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SUP/SUB75N03-04

Vishay Siliconix

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

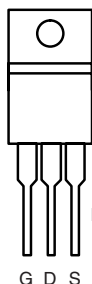
FEATURES

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



Available
RoHS*
 COMPLIANT

TO-220AB

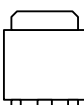


DRAIN connected to TAB

G D S

Top View
 SUP75N03-04

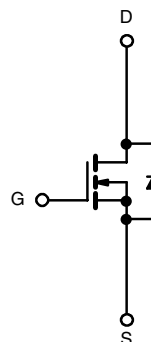
TO-263



DRAIN connected to TAB

G D S

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 $T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted				
Parameter		Symbol	Limit	Unit
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current ($T_J = 175\text{ }^\circ\text{C}$)	$T_C = 25\text{ }^\circ\text{C}$	I_D	75 ^a	A
	$T_C = 125\text{ }^\circ\text{C}$		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	L = 0.1 mH	E_{AS}	280	mJ
Repetitive Avalanche Energy ^b	L = 0.05 mH	E_{AR}	140	
Maximum Power Dissipation	$T_C = 25\text{ }^\circ\text{C}$ (TO-220AB and TO-263)	P_D	187 ^c	W
	$T_A = 25\text{ }^\circ\text{C}$ (TO-263) ^d		3.7	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 175	$^\circ\text{C}$
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	$^\circ\text{C/W}$
	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

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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 $\leq 2\%$.

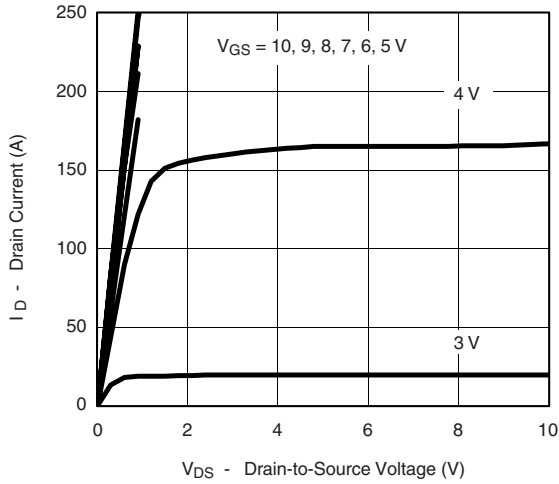
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



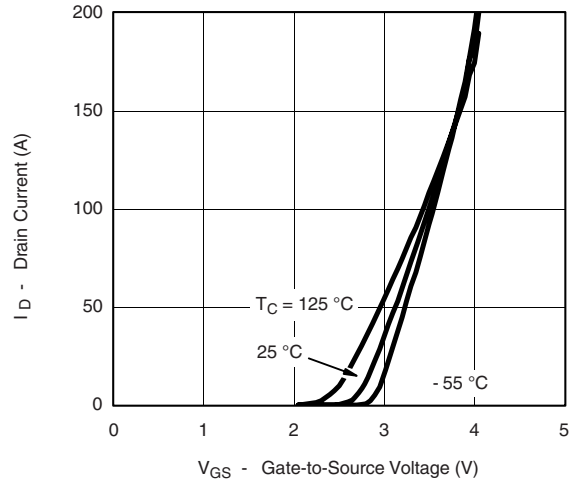
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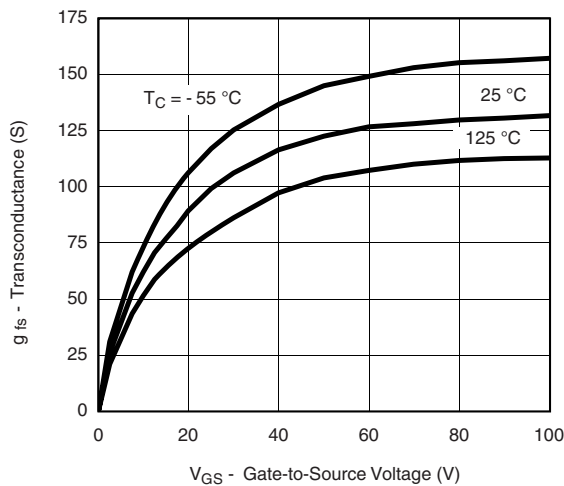
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



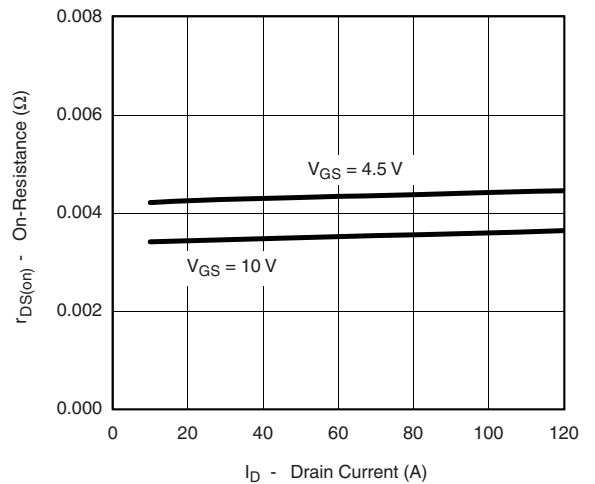
Output Characteristics



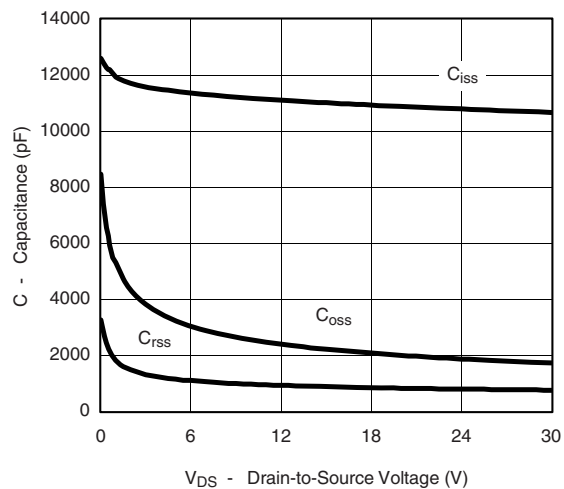
Transfer Characteristics



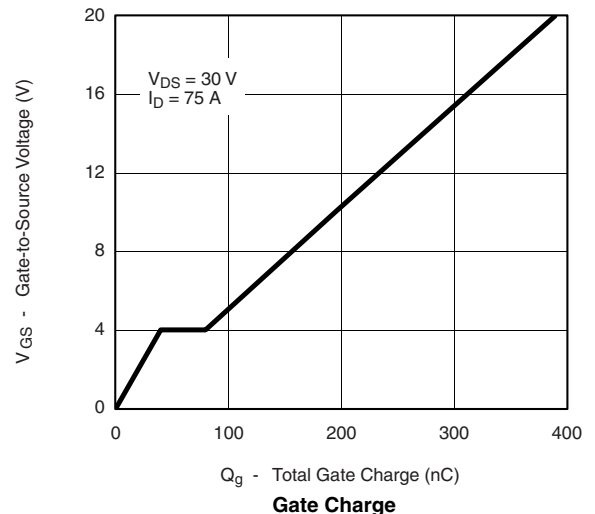
Transconductance



On-Resistance vs. Drain Current



Capacitance



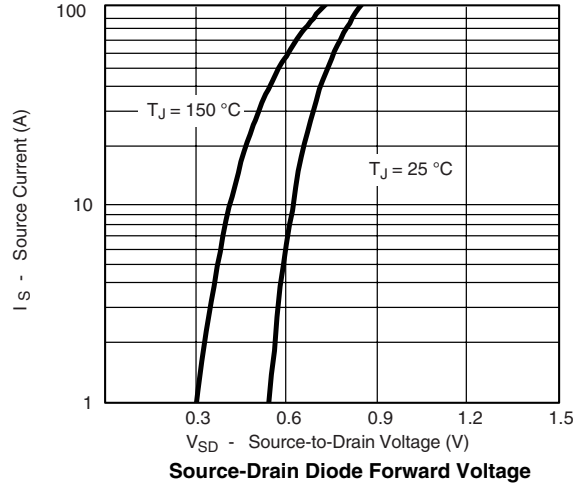
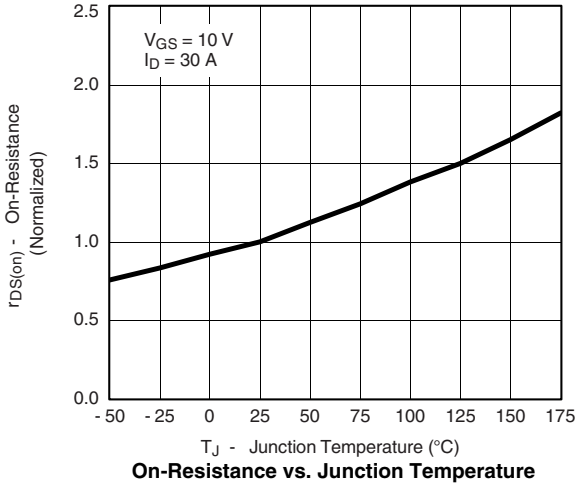
Gate Charge

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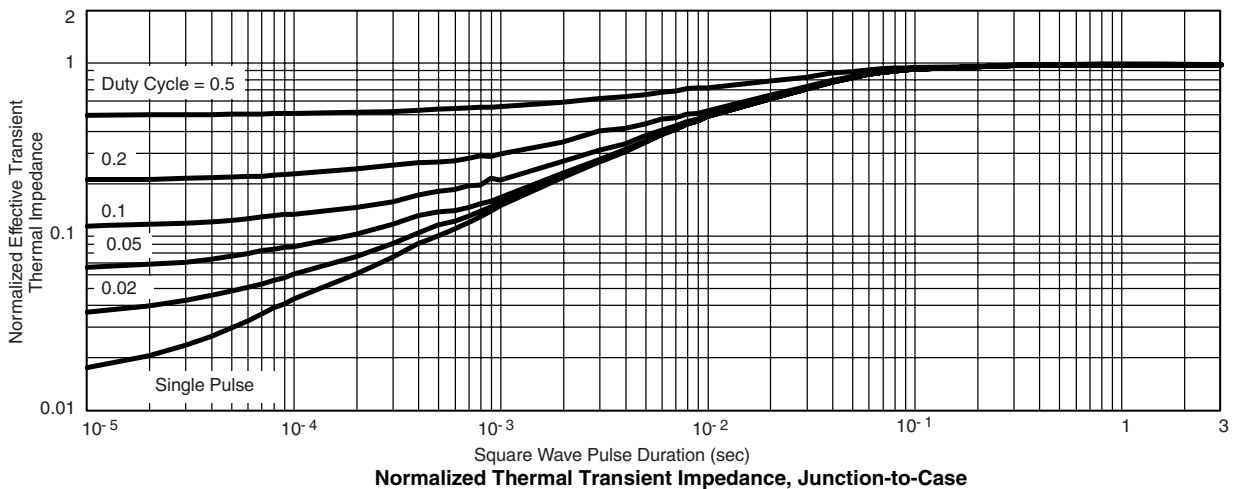
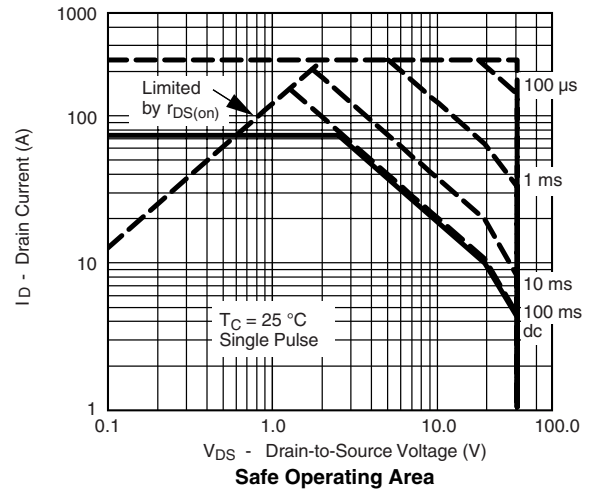
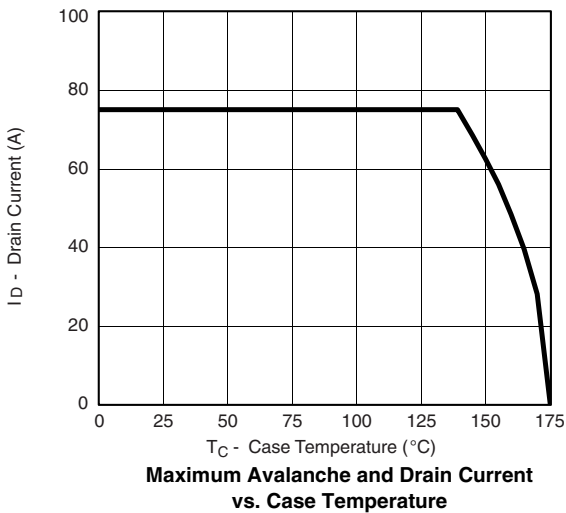
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TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



THERMAL RATINGS



Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see <http://www.vishay.com/ppg?70745>.



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Vishay

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