

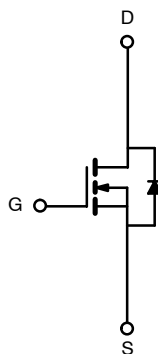
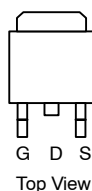


N-Channel 30-V (D-S) 175°C MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.006 @ $V_{GS} = 10$ V	85
	0.009 @ $V_{GS} = 4.5$ V	77

TO-263



Ordering Information: SUM85N03-06P
SUM85N03-06P-E3 (Lead Free)

N-Channel MOSFET

FEATURES

- TrenchFET® Power MOSFET
- 175°C Junction Temperature
- PWM Optimized for High Efficiency
- New Package with Low Thermal Resistance
- 100% R_g Tested

APPLICATIONS

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

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	85	A
	$T_C = 100^\circ\text{C}$		67	
Pulsed Drain Current		I_{DM}	200	
Avalanche Current		I_{AR}	45	
Repetitive Avalanche Energy ^a		E_{AR}	101	mJ
Maximum Power Dissipation ^a	$T_C = 25^\circ\text{C}$	P_D	100 ^b	W
	$T_A = 25^\circ\text{C}^c$		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	$^\circ\text{C/W}$
	Free Air		62.5	
Junction-to-Case		R_{thJC}	1.5	

Notes

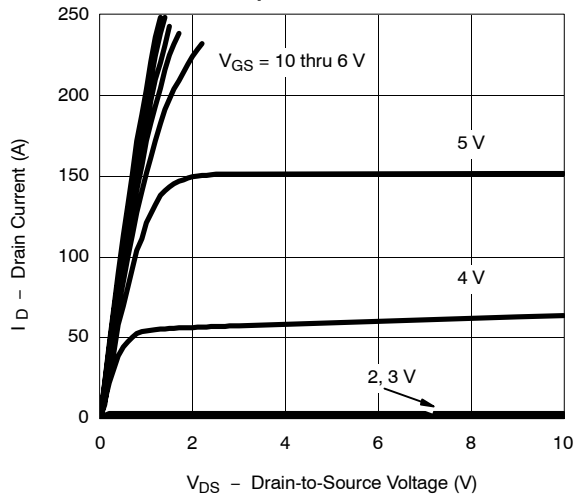
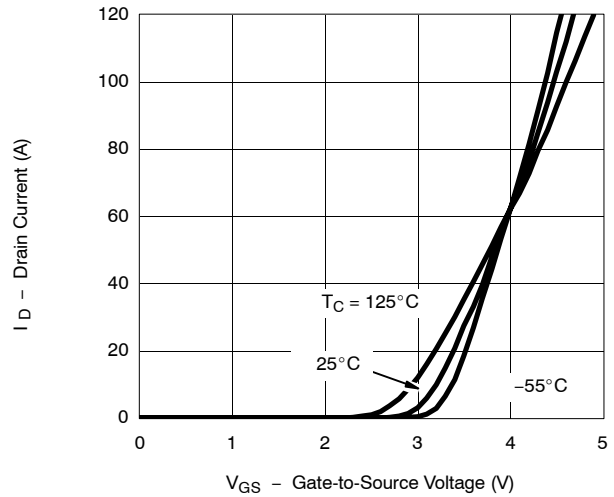
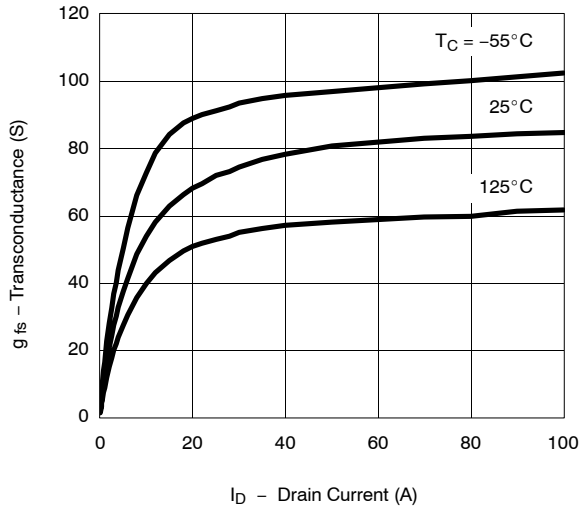
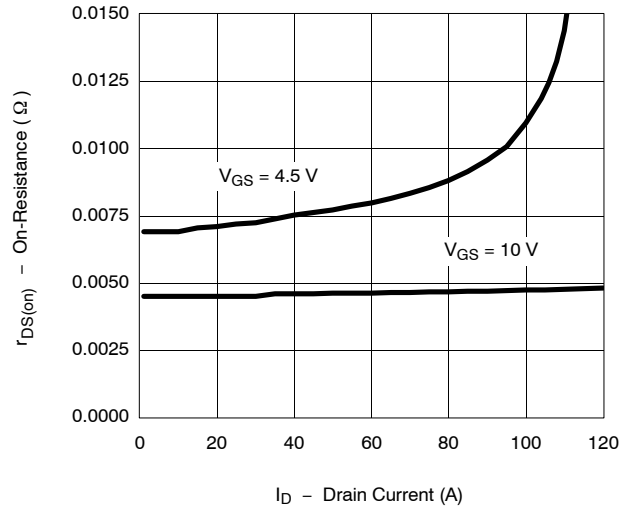
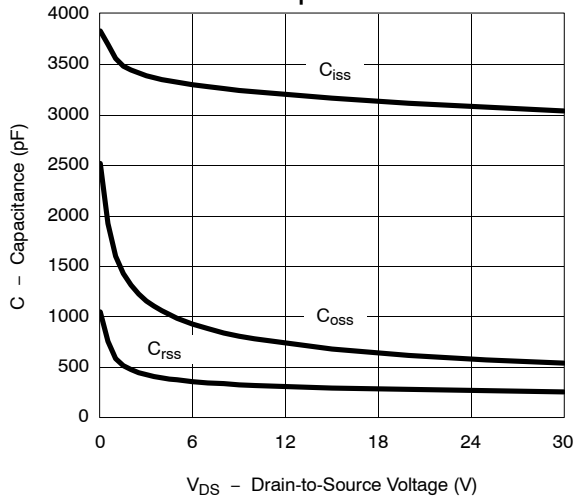
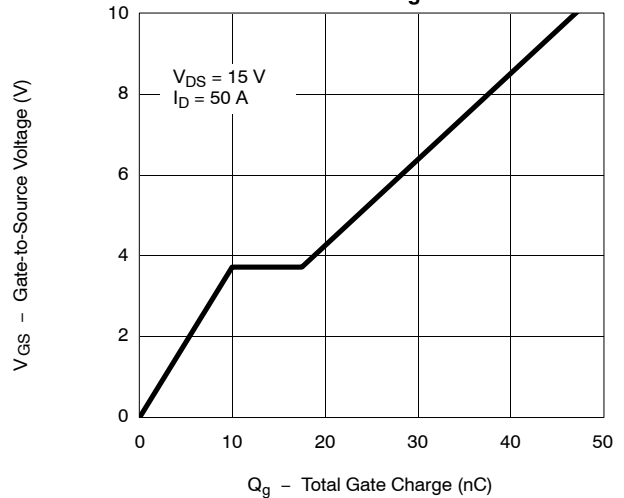
- a. Duty cycle $\leq 1\%$.
b. See SOA curve for voltage derating.
c. When mounted on 1" square PCB (FR-4 material).

SPECIFICATIONS ($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

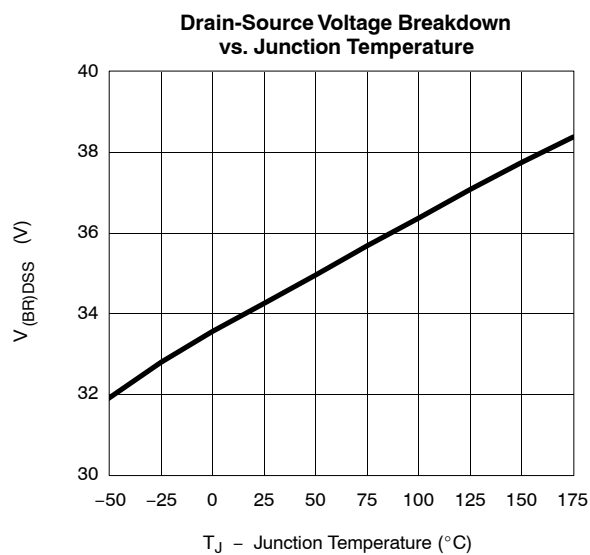
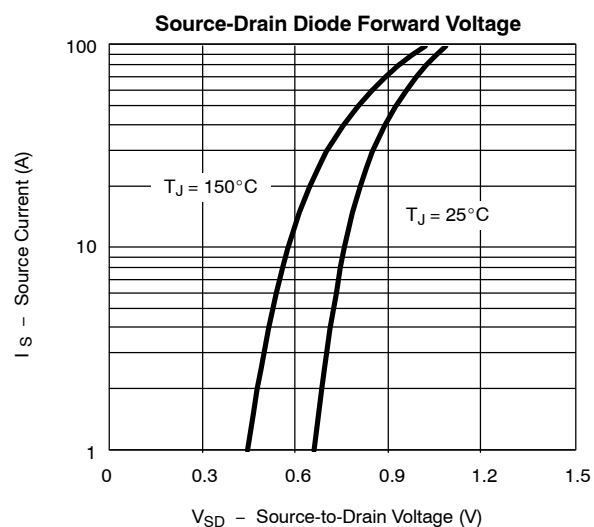
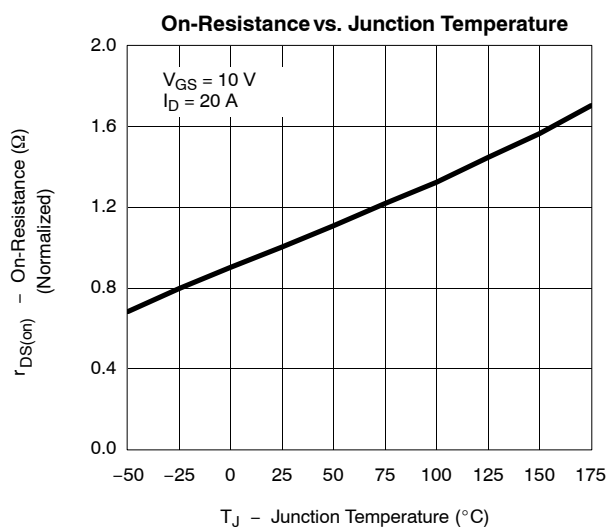
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{DS} = 0 V, I _D = 250 μA	30			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1		3.0	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage 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	120			A
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		0.0045	0.006	Ω
		V _{GS} = 10 V, I _D = 20 A, T _J = 125°C			0.0085	
		V _{GS} = 10 V, I _D = 20 A, T _J = 175°C			0.011	
		V _{GS} = 4.5 V, I _D = 20 A		0.0072	0.009	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 20 A	20			S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		3100		pF
Output Capacitance	C _{oss}			565		
Reverse Transfer Capacitance	C _{rss}			255		
Gate-Resistance	R _g		0.5	1.9	3.1	Ω
Total Gate Charge ^b	Q _g	V _{DS} = 15 V, V _{GS} = 10 V, I _D = 50 A		48	65	nC
Gate-Source Charge ^b	Q _{gs}			10		
Gate-Drain Charge ^b	Q _{gd}			7.5		
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		12	20	ns
Rise Time ^b	t _r			12	20	
Turn-Off Delay Time ^b	t _{d(off)}			30	45	
Fall Time ^b	t _f			10	15	
Source-Drain Diode Ratings and Characteristics (T _C = 25°C) ^c						
Continuous Current	I _S				100	A
Pulsed Current	I _{SM}				200	
Forward Voltage ^a	V _{SD}	I _F = 30 A, V _{GS} = 0 V		1.2	1.5	V
Reverse Recovery Time	t _{rr}	I _F = 50 A, di/dt = 100 A/μs		35	70	ns

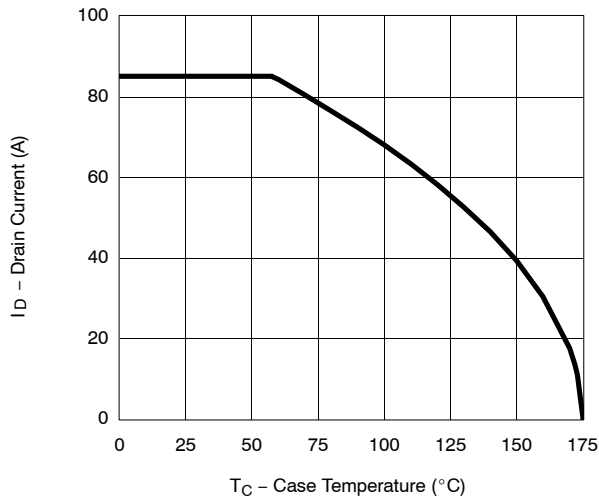
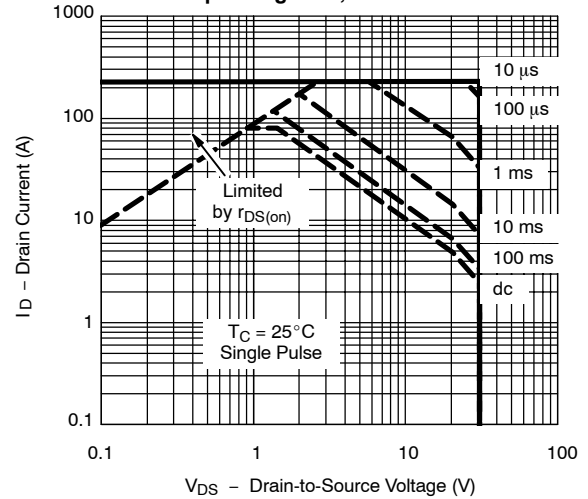
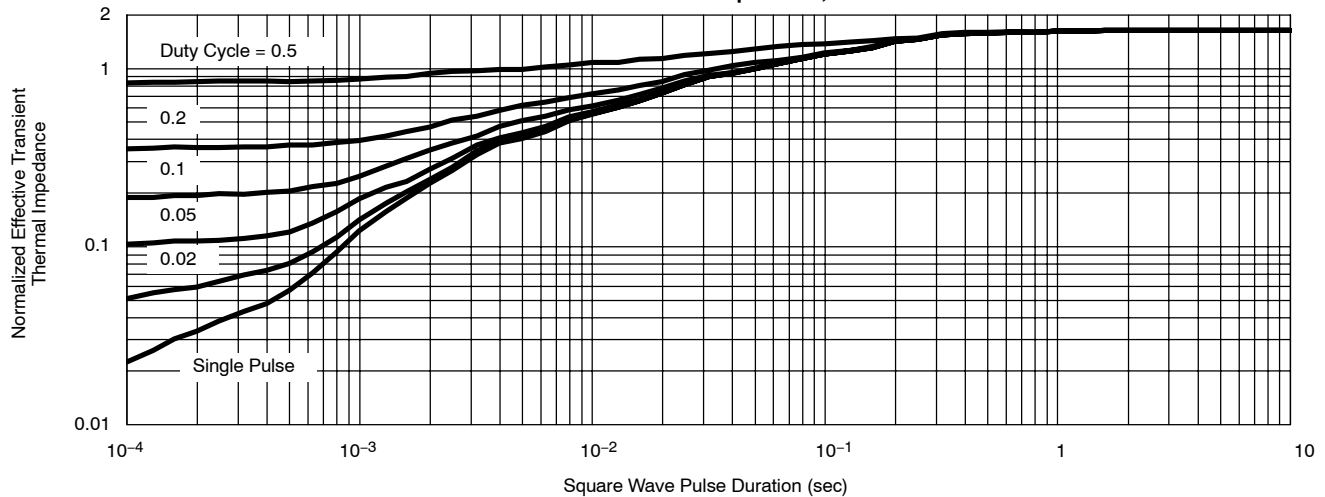
Notes

- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. Independent of operating temperature.
c. Guaranteed by design, not subject to production testing.

**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****Maximum Avalanche Drain Current
vs. Case Temperature****Safe Operating Area, Junction-to-Case****Normalized Thermal Transient Impedance, Junction-to-Case**



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.