



N-Channel 30-V (D-S) 175°C MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.016 @ $V_{GS} = 10$ V	55
	0.024 @ $V_{GS} = 4.5$ V	45

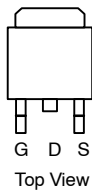
FEATURES

- TrenchFET® Power MOSFET
- 175°C Junction Temperature
- PWM Optimized
- 100% R_g Tested

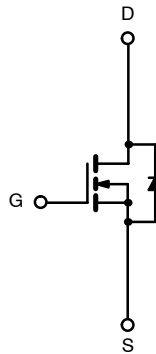
APPLICATIONS

- High-Side Core DC/DC
 - Desktop
 - Server
- DDR DC/DC Converter

TO-263



DRAIN connected to TAB



Ordering Information: SUM55N03-16P—E3 (Lead Free)

N-Channel MOSFET

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}	± 20	
Continuous Drain Current ($T_J = 175^\circ\text{C}$)	$T_C = 25^\circ\text{C}$	I_D	55	A
	$T_C = 100^\circ\text{C}$		39	
Pulsed Drain Current		I_{DM}	50	
Avalanche Current		I_{AR}	25	
Repetitive Avalanche Energy ^a	$L = 0.1$ mH	E_{AR}	31.25	mJ
Maximum Power Dissipation ^a	$T_C = 25^\circ\text{C}$	P_D	93 ^b	W
	$T_A = 25^\circ\text{C}$ ^d		3.75	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 175	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Limit	Unit
Junction-to-Ambient	PCB Mount ^c	R_{thJA}	40	$^\circ\text{C/W}$
Junction-to-Case		R_{thJC}	1.6	

Notes

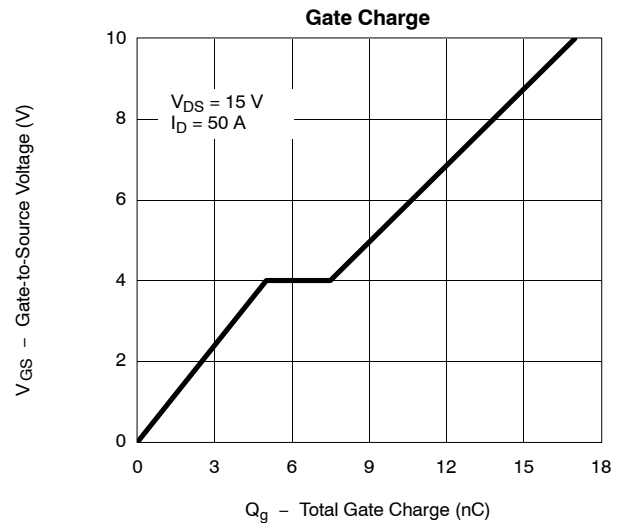
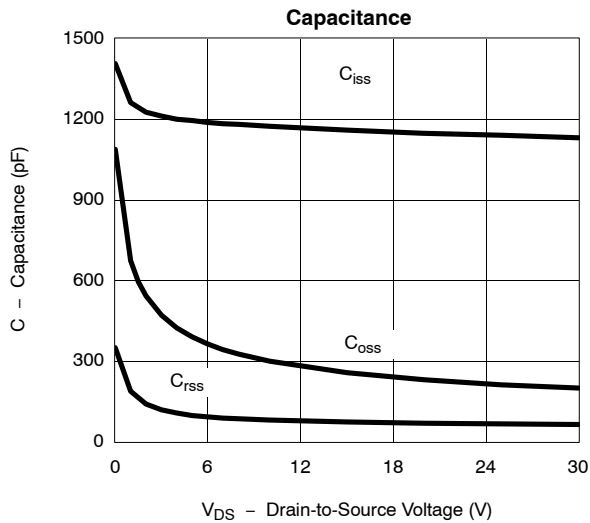
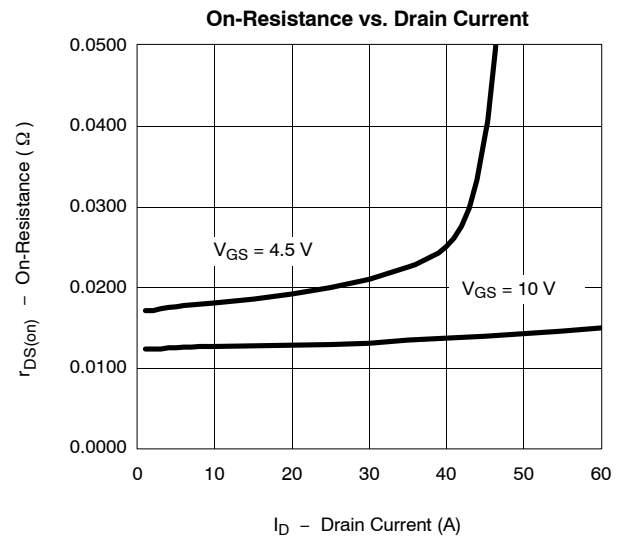
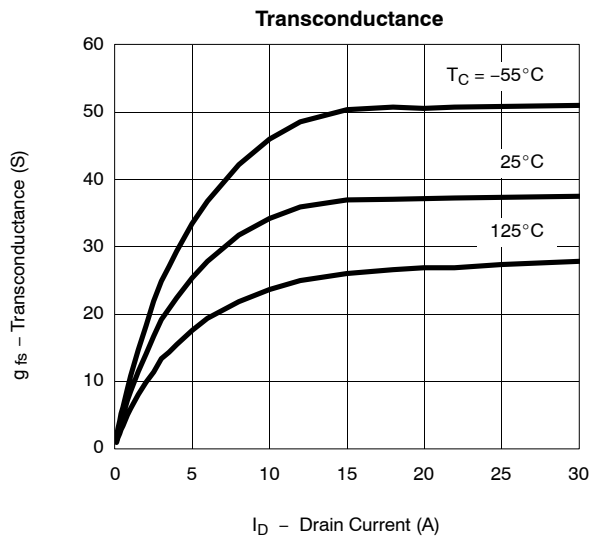
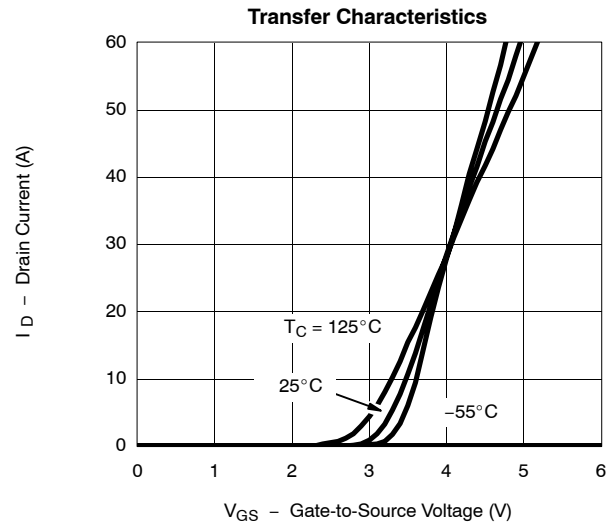
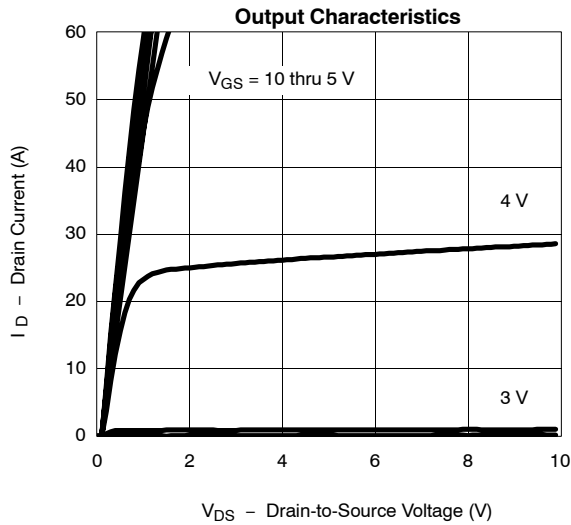
- Duty cycle $\leq 1\%$.
- See SOA curve for voltage derating.
- When mounted on 1" square PCB (FR-4 material).

SPECIFICATIONS (T_J = 25 °C UNLESS OTHERWISE NOTED)

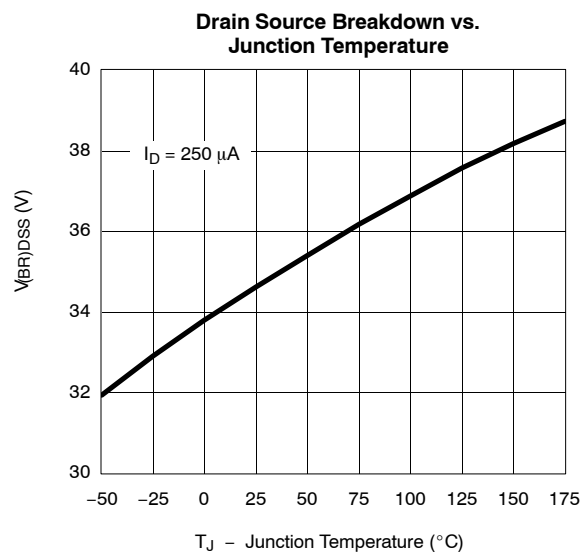
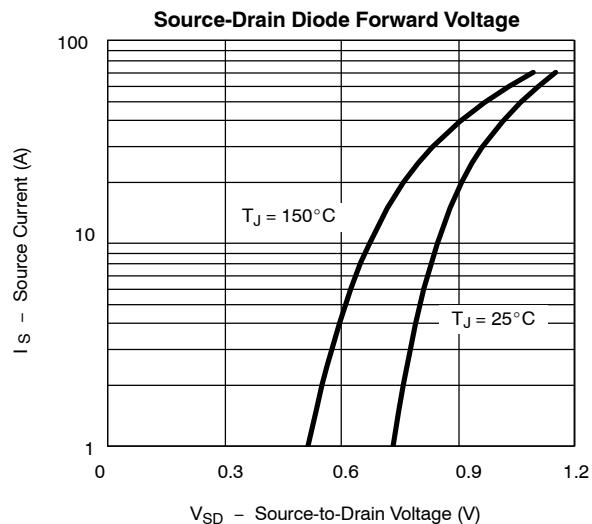
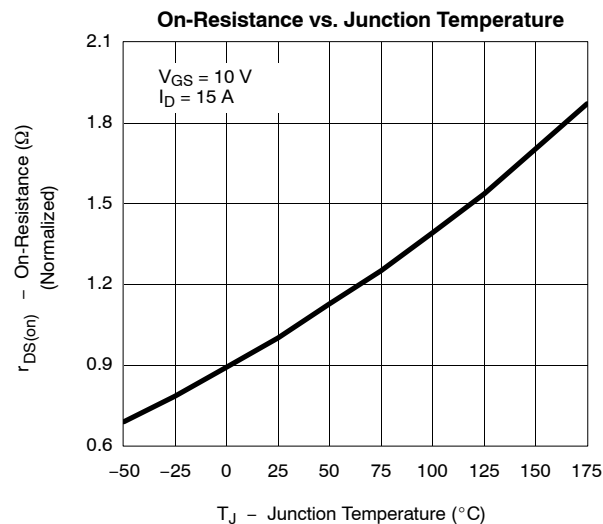
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{DS} = 0 V, I _D = 250 μA	30			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1		3	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			± 100	nA
Zero Gate Voltage 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			250	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	50			A
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 10 V, I _D = 15 A		0.0128	0.016	Ω
		V _{GS} = 10 V, I _D = 15 A, T _J = 125°C			0.025	
		V _{GS} = 10 V, I _D = 15 A, T _J = 175°C			0.031	
		V _{GS} = 4.5 V, I _D = 10 A		0.019	0.024	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 20 A	10			S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		1150		pF
Output Capacitance	C _{oss}			215		
Reverse Transfer Capacitance	C _{rss}			70		
Total Gate Charge ^b	Q _g	V _{DS} = 15 V, V _{GS} = 10 V, I _D = 50 A		17	26	nC
Gate-Source Charge ^b	Q _{gs}			5		
Gate-Drain Charge ^b	Q _{gd}			2.5		
Gate Resistance	R _g		2.7	5.5	8.25	Ω
Turn-On Delay Time ^b	t _{d(on)}	V _{DD} = 15 V, R _L = 0.3 Ω I _D ≅ 50 A, V _{GEN} = 10 V, R _g = 2.5 Ω		7	15	ns
Rise Time ^b	t _r			20	30	
Turn-Off Delay Time ^b	t _{d(off)}			25	40	
Fall Time ^b	t _f			12	20	
Source-Drain Diode Ratings and Characteristics (T _C = 25°C) ^c						
Continuous Current	I _S				55	A
Pulsed Current	I _{SM}				50	
Forward Voltage ^a	V _{SD}	I _F = 20 A, V _{GS} = 0 V		1.0	1.5	V
Reverse Recovery Time	t _{rr}	I _F = 40 A, di/dt = 100 A/μs		25	70	ns
Peak Reverse Recovery Current	I _{RM}			1.2	2.5	A
Reverse Recovery Charge	Q _{rr}			0.15	0.09	μC

Notes

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

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

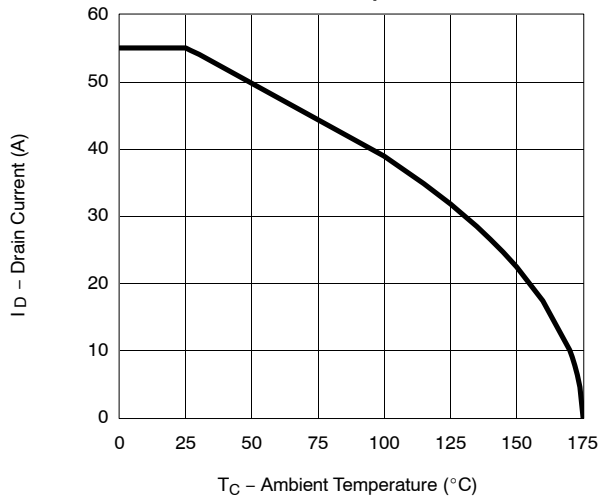
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



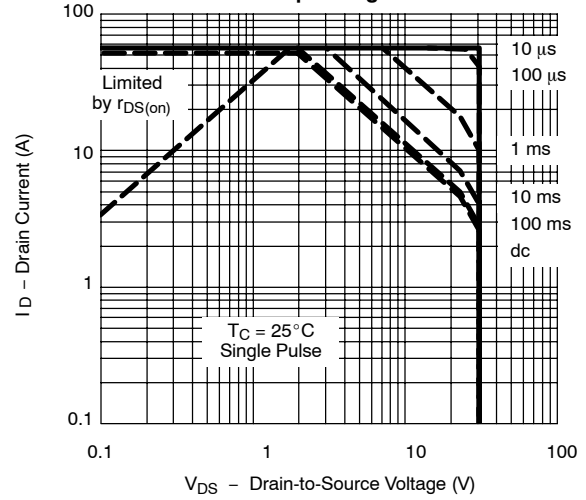


THERMAL RATINGS

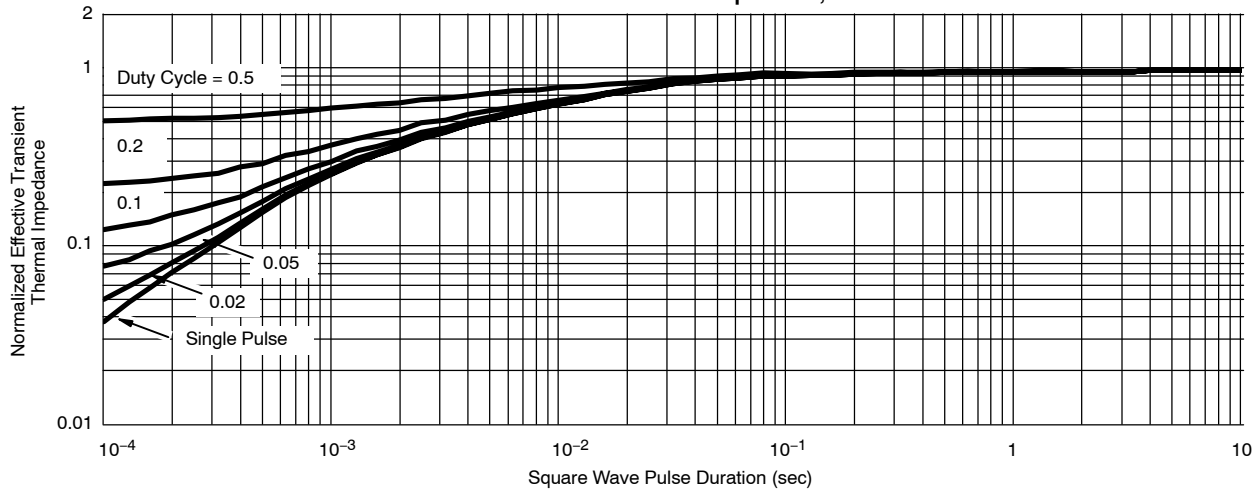
**Maximum Avalanche and Drain Current
vs. Case Temperature**



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case





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.