



## N-Channel 30-V (D-S), 175°C, MOSFET PWM Optimized

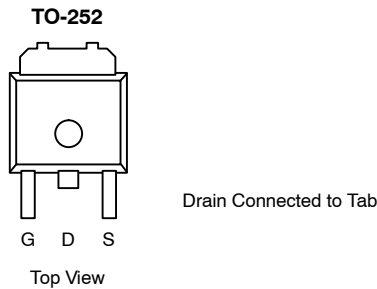
PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A) <sup>a</sup>
30	0.010 @ $V_{GS} = 10$ V	62 <sup>c</sup>
	0.012 @ $V_{GS} = 4.5$ V	55 <sup>c</sup>

### FEATURES

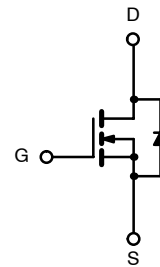
- TrenchFET® Power MOSFETS
- PWM Optimized for High Efficiency
- 100%  $R_g$  Tested

### APPLICATIONS

- Buck Converter
  - High-Side
  - Low-Side
- Synchronous Rectifier
  - Secondary Rectifier



Order Number:  
SUD50N03-10CP



ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 175^\circ\text{C}$ ) <sup>a</sup>	$I_D$	$T_C = 25^\circ\text{C}$	62 <sup>c</sup>
		$T_C = 100^\circ\text{C}$	44 <sup>c</sup>
Pulsed Drain Current	$I_{DM}$	100	A
Continuous Source Current (Diode Conduction) <sup>a</sup>	$I_S$	20	
Maximum Power Dissipation	$P_D$	$T_C = 25^\circ\text{C}$	71 <sup>b</sup>
		$T_A = 25^\circ\text{C}$	8.3 <sup>a</sup>
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 175	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS				
Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>a</sup>	$R_{thJA}$	$t \leq 10$ sec	15	$^\circ\text{C}/\text{W}$
		Steady State	40	
Maximum Junction-to-Case (Drain)	$R_{thJC}$	1.75	2.1	

Notes:

- a Surface mounted on 1" x 1" FR4 Board,  $t \leq 10$  sec.
- b See SOA curve for voltage derating.
- c Based on maximum allowable Junction Temperature. Package limitation current is 50 A.

MOSFET SPECIFICATIONS (T <sub>J</sub> = 25° C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</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>DS</sub> = 250 μA	1			
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	
		V <sub>DS</sub> = 24 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175° C			150	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 10 V	50			A
Drain-Source On-State Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 15 A		0.008	0.010	Ω
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 15 A, T <sub>J</sub> = 125° C			0.016	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 15 A, T <sub>J</sub> = 175° C			0.020	
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 15 A		0.0105	0.012	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 15 A	20	60		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz		1725		pF
Output Capacitance	C <sub>oss</sub>			425		
Reverse Transfer Capacitance	C <sub>rss</sub>			120		
Total Gate Charge <sup>c</sup>	Q <sub>g</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 62 A		13	18	nC
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>			4.5		
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			4.0		
Gate Resistance	R <sub>g</sub>		1	1.7	3.5	Ω
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>	V <sub>DD</sub> = 15 V, R <sub>L</sub> = 1 Ω I <sub>D</sub> = 62 A, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 6 Ω		10	15	ns
Rise Time <sup>c</sup>	t <sub>r</sub>			160	240	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>			30	45	
Fall Time <sup>c</sup>	t <sub>f</sub>			55	85	
<b>Source-Drain Diode Ratings and Characteristics (T<sub>C</sub> = 25° C)<sup>b</sup></b>						
Continuous Current	I <sub>S</sub>				62	A
Pulsed Current	I <sub>SM</sub>				100	
Forward Voltage <sup>a</sup>	V <sub>SD</sub>	I <sub>F</sub> = 15 A, V <sub>GS</sub> = 0 V		0.85	12	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 62 A, di/dt = 100 A/μs		80	110	ns

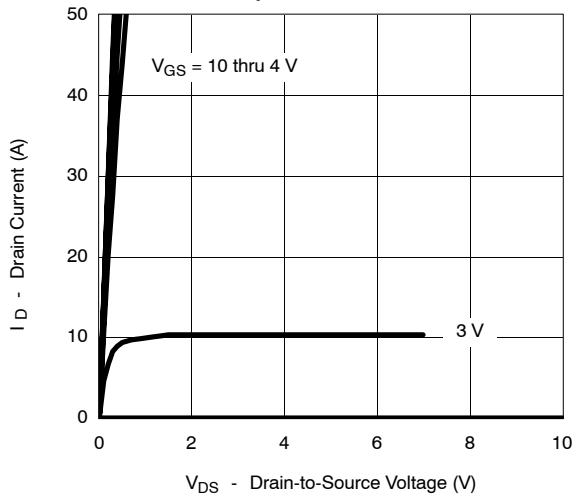
## Notes:

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

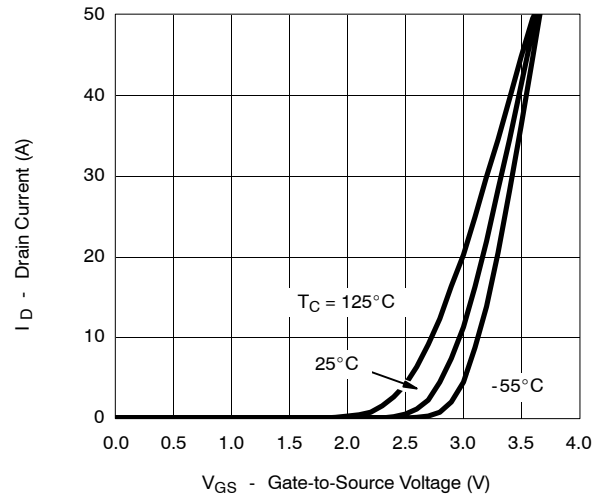


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

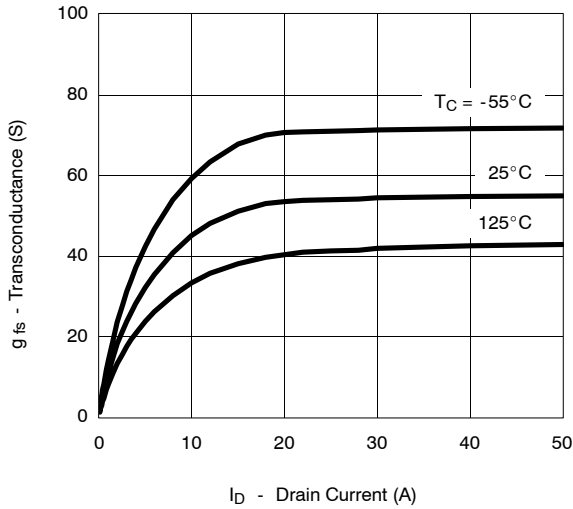
**Output Characteristics**



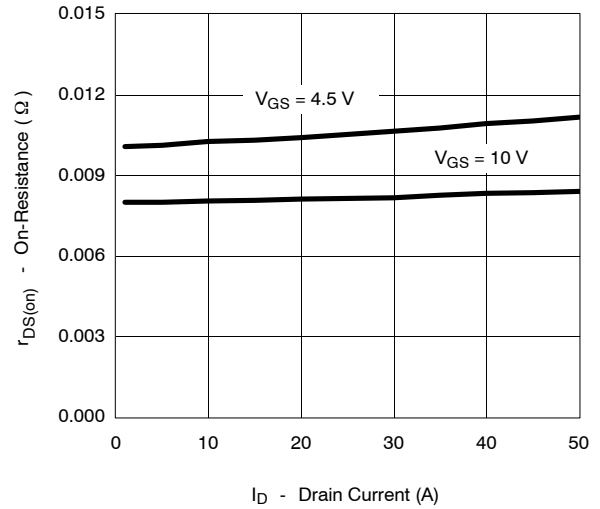
**Transfer Characteristics**



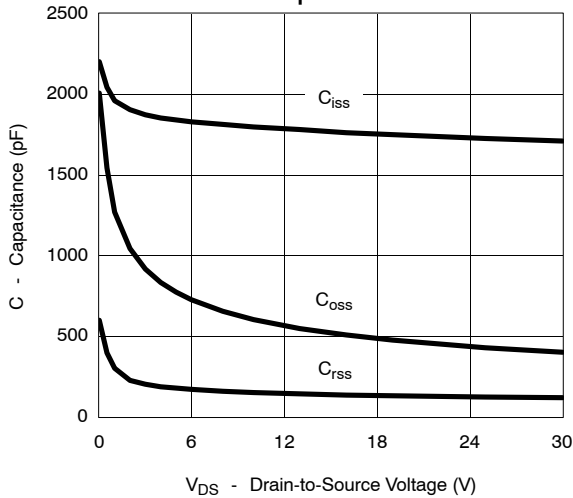
**Transconductance**



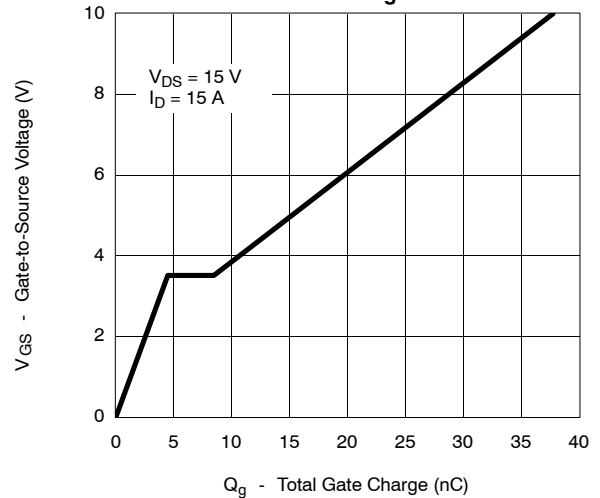
**On-Resistance vs. Drain Current**



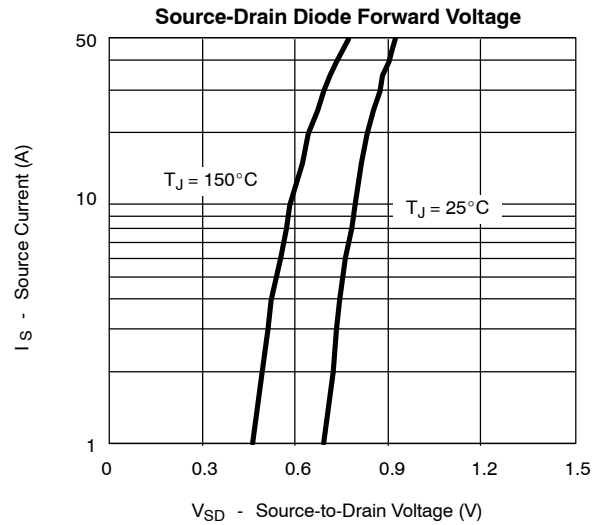
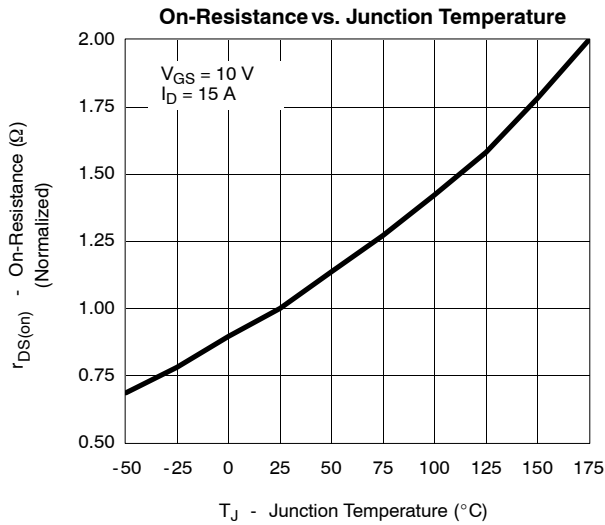
**Capacitance**



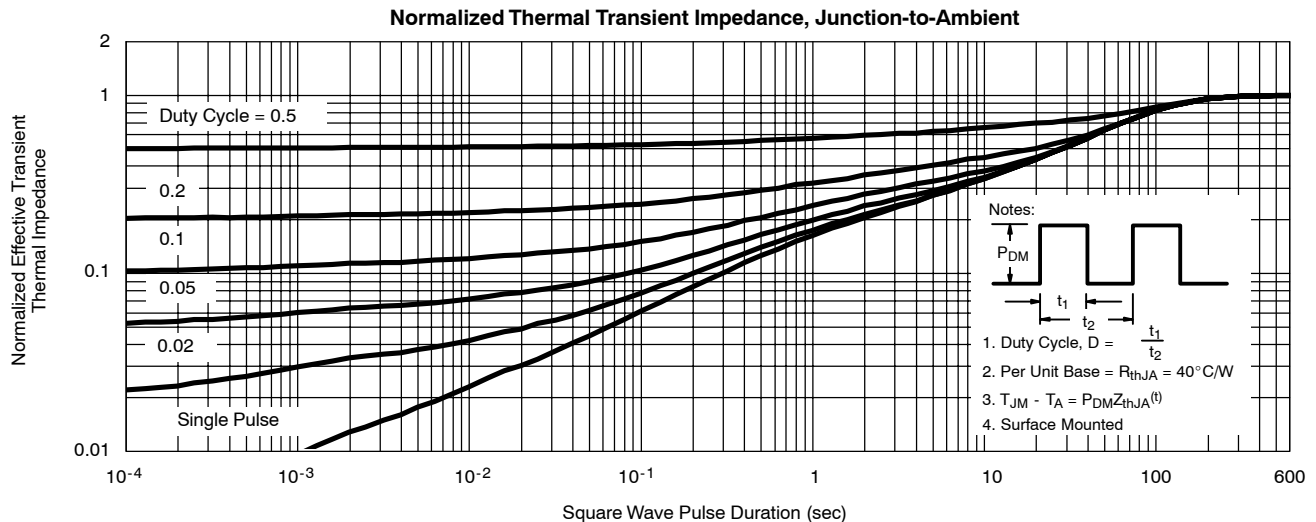
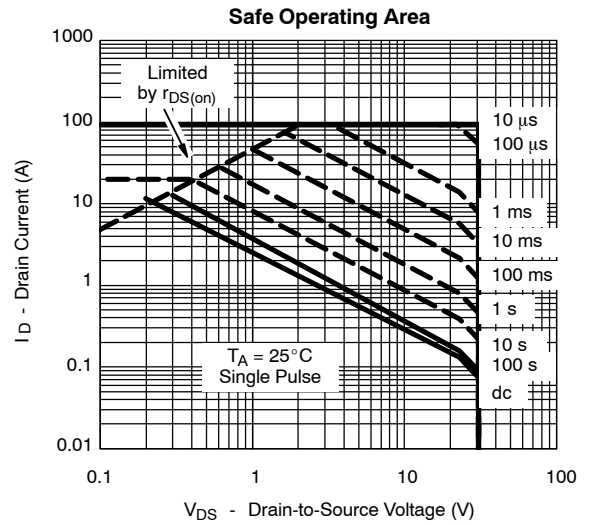
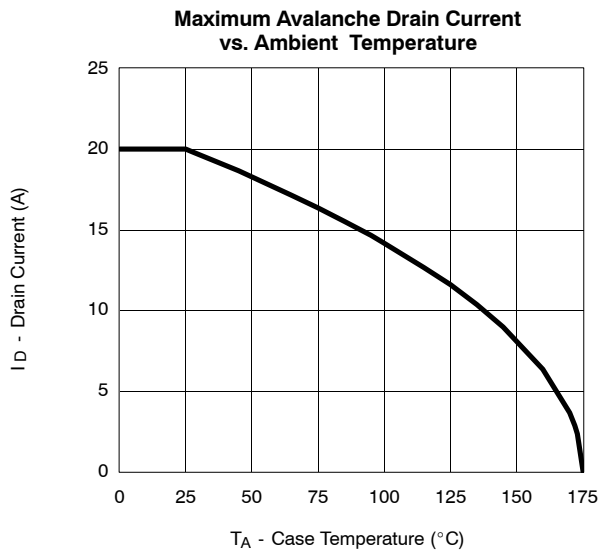
**Gate Charge**



### TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

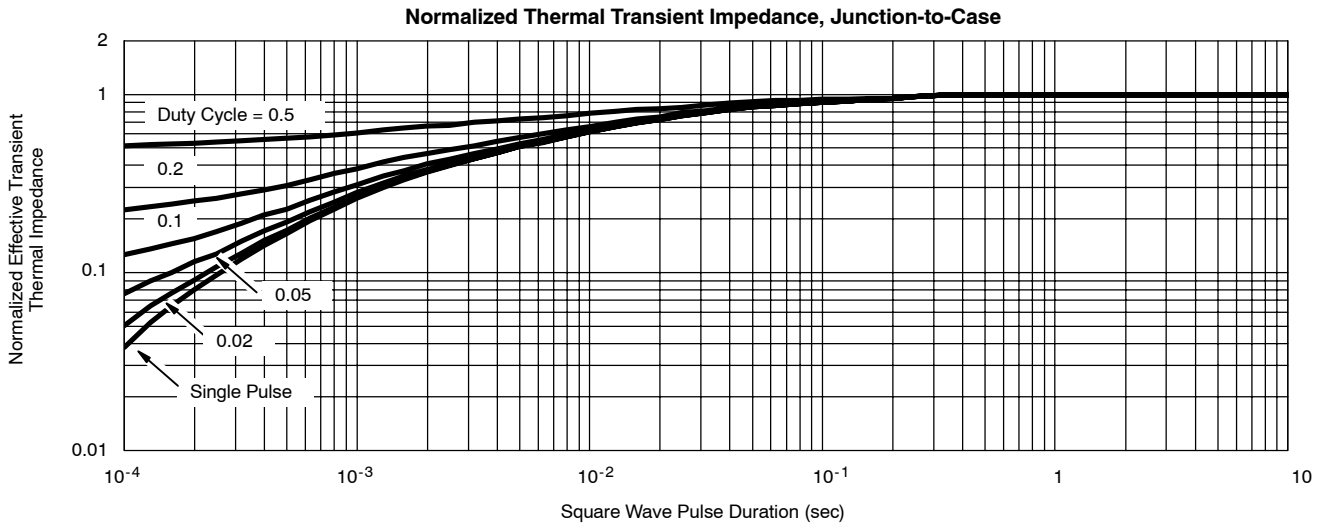


### THERMAL RATINGS





**THERMAL RATINGS**





## Notice

Specifications of the products displayed herein are subject to change without notice. Vishay Intertechnology, Inc., or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Vishay's terms and conditions of sale for such products, Vishay assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of Vishay products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Vishay for any damages resulting from such improper use or sale.



## Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.