

## N-Channel 30 V (D-S) MOSFET

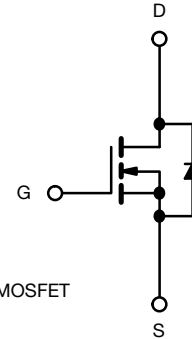
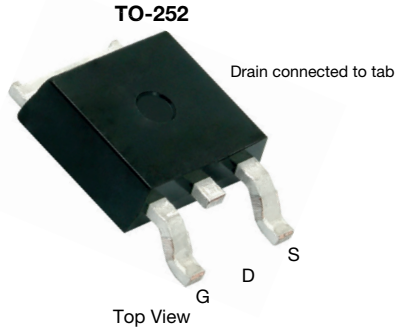
PRODUCT SUMMARY		
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A) <sup>a</sup>
30	0.0120 at V <sub>GS</sub> = 10 V	16.8
	0.0175 at V <sub>GS</sub> = 4.5 V	13.9

### FEATURES

- TrenchFET® power MOSFET
- 100 % R<sub>g</sub> and UIS tested
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**



N-Channel MOSFET

### Ordering Information:

SUD50N03-12P-GE3 (lead (Pb)-free and halogen-free)

ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> = 25 °C, unless otherwise noted)					
PARAMETER	SYMBOL	LIMIT	UNIT		
Drain-Source Voltage	V <sub>DS</sub>	30	V		
Gate-Source Voltage	V <sub>GS</sub>	± 20			
Continuous Drain Current <sup>a</sup>	I <sub>D</sub>	T <sub>A</sub> = 25 °C	16.8	A	
		T <sub>A</sub> = 100 °C	10.6		
Pulsed Drain Current	I <sub>DM</sub>	40			
Continuous Source Current (Diode Conduction) <sup>a</sup>	I <sub>S</sub>	3.6			
Avalanche Current	I <sub>AS</sub>	L = 0.1 mH	30		mJ
Single Pulse Avalanche Energy			E <sub>AS</sub>		
Maximum Power Dissipation	P <sub>D</sub>	T <sub>C</sub> = 25 °C	39	W	
		T <sub>A</sub> = 25 °C	5.4 <sup>a</sup>		
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to +150	°C		

THERMAL RESISTANCE RATINGS					
PARAMETER	SYMBOL	TYPICAL	MAXIMUM	UNIT	
Maximum Junction-to-Ambient <sup>a</sup>	R <sub>thJA</sub>	t ≤ 10 s	18	23	°C/W
		Steady State	40	50	
Maximum Junction-to-Case	R <sub>thJC</sub>	2.6	3.2		

### Note

a. Surface mounted on FR4 board, t ≤ 10 s.



SPECIFICATIONS (T <sub>J</sub> = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP. <sup>a</sup>	MAX.	UNIT
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>DS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250 μA	30	-	-	V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	1	-	3	
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 20 V	-	-	± 100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 24 V, V <sub>GS</sub> = 0 V	-	-	1	μA
		V <sub>DS</sub> = 24 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C	-	-	50	
On-State Drain Current <sup>b</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 10 V	40	-	-	A
Drain-Source On-State Resistance <sup>b</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A	-	0.0100	0.0120	Ω
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A, T <sub>J</sub> = 125 °C	-	-	0.0170	
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 15 A	-	0.0138	0.0175	
Forward Transconductance <sup>b</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 20 A	15	-	-	S
<b>Dynamic <sup>a</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz	-	1600	-	pF
Output Capacitance	C <sub>oss</sub>		-	285	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	140	-	
Total Gate Charge <sup>c</sup>	Q <sub>g</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 50 A	-	28	42	nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>		-	6	-	
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>		-	5	-	
Gate Resistance	R <sub>g</sub>	f = 1 MHz	0.3	1.5	3.0	Ω
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = 15 V, R <sub>L</sub> = 0.3 Ω I <sub>D</sub> ≅ 50 A, V <sub>GEN</sub> = 10 V, R <sub>g</sub> = 2.5 Ω	-	9	15	ns
Rise Time <sup>c</sup>	t <sub>r</sub>		-	15	25	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>		-	20	30	
Fall Time <sup>c</sup>	t <sub>f</sub>		-	12	20	
<b>Source-Drain Diode Ratings and Characteristics (T<sub>C</sub> = 25 °C)</b>						
Pulsed Current	I <sub>SM</sub>		-	-	100	A
Diode Forward Voltage <sup>b</sup>	V <sub>SD</sub>	I <sub>F</sub> = 40 A, V <sub>GS</sub> = 0 V	-	1.2	1.5	V
Source-Drain Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 50 A, di/dt = 100 A/μs	-	25	70	ns

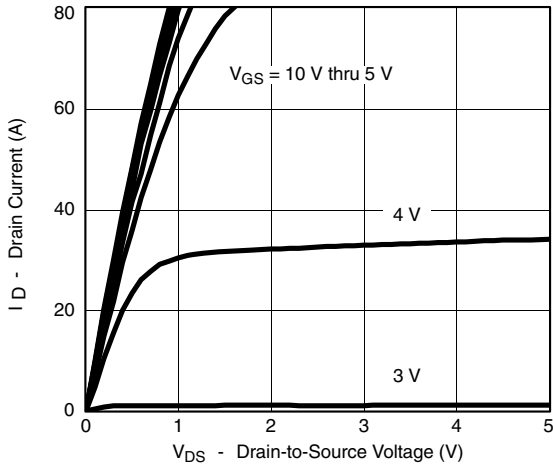
**Notes**

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

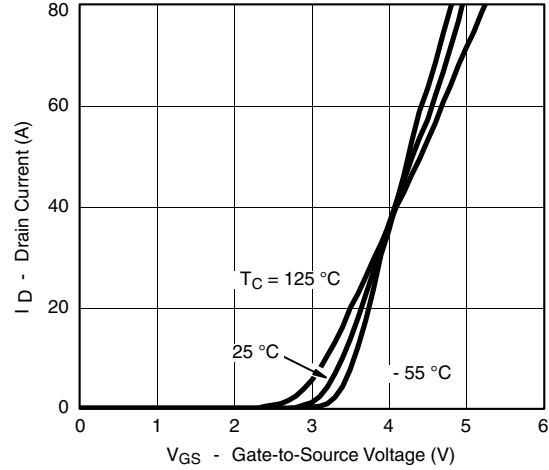
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



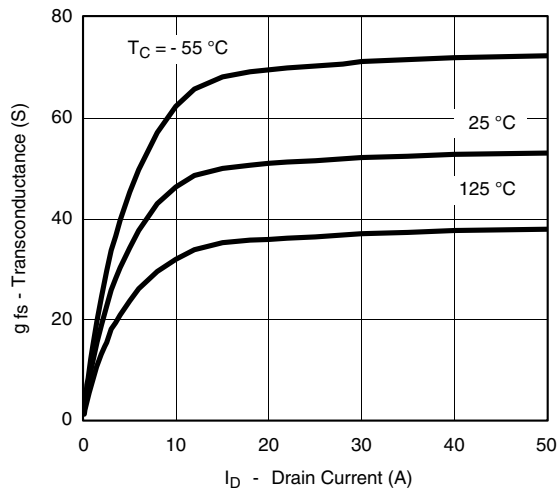
TYPICAL CHARACTERISTICS (25 °C unless noted)



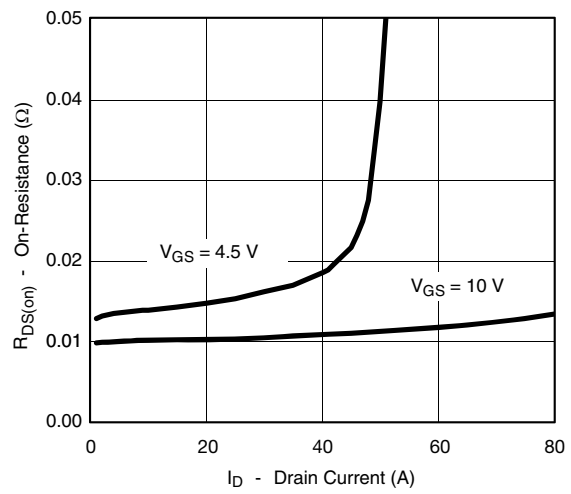
Output Characteristics



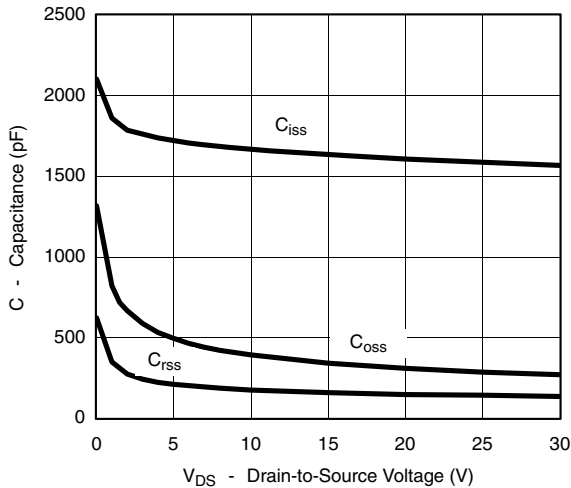
Transfer Characteristics



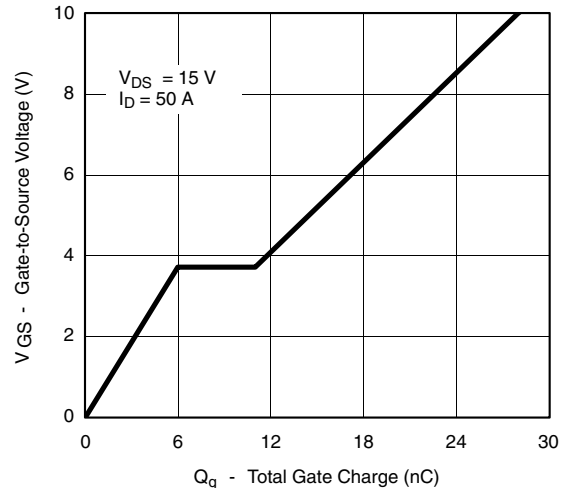
Transconductance



On-Resistance vs. Drain Current



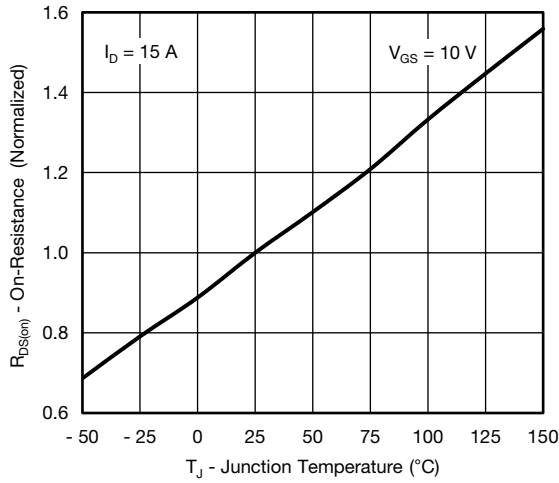
Capacitance



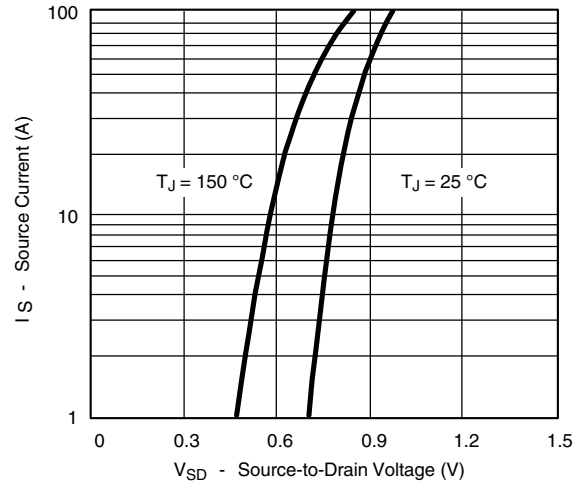
Gate Charge



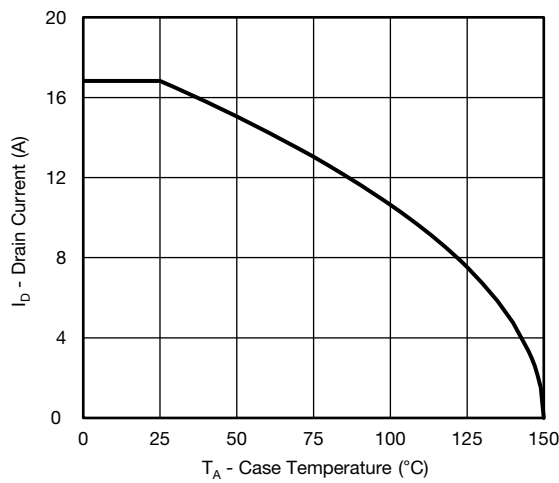
THERMAL RATINGS



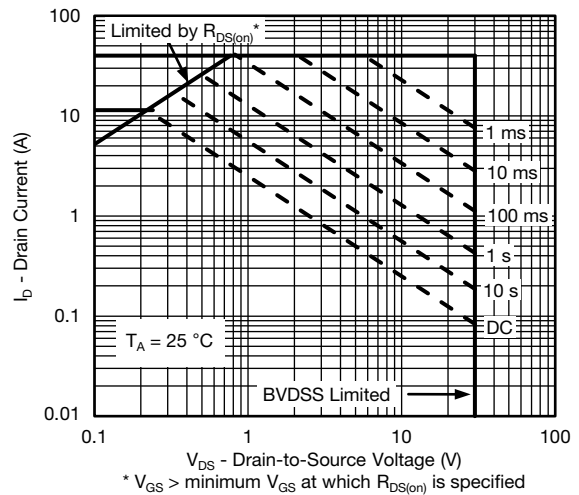
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage



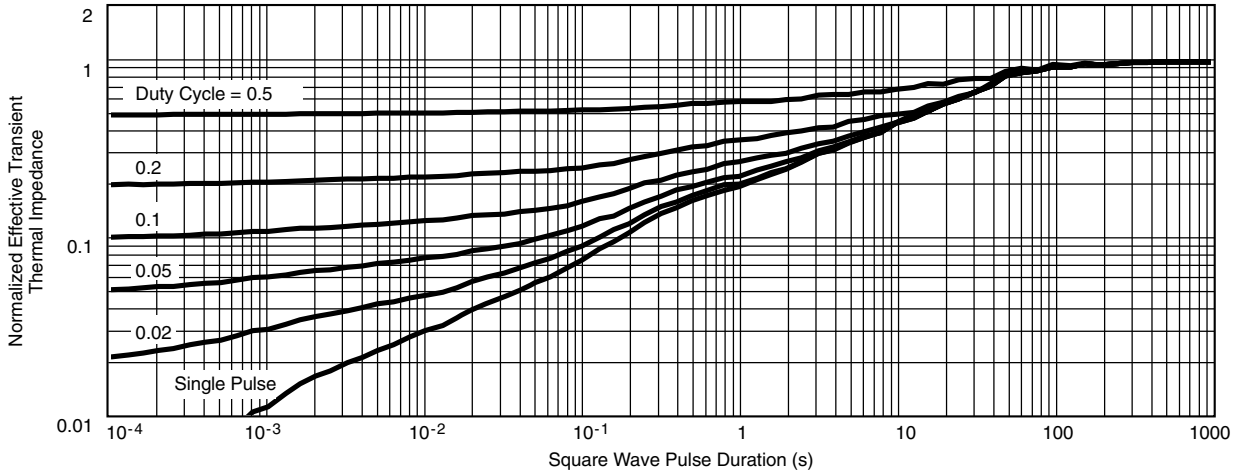
Maximum Drain Current vs. Ambient Temperature



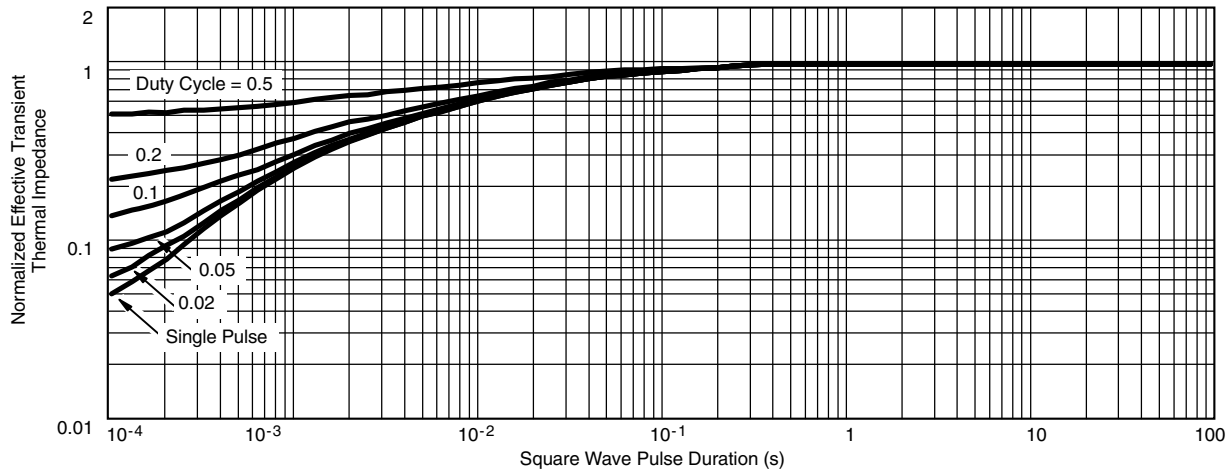
Safe Operating Area



THERMAL RATINGS



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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# TO-252AA Case Outline

## VERSION 1: FACILITY CODE = Y



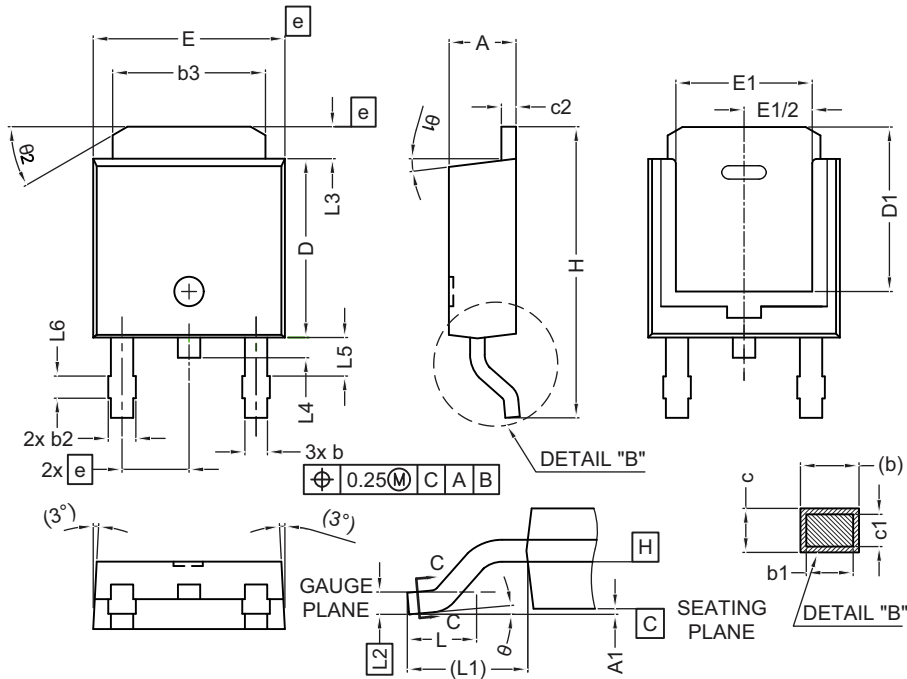
MILLIMETERS		
DIM.	MIN.	MAX.
A	2.18	2.38
A1	-	0.127
b	0.64	0.88
b2	0.76	1.14
b3	4.95	5.46
C	0.46	0.61
C2	0.46	0.89
D	5.97	6.22
D1	4.10	-
E	6.35	6.73
E1	4.32	-
H	9.40	10.41
e	2.28 BSC	
e1	4.56 BSC	
L	1.40	1.78
L3	0.89	1.27
L4	-	1.02
L5	1.01	1.52

### Note

- Dimension L3 is for reference only



VERSION 2: FACILITY CODE = N



MILLIMETERS		
DIM.	MIN.	MAX.
A	2.18	2.39
A1	-	0.13
b	0.65	0.89
b1	0.64	0.79
b2	0.76	1.13
b3	4.95	5.46
c	0.46	0.61
c1	0.41	0.56
c2	0.46	0.60
D	5.97	6.22
D1	5.21	-
E	6.35	6.73
E1	4.32	-
e	2.29 BSC	
H	9.94	10.34

MILLIMETERS		
DIM.	MIN.	MAX.
L	1.50	1.78
L1	2.74 ref.	
L2	0.51 BSC	
L3	0.89	1.27
L4	-	1.02
L5	1.14	1.49
L6	0.65	0.85
θ	0°	10°
θ1	0°	15°
θ2	25°	35°

Notes

- Dimensioning and tolerance confirm to ASME Y14.5M-1994
- All dimensions are in millimeters. Angles are in degrees
- Heat sink side flash is max. 0.8 mm
- Radius on terminal is optional

ECN: E19-0649-Rev. Q, 16-Dec-2019  
 DWG: 5347

## RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)



Recommended Minimum Pads  
Dimensions in Inches/(mm)

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