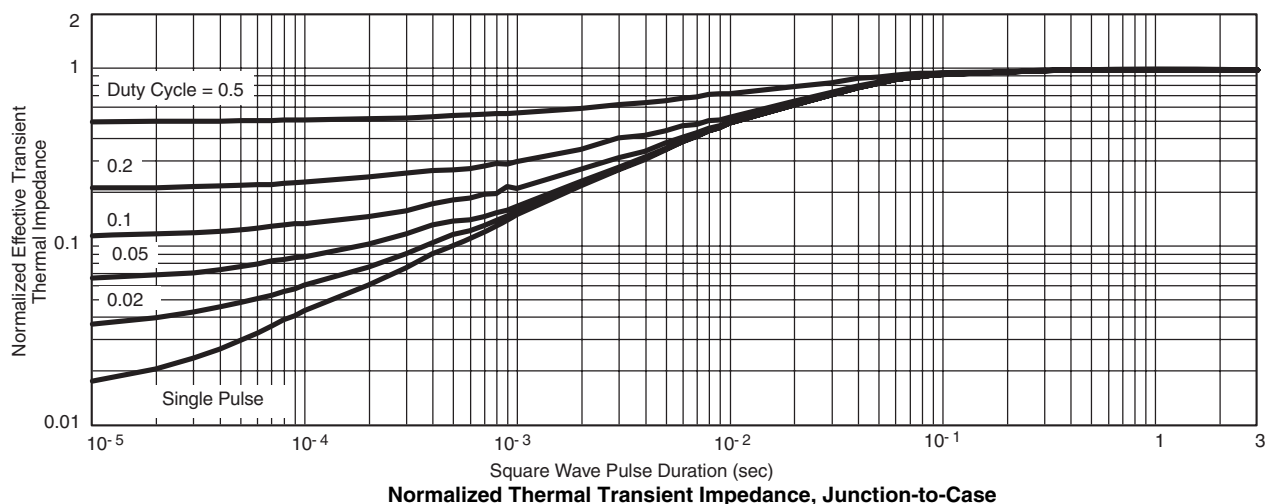
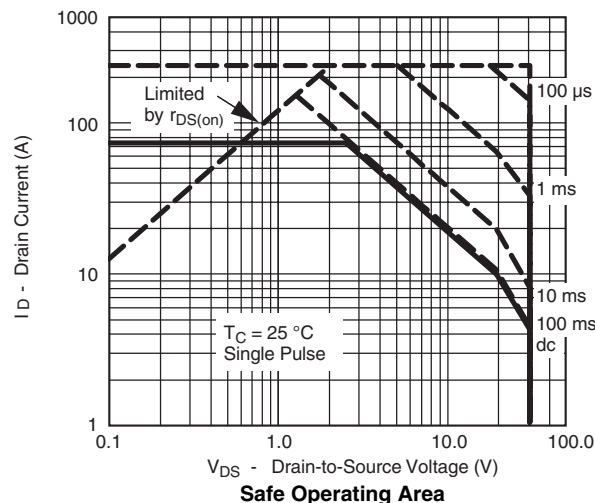
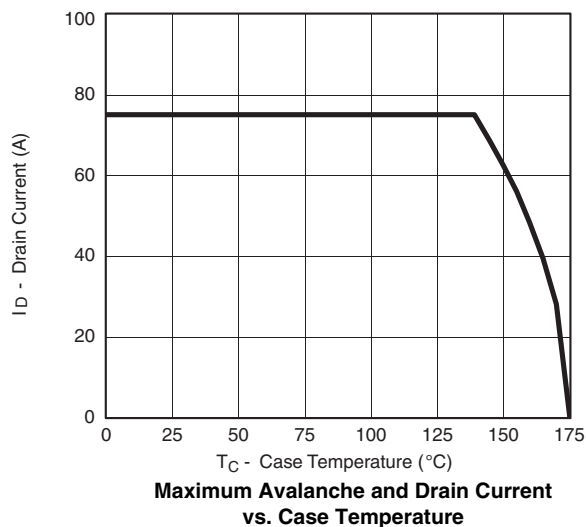
SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ ^a	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}$, $I_D = 250\text{ }\mu\text{A}$	30			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	1		3	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 20\text{ V}$			± 500	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 125\text{ }^{\circ}\text{C}$			50	
		$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 175\text{ }^{\circ}\text{C}$			200	
On-State Drain Current ^b	$I_{D(on)}$	$V_{DS} = 5\text{ V}$, $V_{GS} = 10\text{ V}$	120			A
Drain-Source On-State Resistance ^b	$r_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 75\text{ A}$		0.0034	0.004	Ω
		$V_{GS} = 4.5\text{ V}$, $I_D = 75\text{ A}$		0.005	0.006	
		$V_{GS} = 10\text{ V}$, $I_D = 25\text{ A}$, $T_J = 125\text{ }^{\circ}\text{C}$			0.006	
		$V_{GS} = 10\text{ V}$, $I_D = 25\text{ A}$, $T_J = 175\text{ }^{\circ}\text{C}$			0.008	
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15\text{ V}$, $I_D = 25\text{ A}$	30			S
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$		10742		pF
Output Capacitance	C_{oss}			1811		
Reverse Transfer Capacitance	C_{rss}			775		
Total Gate Charge	Q_g	$V_{DS} = 30\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 75\text{ A}$		200	250	nC
Gate-Source Charge	Q_{gs}			40		
Gate-Drain Charge	Q_{gd}			40		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 30\text{ V}$, $R_L = 0.6\text{ }\Omega$ $I_D \cong 50\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_G = 2.5\text{ }\Omega$		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}	$I_F = 75\text{ A}$, $V_{GS} = 0\text{ V}$			1.3	V
Reverse Recovery Time	t_{rr}	$I_F = 50\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$		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 $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

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**THERMAL RATINGS**

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