![VISHAY logo]

P-Channel 30-V (D-S), 150°C MOSFET

Product Summary

V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)[a]
–30	0.015 @ V_{GS} = –10 V	± 13
	0.024 @ V_{GS} = –4.5 V	± 8

TrenchFET™ Power MOSFETs

TO-252

Drain Connected to Tab

G   D   S

Top View

Order Number:
SUD45P03-15

S

G

D

P-Channel MOSFET
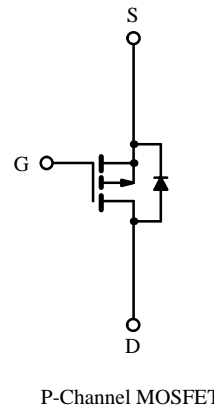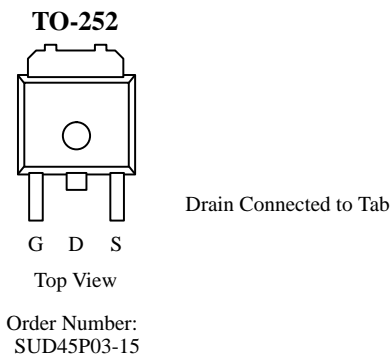
Absolute Maximum Ratings (T_A = 25°C Unless Otherwise Noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	–30	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current[b]	T_A = 25°C	I_D	± 13	A
	T_A = 100°C		± 8	
Pulsed Drain Current		I_{DM}	± 100	
Continuous Source Current (Diode Conduction)		I_S	–13	
Maximum Power Dissipation[b]	T_C = 25°C	P_D	70	W
	T_A = 25°C		4[a]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 150	°C

Thermal Resistance Ratings

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[b]	R_{thJA}		30	°C/W
Maximum Junction-to-Case	R_{thJC}		1.8	

Notes
a. Calculated Rating for T_A = 25°C, for comparison purposes only. This cannot be used as continuous rating (see Absolute Maximum Ratings and Typical Characteristics).
b. Surface Mounted on FR4 Board, t ≤ 10 sec.

Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70267.
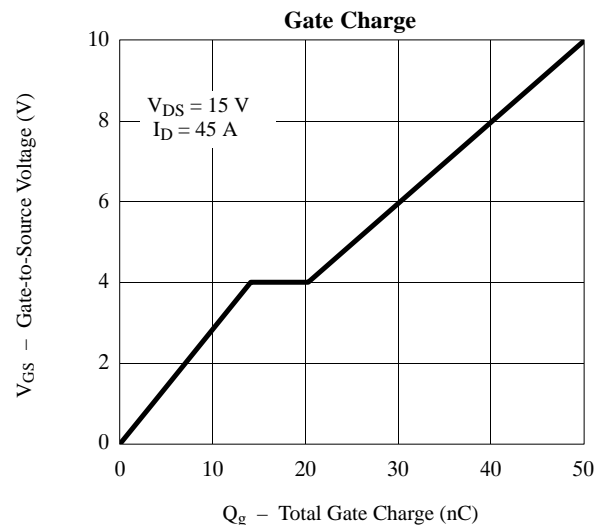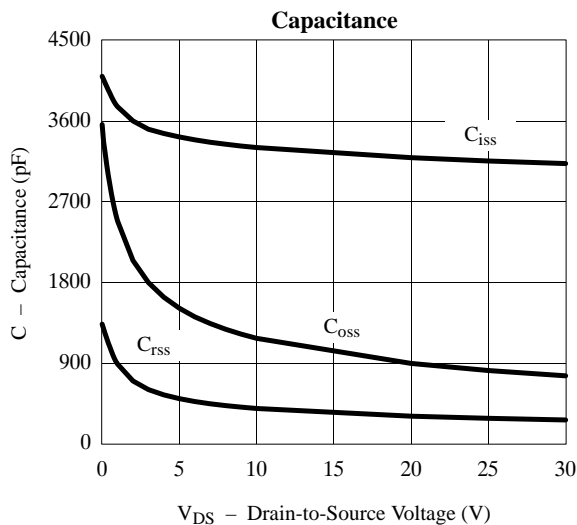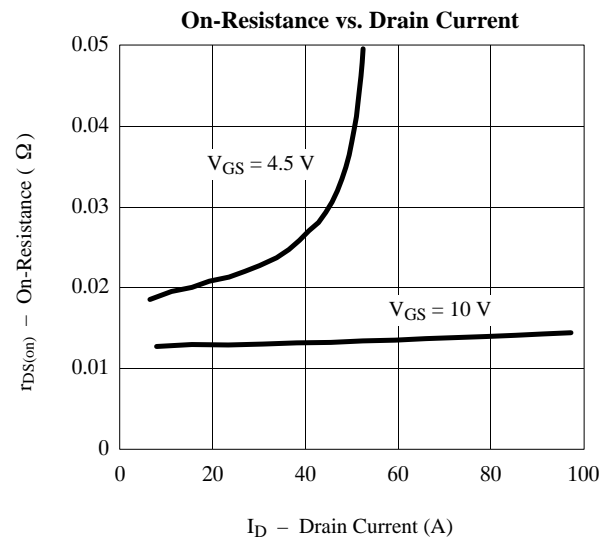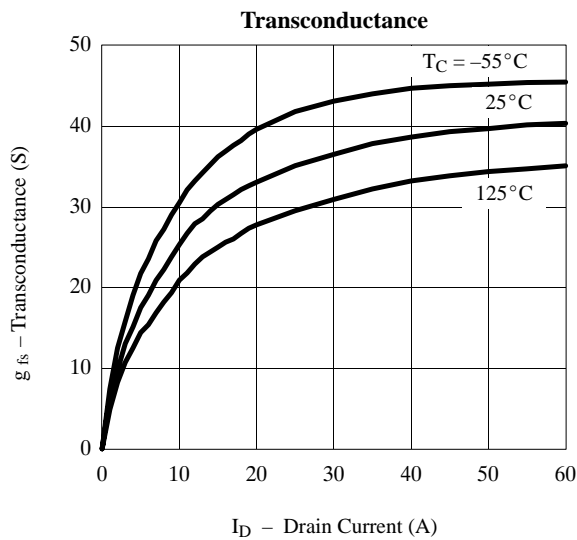
Specifications ($T_J = 25°C$ Unless Otherwise Noted)

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	–1.0			
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = \pm 20$ V			± 100	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	
On-State Drain Current[b]	$I_{D(on)}$	$V_{DS} = -5$ V, $V_{GS} = -10$ V	–50			A
		$V_{DS} = -5$ V, $V_{GS} = -4.5$ V	–20			
Drain-Source On-State Resistance[b]	$r_{DS(on)}$	$V_{GS} = -10$ V, $I_D = -13$ A		0.012	0.015	Ω
		$V_{GS} = -10$ V, $I_D = -13$ A, $T_J = 125°C$		0.018	0.026	
		$V_{GS} = -4.5$ V, $I_D = -13$ A		0.020	0.024	
Forward Transconductance[b]	g_{fs}	$V_{DS} = -15$ V, $I_D = -13$ A	20			S
Dynamic[a]						
Input Capacitance	C_{iss}	$V_{GS} = 0$ V, $V_{DS} = -25$ V, F = 1 MHz		3200		pF
Output Capacitance	C_{oss}			800		
Reverse Transfer Capacitance	C_{rss}			280		
Total Gate Charge[c]	Q_g	$V_{DS} = -15$ V, $V_{GS} = -10$ V, $I_D = -45$ A		50	125	nC
Gate-Source Charge[c]	Q_{gs}			14		
Gate-Drain Charge[c]	Q_{gd}			6.2		
Turn-On Delay Time[c]	$t_{d(on)}$	$V_{DD} = -15$ V, $R_L = 0.33$ Ω $I_D \cong -45$ A, $V_{GEN} = -10$ V, $R_G = 2.4$ Ω		13	20	ns
Rise Time[c]	t_r			10	20	
Turn-Off Delay Time[c]	$t_{d(off)}$			50	100	
Fall Time[c]	t_f			20	40	
Source-Drain Diode Ratings and Characteristic ($T_C = 25°C$)						
Pulsed Current	I_{SM}				100	A
Diode Forward Voltage[b]	V_{SD}	$I_F = -45$ A, $V_{GS} = 0$ V		1.0	1.5	V
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = -45$ A, di/dt = 100 A/μs		55	100	ns

Notes
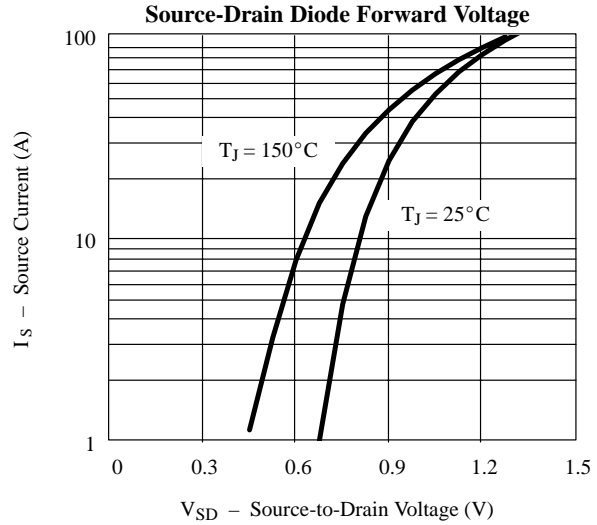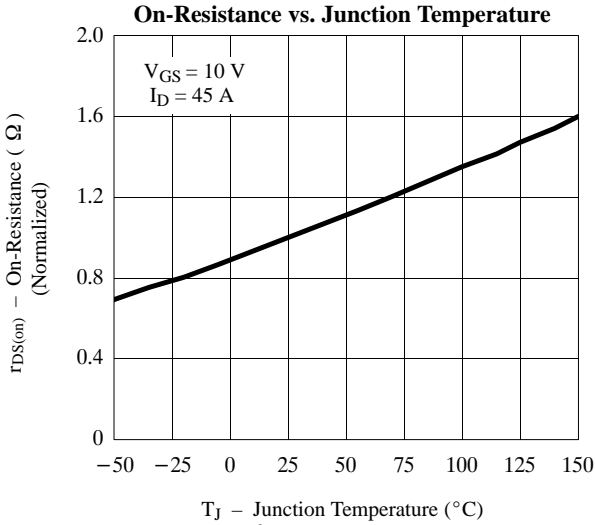a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width $\leq$ 300 μs, duty cycle $\leq$ 2%.
c. Independent of operating temperature.
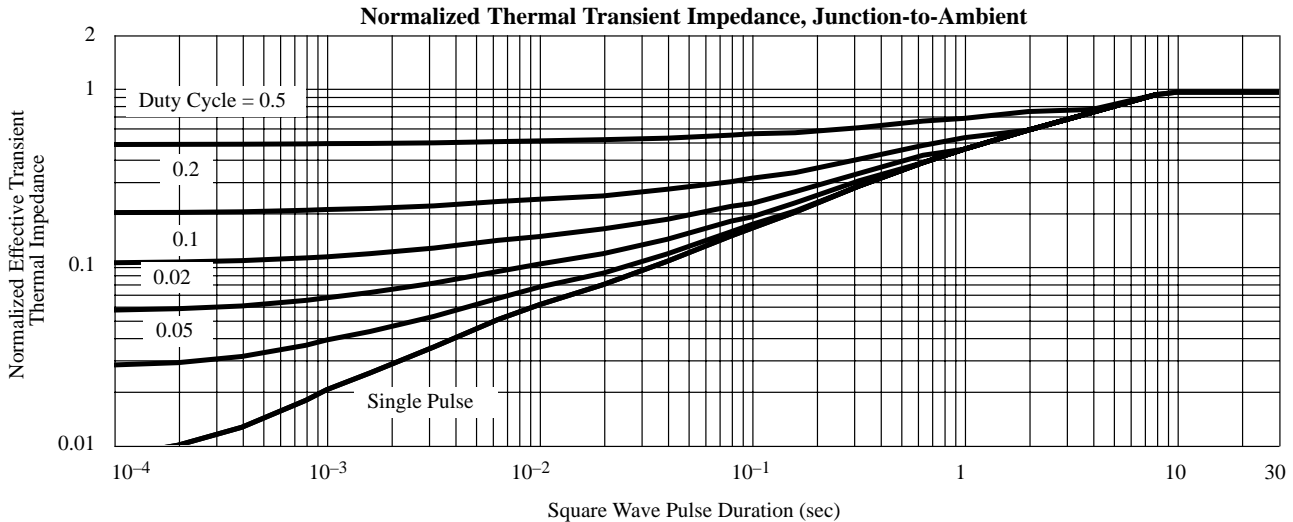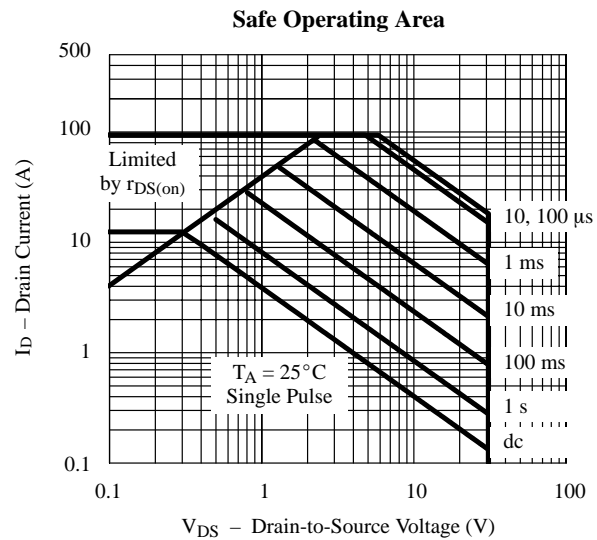
Typical Characteristics (25°C Unless Otherwise Noted)

Output Characteristics

Transfer Characteristics

Transconductance

On-Resistance vs. Drain Current

Capacitance

Gate Charge

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SUD45P03-15

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Typical Characteristics (25°C Unless Otherwise Noted)

On-Resistance vs. Junction Temperature

$V_{GS} = 10$ V
$I_D = 45$ A

$r_{DS(on)}$ – On-Resistance (Ω) (Normalized)

T_J – Junction Temperature (°C)

Source-Drain Diode Forward Voltage

$T_J = 150°C$

$T_J = 25°C$

I_S – Source Current (A)

V_{SD} – Source-to-Drain Voltage (V)

Thermal Ratings

Maximum Drain Current vs. Ambiemt Temperature

I_D – Drain Current (A)

T_A – Ambient Temperature (°C)

Safe Operating Area

Limited by $r_{DS(on)}$

10, 100 μs
1 ms
10 ms
100 ms
1 s
dc

$T_A = 25°C$
Single Pulse

I_D – Drain Current (A)

V_{DS} – Drain-to-Source Voltage (V)

Normalized Thermal Transient Impedance, Junction-to-Ambient

Duty Cycle = 0.5
0.2
0.1
0.02
0.05
Single Pulse

Normalized Effective Transient Thermal Impedance

Square Wave Pulse Duration (sec)

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