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

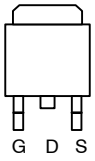
FEATURES

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

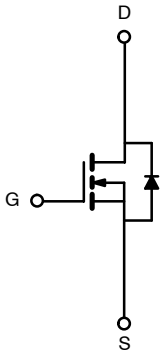
APPLICATIONS

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

TO-263



Top View



N-Channel MOSFET

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

ABSOLUTE MAXIMUM RATINGS (T_A = 25°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°C)	T_C = 25°C	I_D	85	A
	T_C = 100°C		67	
Pulsed Drain Current		I_{DM}	200	
Avalanche Current		I_{AR}	45	
Repetitive Avalanche Energy[a]	L = 0.1 mH	E_{AR}	101	mJ
Maximum Power Dissipation[a]	T_C = 25°C	P_D	100[b]	W
	T_A = 25°C[c]		3.75	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 175	°C

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Limit	Unit
Junction-to-Ambient	PCB Mount[c]	R_{thJA}	40	°C/W
	Free Air		62.5	
Junction-to-Case		R_{thJC}	1.5	

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

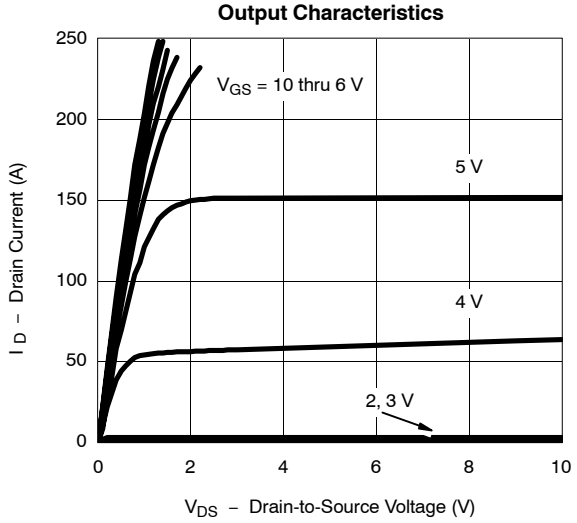
SPECIFICATIONS (T_J =25°C UNLESS OTHERWISE NOTED)

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

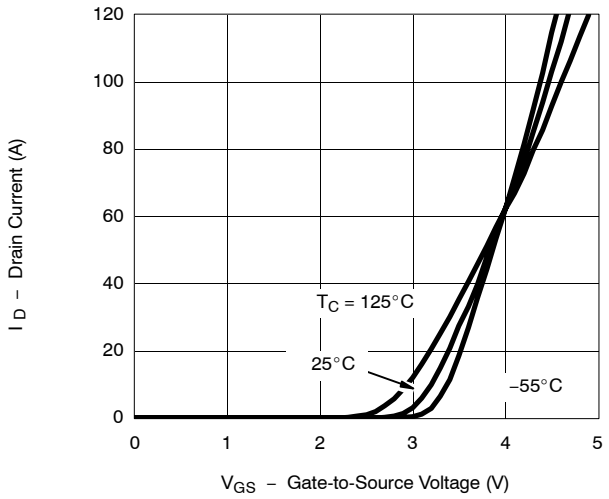
Notes
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
b. Independent of operating temperature.
c. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

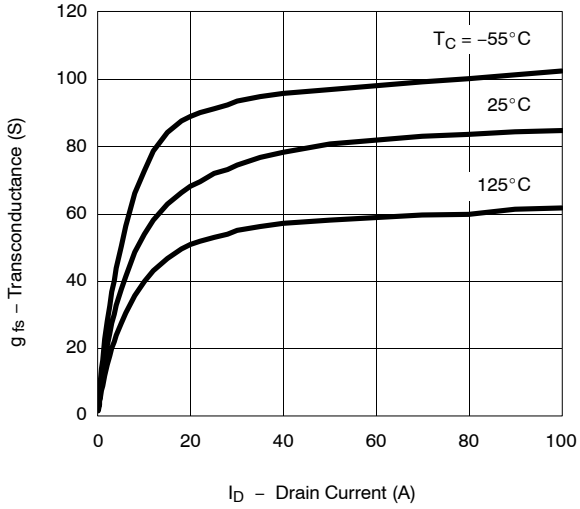
Output Characteristics



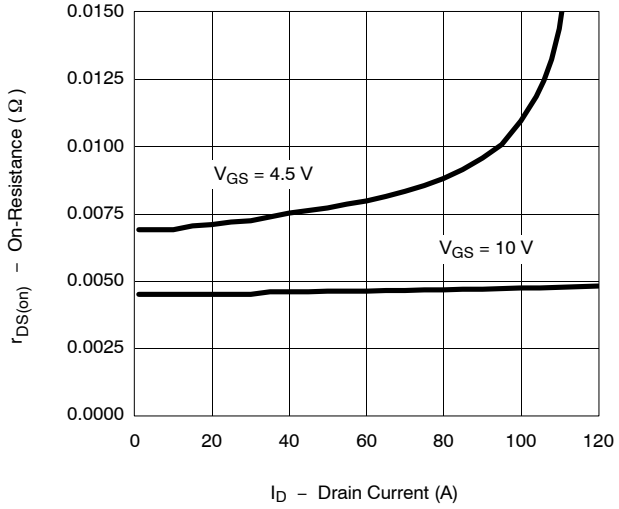
Transfer Characteristics



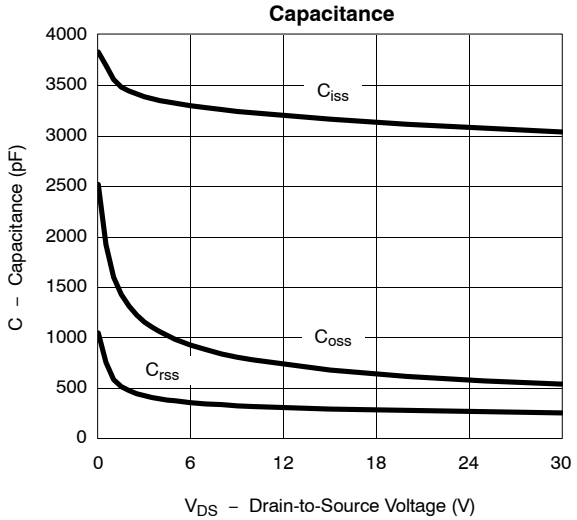
Transconductance



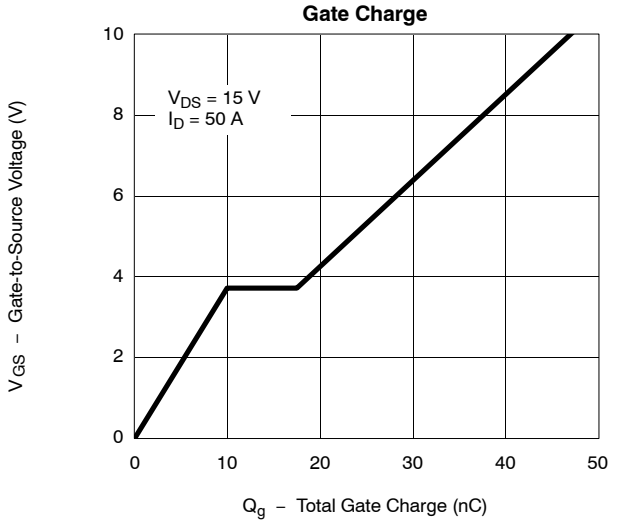
On-Resistance vs. Drain Current



Capacitance

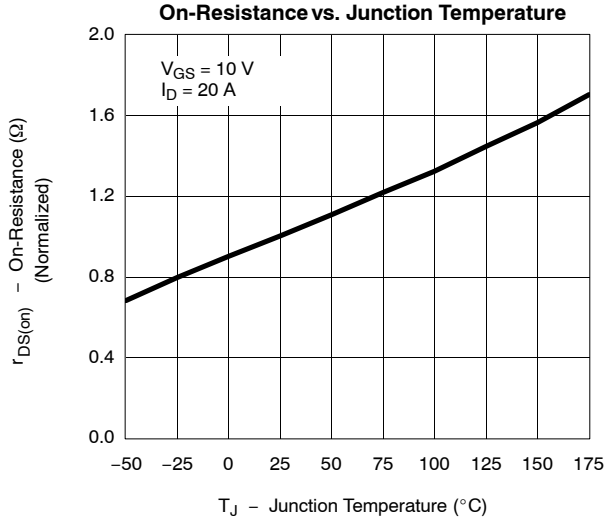


Gate Charge

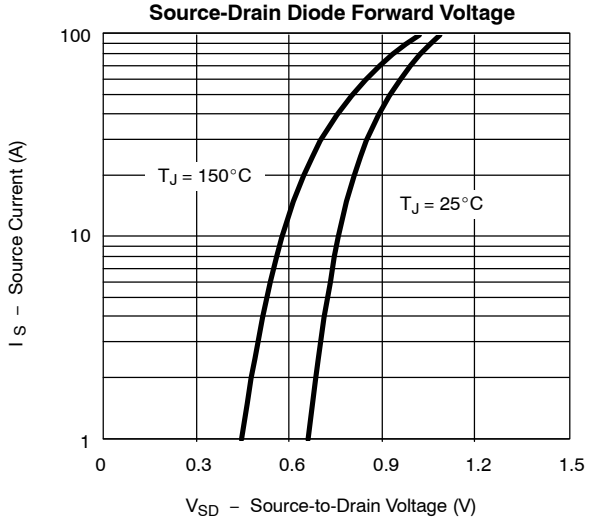


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

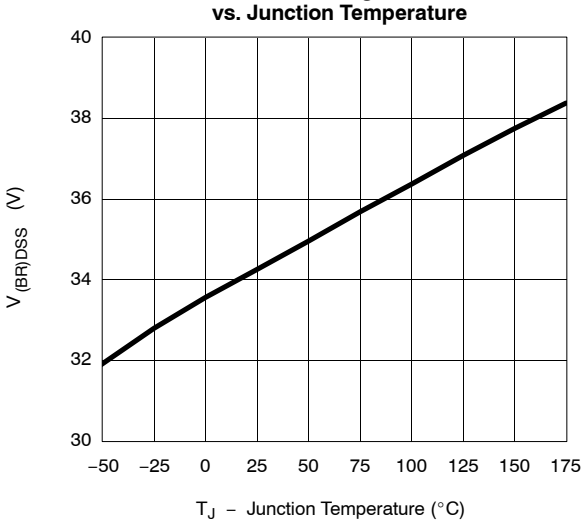
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

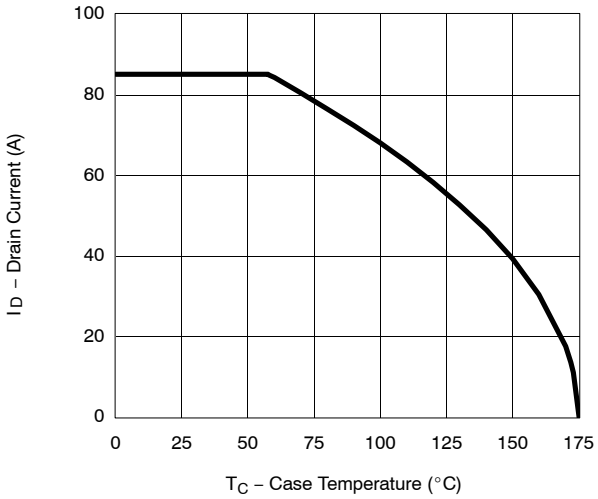


Drain-Source Voltage Breakdown vs. Junction Temperature

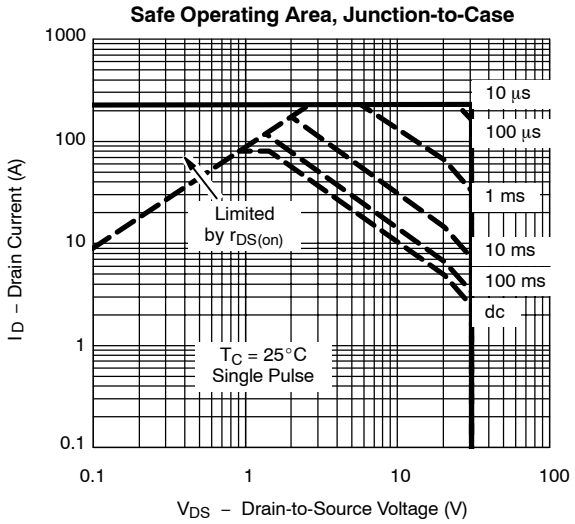


THERMAL RATINGS

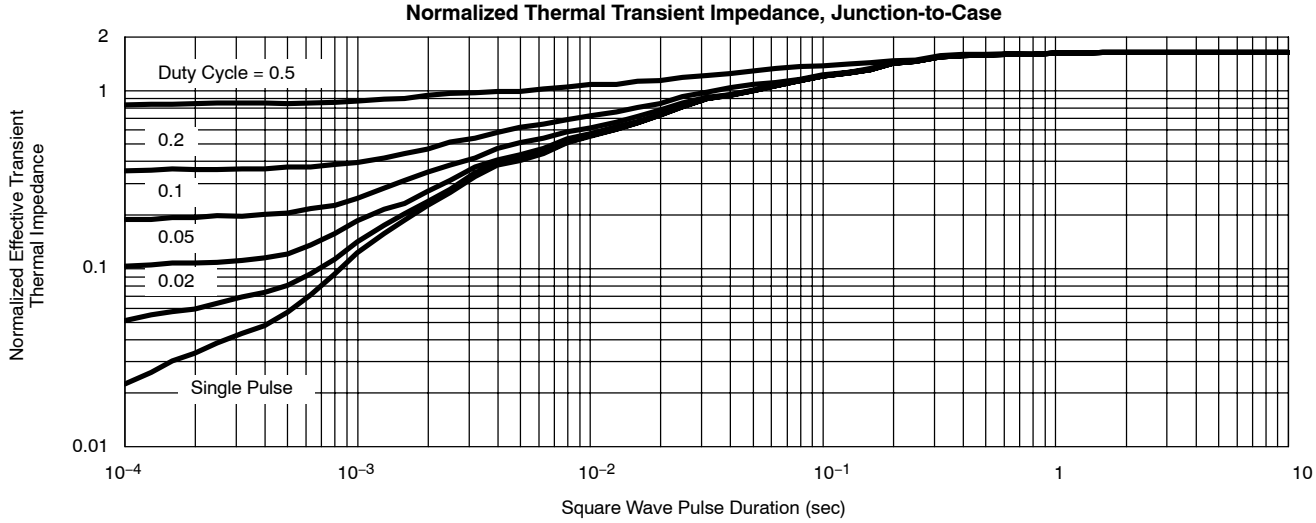
Maximum Avalanche Drain Current vs. Case Temperature



Safe Operating Area, Junction-to-Case



Normalized Thermal Transient Impedance, Junction-to-Case



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