

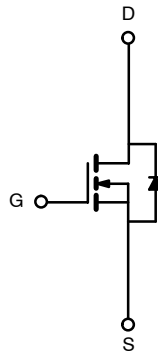
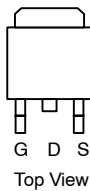


N-Channel 30-V (D-S) 175°C MOSFET

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

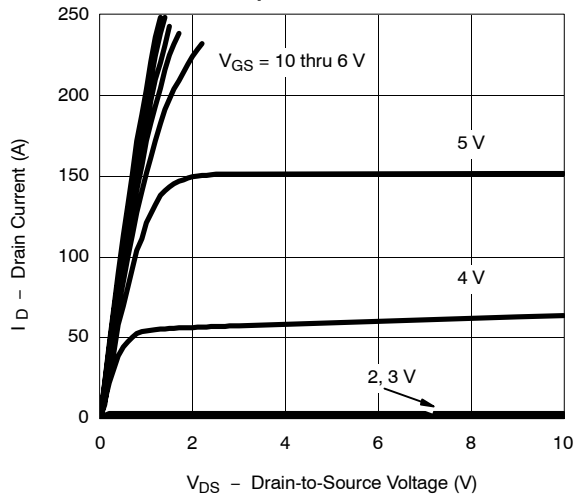
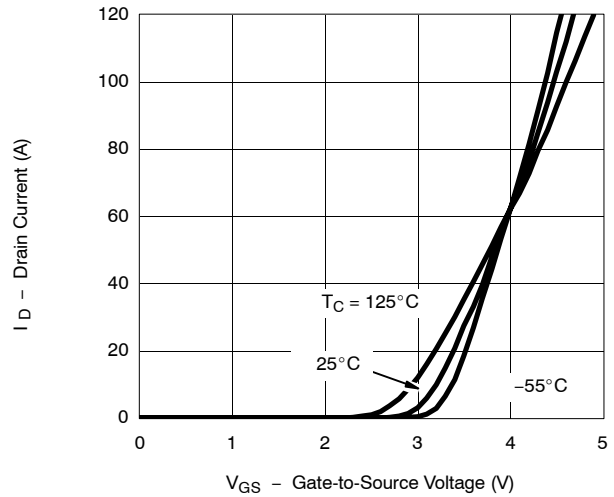
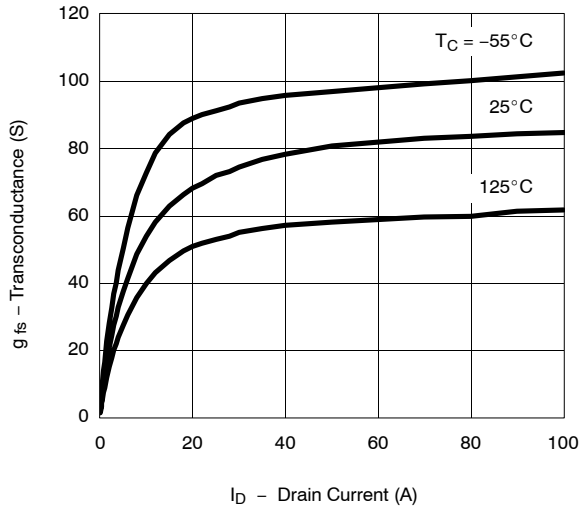
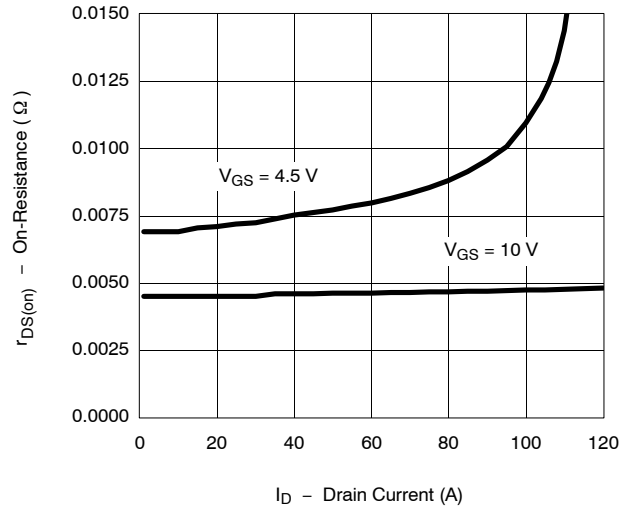
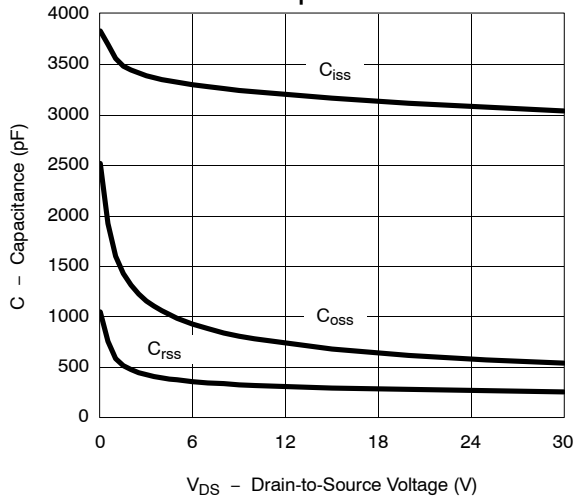
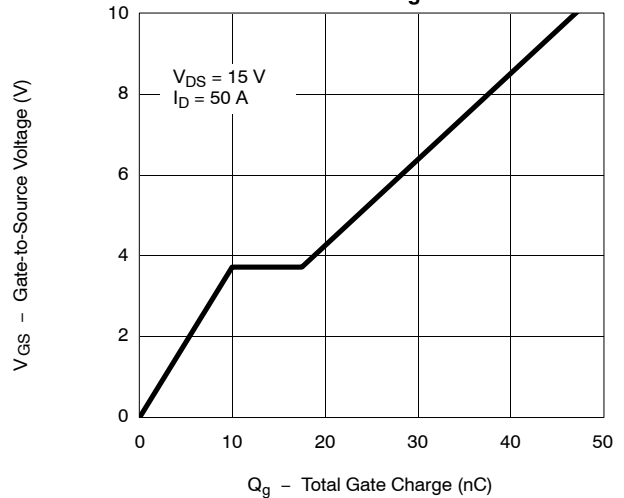
- Duty cycle $\leq 1\%$.
- See SOA curve for voltage derating.
- When mounted on 1" square PCB (FR-4 material).

SPECIFICATIONS (T_J = 25 °C UNLESS OTHERWISE NOTED)

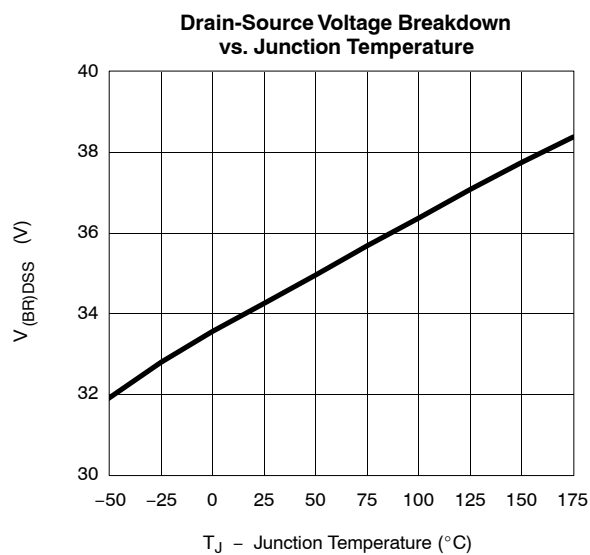
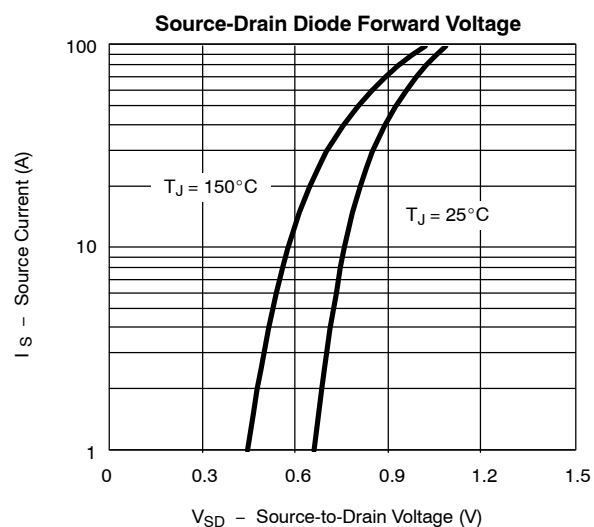
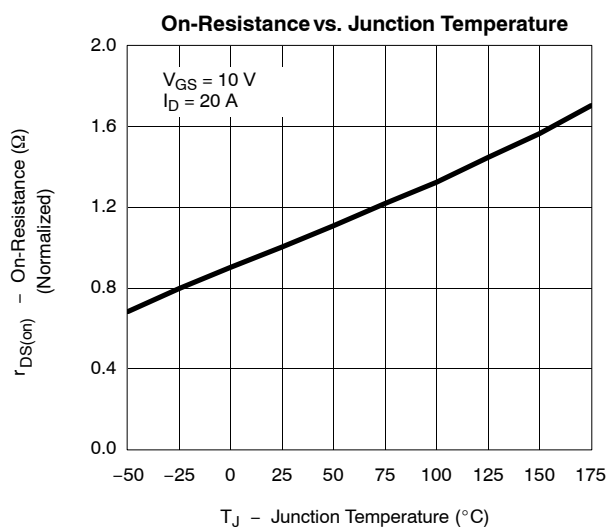
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{DS} = 0 V, I _D = 250 μA	30			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1		3.0	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±100	nA
Zero Gate Voltage 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

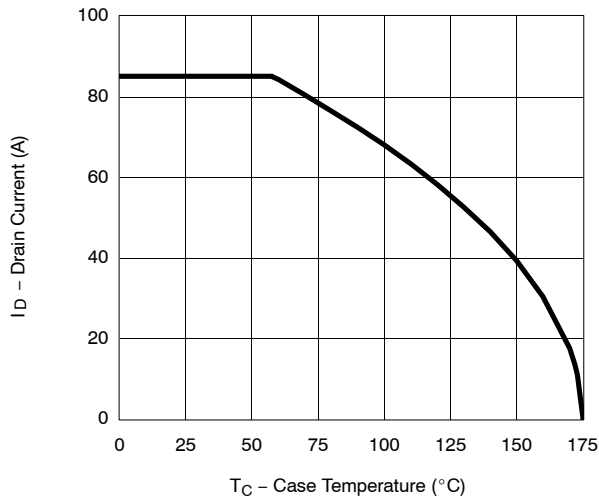
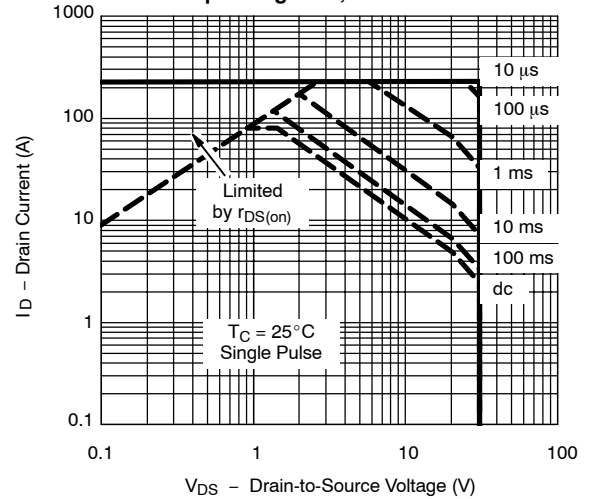
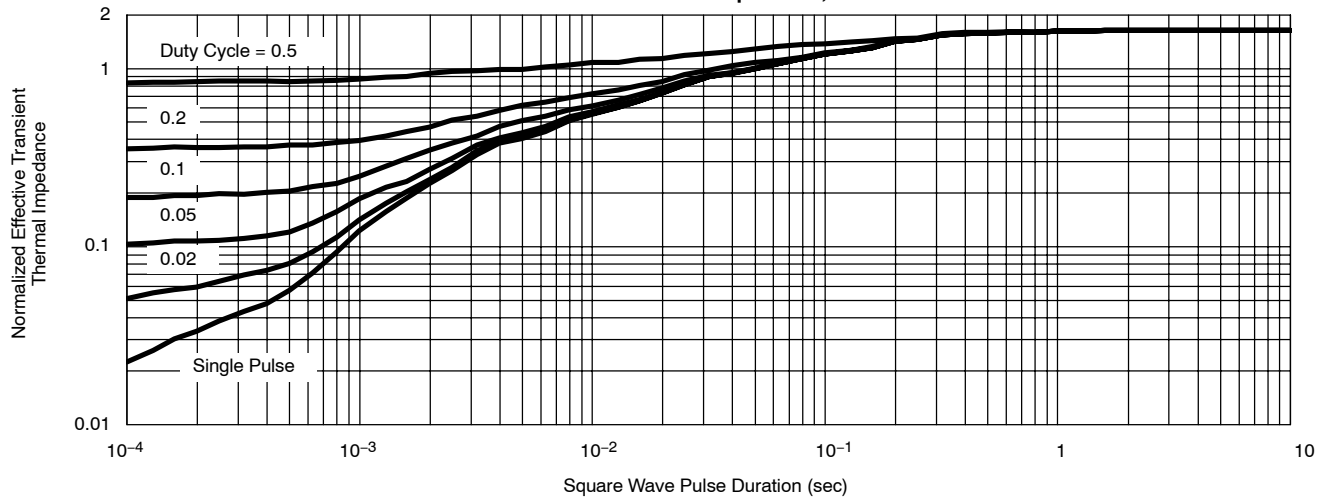
Notes

- a. Pulse test; pulse width ≤ 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)****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**



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