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SUP45N03-13L-E3

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SUP45N03-13L

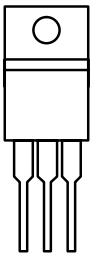
Vishay Siliconix

N-Channel 30-V (D-S), 175°C MOSFET

PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.013 @ V_{GS} = 10 V	45[a]
	0.02 @ V_{GS} = 4.5 V	45[a]

175°C Rated
Maximum Junction Temperature

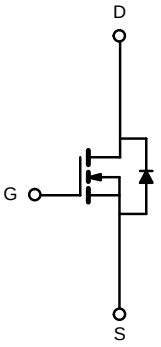
TO-220AB



Top View

SUP45N03-13L

DRAIN connected to TAB



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_C = 25°C UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±10	
Continuous Drain Current (T_J = 175°C)	T_C = 25°C	I_D	45[a]	A
	T_C = 125°C		34[a]	
Pulsed Drain Current		I_{DM}	100	
Avalanche Current		I_{AR}	45	
Repetitive Avalanche Energy[b]	L = 0.1 mH	E_{AR}	100	mJ
Maximum Power Dissipation[b]	T_C = 25°C	P_D	88[c]	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 175	°C

THERMAL RESISTANCE RATINGS				
Parameter		Symbol	Limit	Unit
Junction-to-Ambient	Free Air	R_{thJA}	85	°C/W
Junction-to-Case		R_{thJC}	1.7	

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).

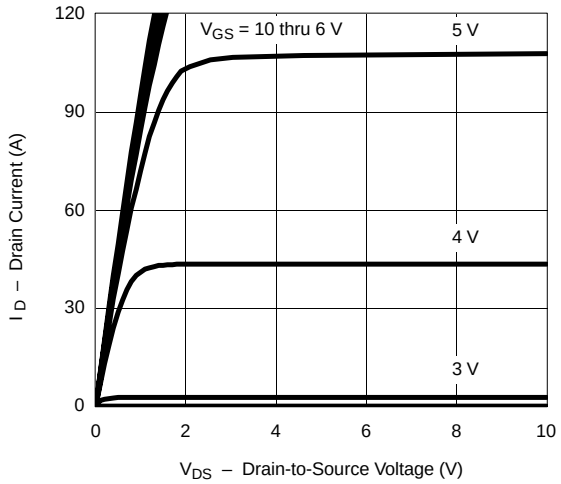
For SPICE model information via the Worldwide Web: http://www.vishay.com/www/product/spice.htm

MOSFET SPECIFICATIONS (T_J =25°C UNLESS OTHERWISE NOTED)						
Parameter	**Symbol**	**Test Condition**	**Min**	**Typ**	**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_{DS} = 250 µA	1		3	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±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	
		V_{DS} = 30 V, V_{GS} = 0 V, T_J = 175°C			150	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V	45			A
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 45 A		0.01	0.013	Ω
		V_{GS} = 10 V, I_D = 45 A, T_J = 125°C		0.0155	0.02	
		V_{GS} = 10 V, I_D = 45 A, T_J = 175°C		0.02	0.026	
		V_{GS} = 4.5 V, I_D = 20 A		0.0145	0.02	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 45 A	20			S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		2730		pF
Output Capacitance	C_{oss}			450		
Reversen Transfer Capacitance	C_{rss}			220		
Total Gate Charge[c]	Q_g	V_{DS} = 15 V, V_{GS} = 10 V, I_D = 45 A		45	70	nC
Gate-Source Charge[c]	Q_{gs}			8.5		
Gate-Drain Charge[c]	Q_{gd}			8		
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 15 V, R_L = 0.33 Ω I_D ≃ 45 A, V_{GEN} = 10 V, R_G = 2.5 Ω		11	20	ns
Rise Time[c]	t_r			9	20	
Turn-Off Delay Time[c]	$t_{d(off)}$			38	70	
Fall Time[c]	t_f			11	20	
Source-Drain Diode Ratings and Characteristics (T_C = 25°C)[b]						
Continuous Current	I_s				45	A
Pulsed Current	I_{SM}				100	
Forward Voltage[a]	V_{SD}	I_F = 45 A, V_{GS} = 0 V		1	1.3	V
Reverse Recovery Time	t_{rr}	I_F = 45 A, di/dt = 100 A/µs		35	70	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			1.7		A
Reverse Recovery Charge	Q_{rr}			0.03		µC

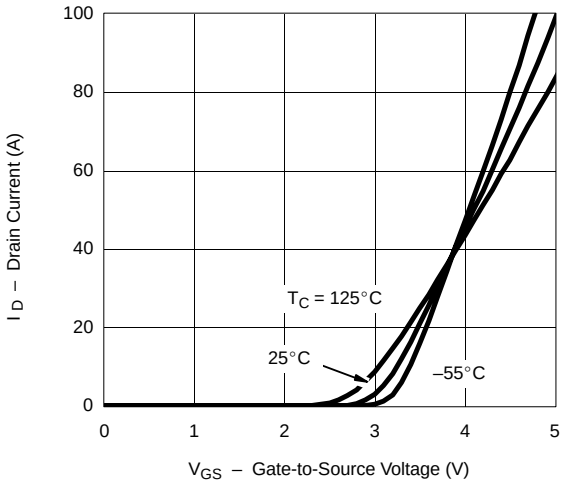
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%.
e. Guaranteed by design, not subject to production testing.
b. Independent of operating temperature.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

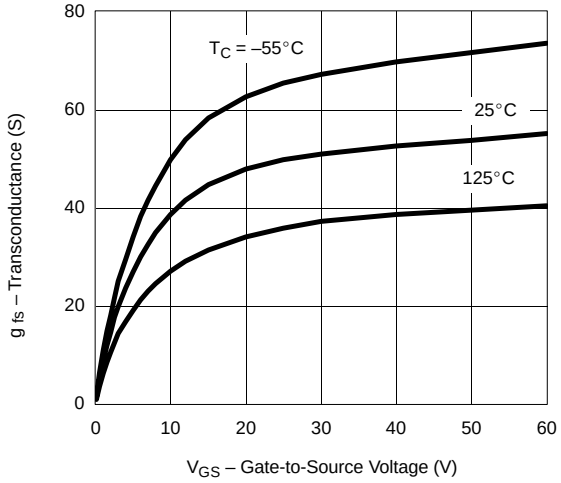
Output Characteristics



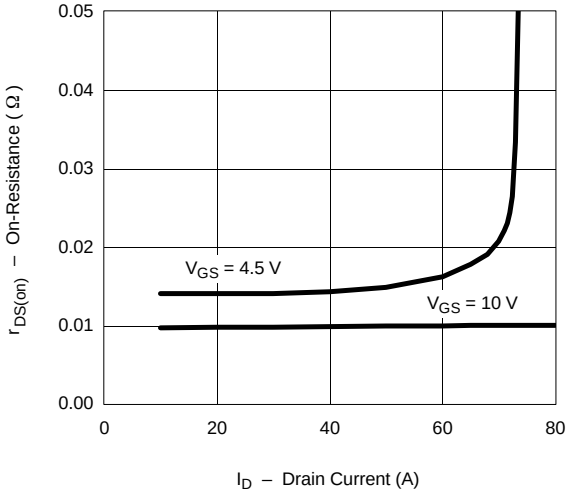
Transfer Characteristics



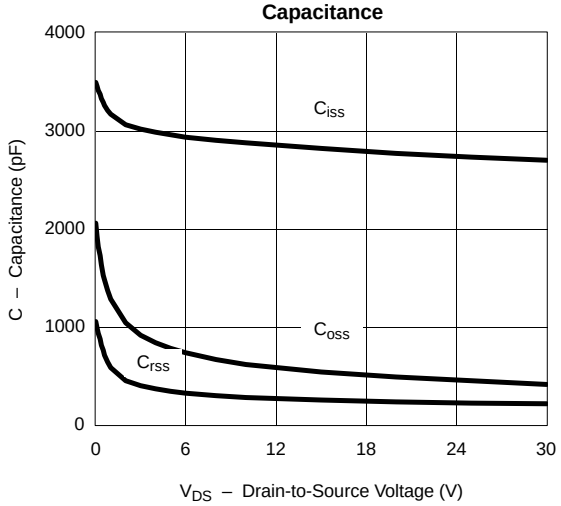
Transconductance



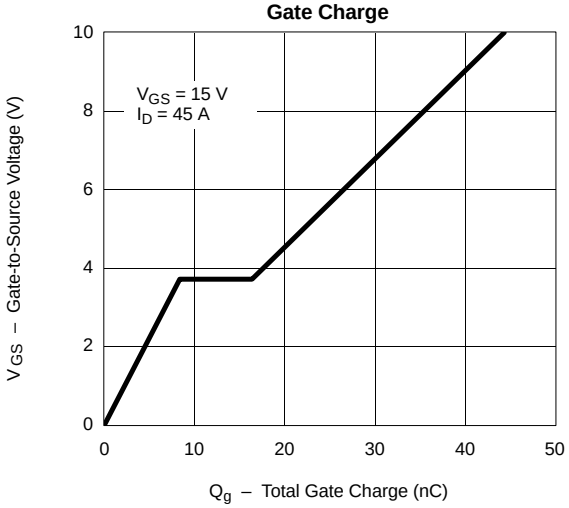
On-Resistance vs. Drain Current



Capacitance

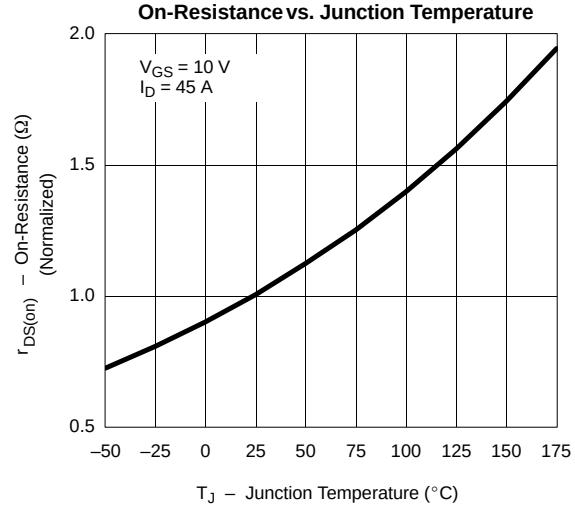


Gate Charge

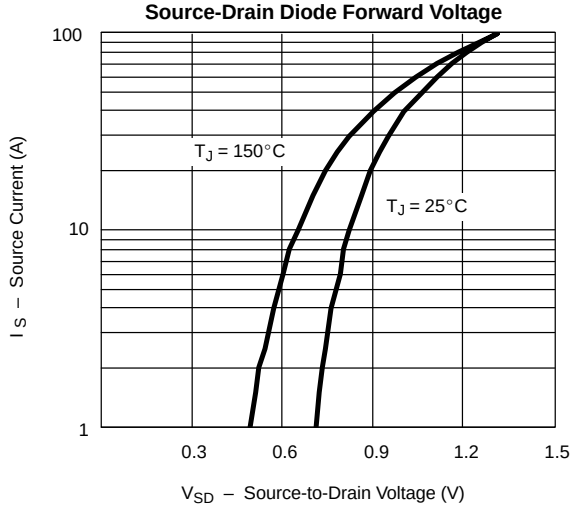


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

On-Resistance vs. Junction Temperature

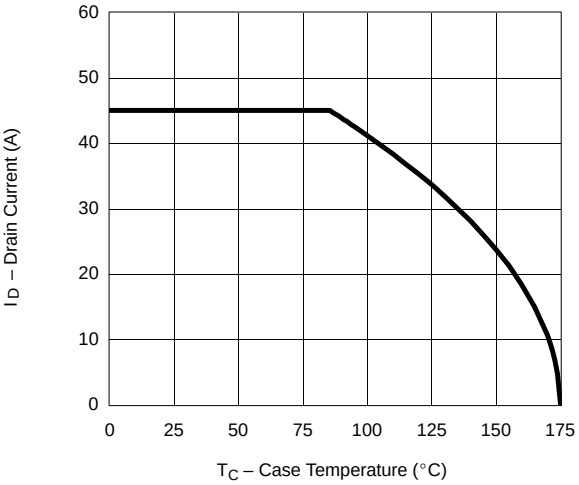


Source-Drain Diode Forward Voltage

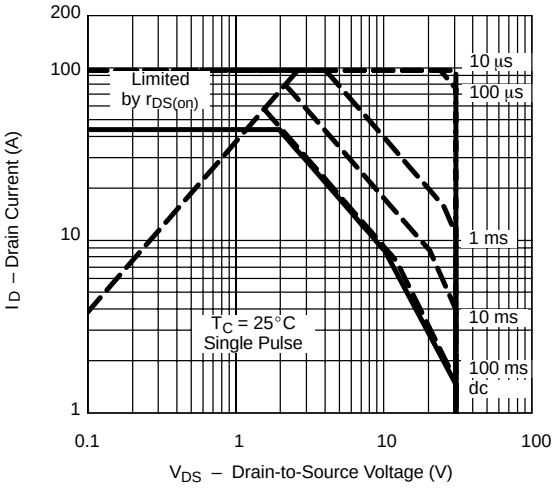


THERMAL RATINGS

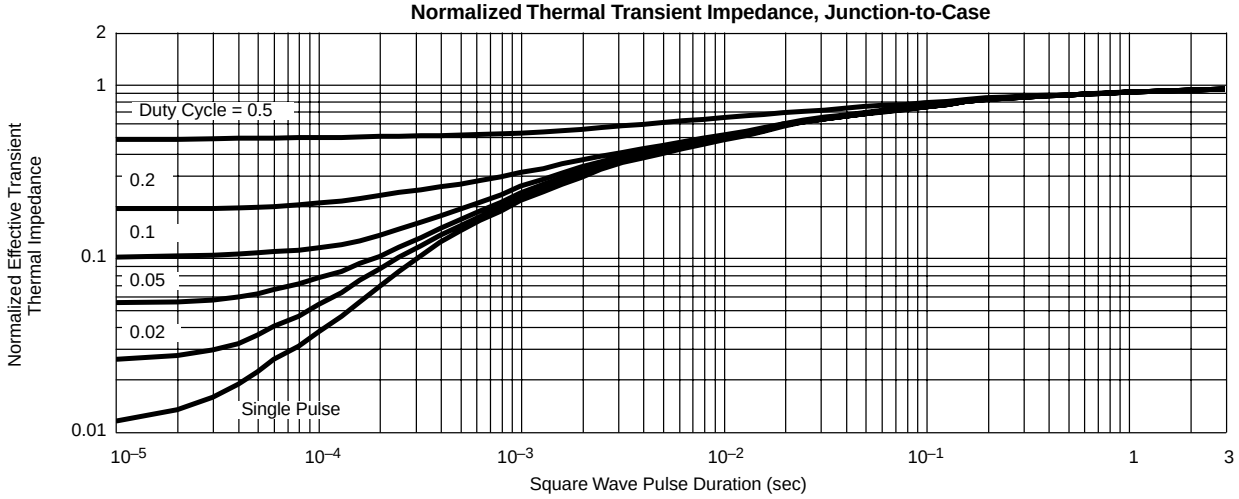
Maximum Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case



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