

N-Channel 40-V (D-S), 175 °C MOSFET

PRODUCT SUMMARY

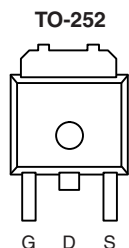
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A) ^c
40	0.0074 at $V_{GS} = 10$ V	65
	0.0011 at $V_{GS} = 4.5$ V	54

FEATURES

- TrenchFET® Power MOSFETS
- 175 °C Junction Temperature
- Low Threshold



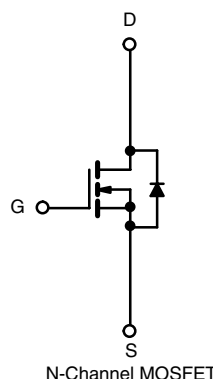
Available

RoHS*
COMPLIANT


Top View

Drain Connected to Tab

Ordering Information: SUD50N04-07L
SUD50N04-07L (Lead (Pb)-free)



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 175$ °C)	I_D	65 ^c	A
		46 ^c	
Pulsed Drain Current	I_{DM}	100	
Avalanche Current	I_{AS}	40	
Single Avalanche Energy ^a	E_{AS}	80	mJ
Power Dissipation	P_D	65	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient ^b	R_{thJA}	18	22	°C/W
		40	50	
Junction-to-Case	R_{thJC}	1.9	2.3	

Notes:

a. Duty cycle ≤ 1 %.

b. Surface Mounted on 1" FR4 board.

c. Based on maximum allowable Junction Temperature. Package limitation current is 50 A.

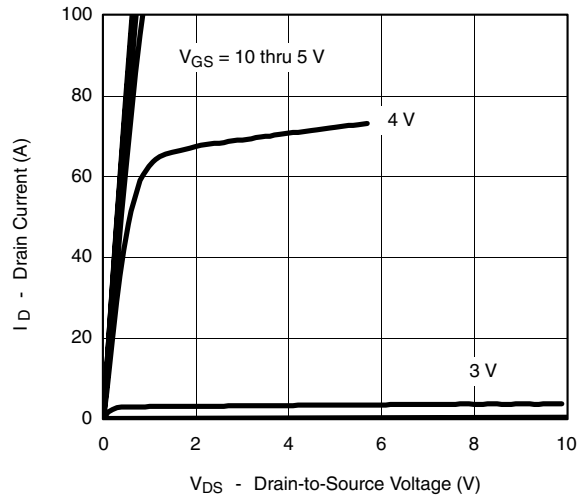
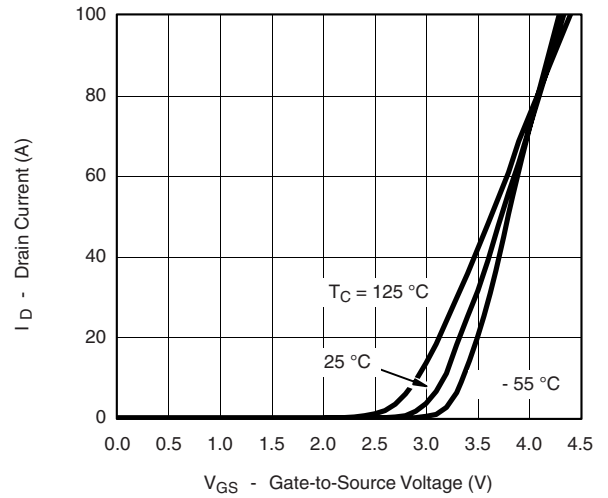
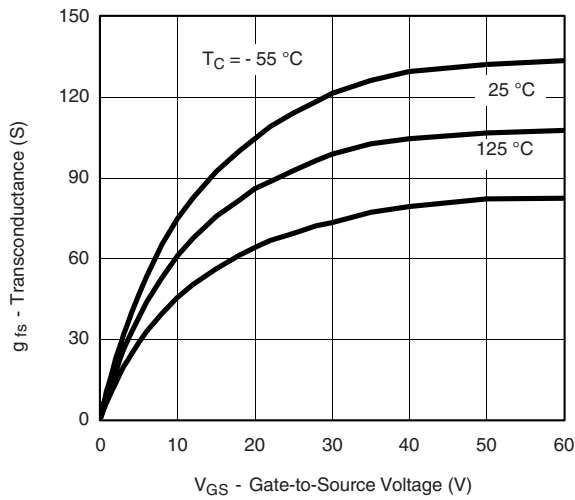
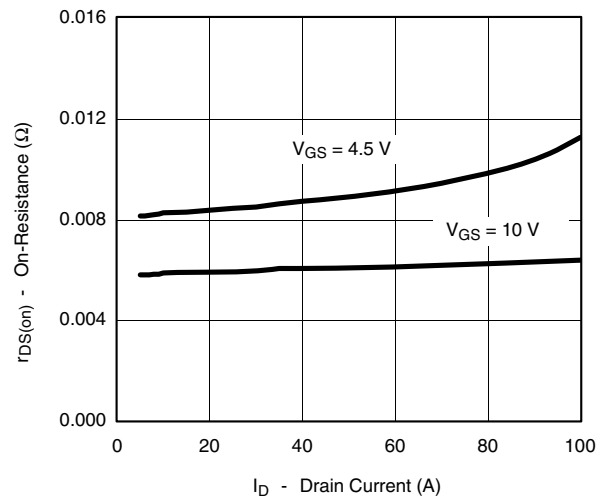
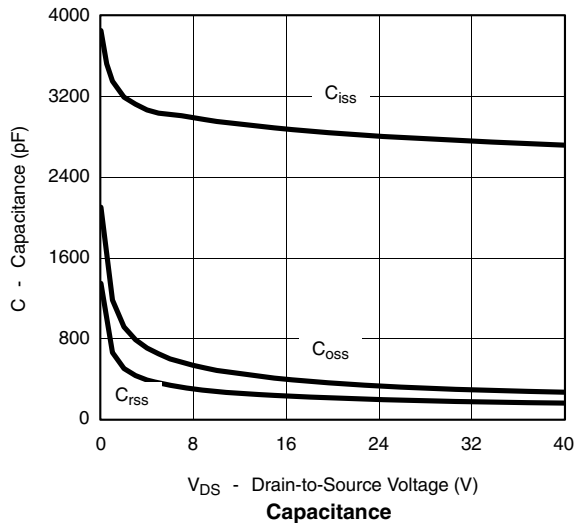
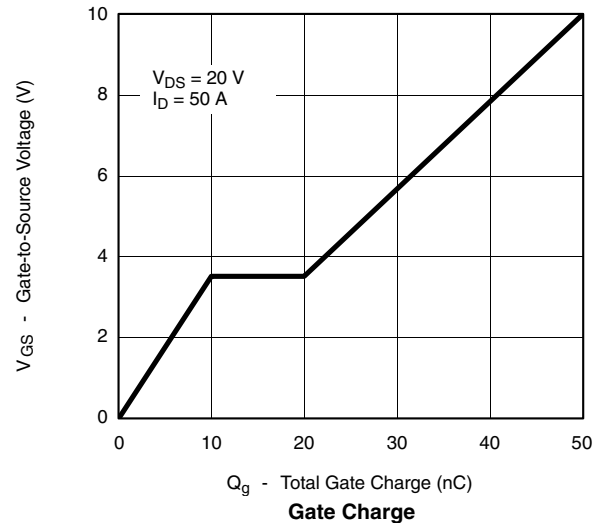
* Pb containing terminations are not RoHS compliant, exemptions may apply.

SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}$, $I_D = 250\text{ }\mu\text{A}$	40			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}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 32\text{ V}$, $V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 32\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 125\text{ }^{\circ}\text{C}$			50	
		$V_{DS} = 32\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 175\text{ }^{\circ}\text{C}$			150	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = 5\text{ V}$, $V_{GS} = 10\text{ V}$	65			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 20\text{ A}$		0.006	0.0074	Ω
		$V_{GS} = 10\text{ V}$, $I_D = 20\text{ A}$, $T_J = 125\text{ }^{\circ}\text{C}$			0.012	
		$V_{GS} = 10\text{ V}$, $I_D = 20\text{ A}$, $T_J = 175\text{ }^{\circ}\text{C}$			0.015	
		$V_{GS} = 4.5\text{ V}$, $I_D = 10\text{ A}$		0.0085	0.011	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}$, $I_D = 15\text{ A}$	20	57		S
Dynamic ^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$		2800		pF
Output Capacitance	C_{oss}			320		
Reversen Transfer Capacitance	C_{rss}			190		
Total Gate Charge ^c	Q_g	$V_{DS} = 20\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 50\text{ A}$		50	75	nC
Gate-Source Charge ^c	Q_{gs}			10		
Gate-Drain Charge ^c	Q_{gd}			10		
Gate Resistance	R_g			2.0		Ω
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = 20\text{ V}$, $R_L = 0.4\text{ }\Omega$ $I_D \equiv 50\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_G = 2.5\text{ }\Omega$		11	20	ns
Rise Time ^c	t_r			20	30	
Turn-Off Delay Time ^c	$t_{d(off)}$			40	60	
Fall Time ^c	t_f			15	25	
Source-Drain Diode Ratings and Characteristics $(T_C = 25\text{ }^{\circ}\text{C})^b$						
Continuous Current	I_S				43	A
Pulsed Current	I_{SM}				100	
Forward Voltage ^a	V_{SD}	$I_F = 30\text{ A}$, $V_{GS} = 0\text{ V}$		0.90	1.50	V
Reverse Recovery Time	t_{rr}	$I_F = 30\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$		30	45	ns

Notes:

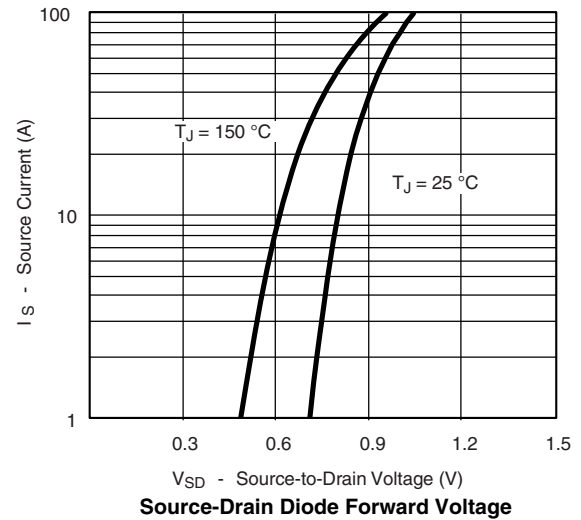
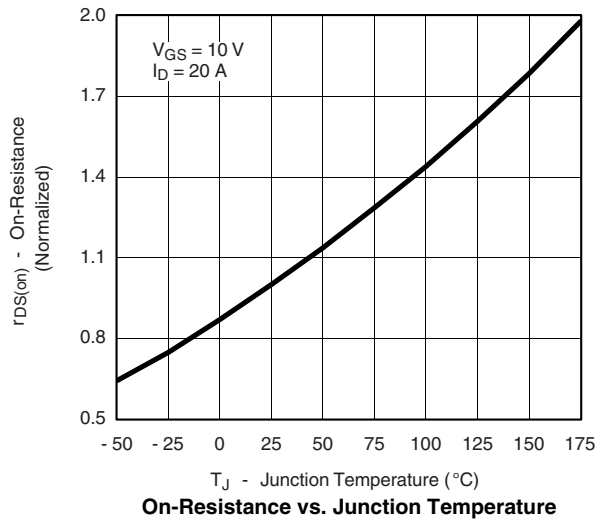
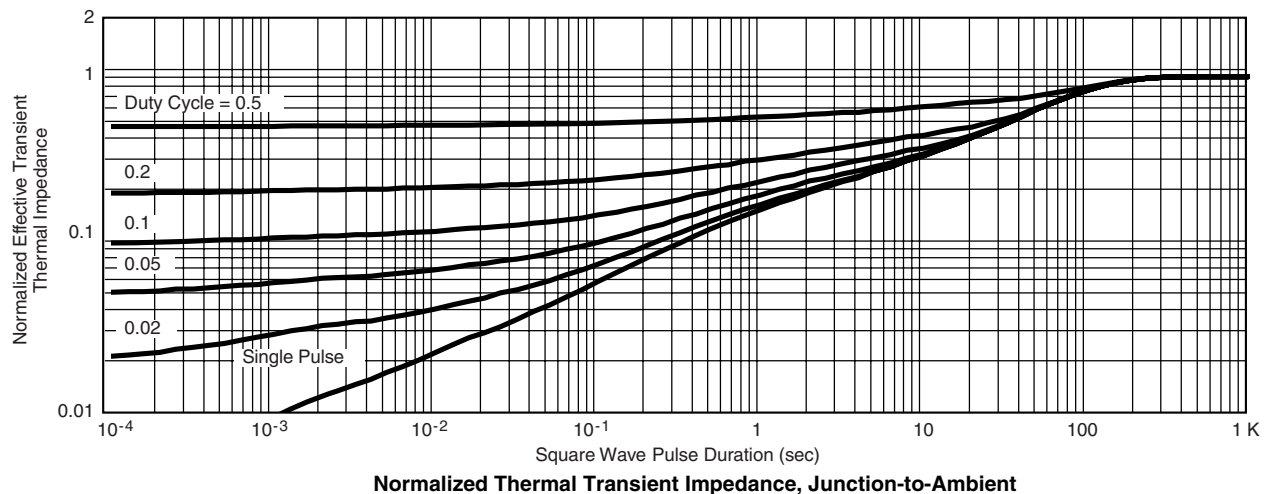
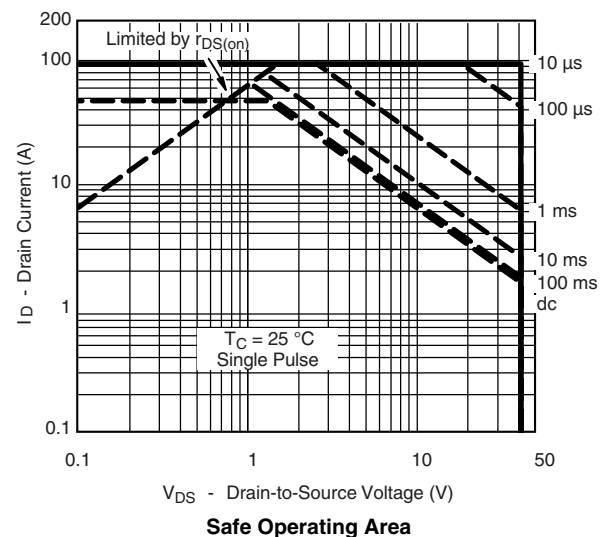
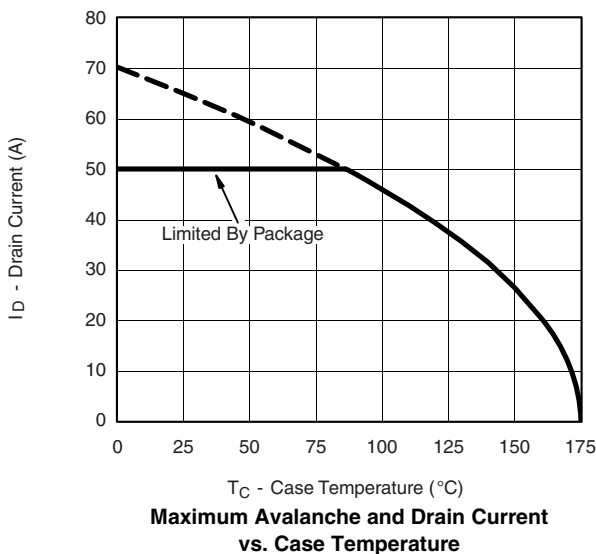
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

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 noted**Output Characteristics****Transfer Characteristics****Transconductance****On-Resistance vs. Drain Current****Capacitance****Gate Charge**

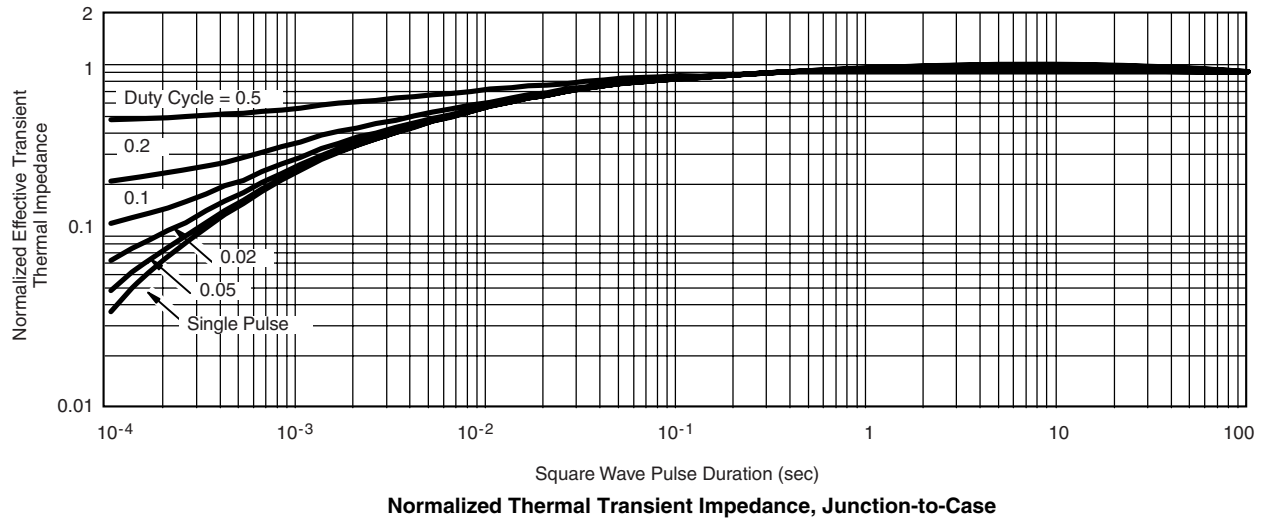
SUD50N04-07L

Vishay Siliconix

**TYPICAL CHARACTERISTICS** 25 °C unless noted**THERMAL RATINGS**



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?72344>.



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