



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

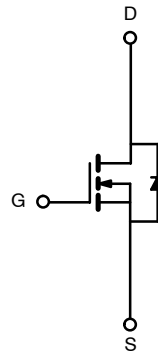
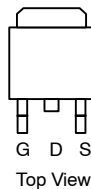
FEATURES

- 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



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

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 ($T_J = 175^\circ\text{C}$)	I_D	$T_C = 25^\circ\text{C}$	85
		$T_C = 100^\circ\text{C}$	67
Pulsed Drain Current	I_{DM}	200	A
Avalanche Current	I_{AR}	45	
Repetitive Avalanche Energy ^a	E_{AR}	101	mJ
Maximum Power Dissipation ^a	P_D	$T_C = 25^\circ\text{C}$	
		$T_A = 25^\circ\text{C}$	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	R_{thJA}	PCB Mount ^c	40
		Free Air	62.5
Junction-to-Case	R_{thJC}	1.5	$^\circ\text{C}/\text{W}$

Notes

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



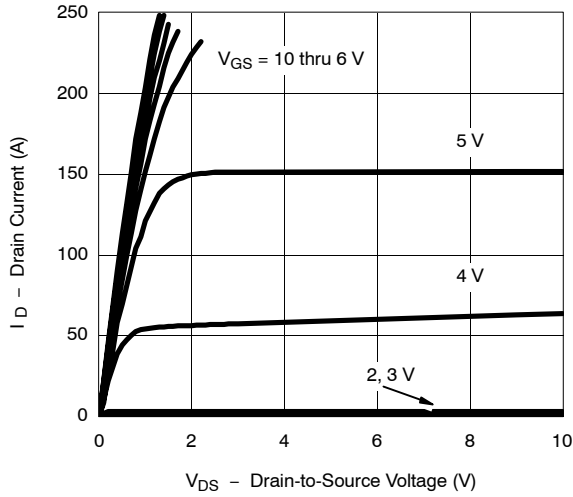
SPECIFICATIONS (T _J = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{DS} = 0 V, I _D = 250 μA	30			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1		3.0	
Gate-Body Leakage	I _{GSS}	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

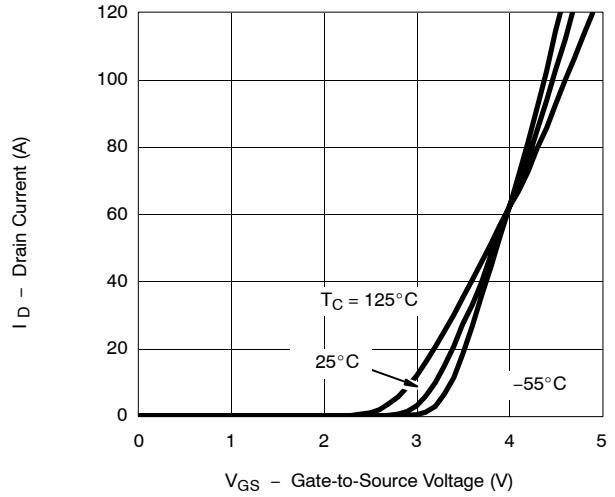
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- b. Independent of operating temperature.
- c. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

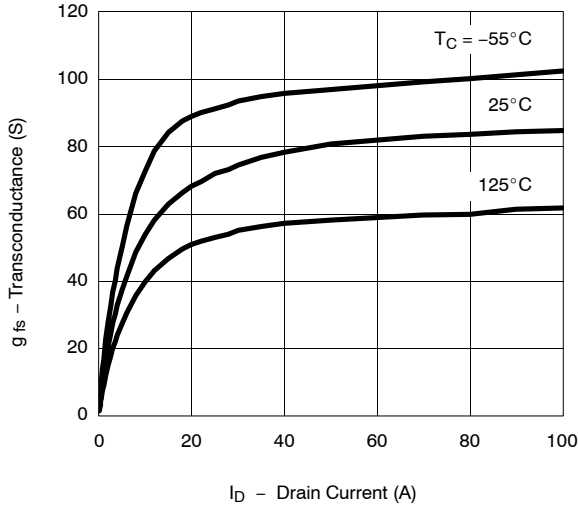
Output Characteristics



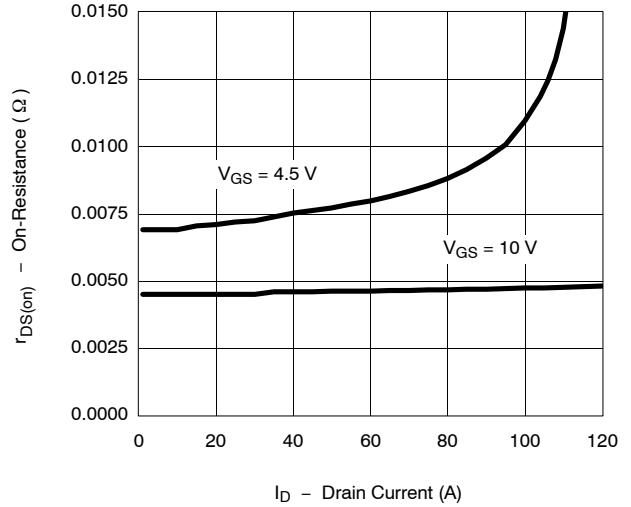
Transfer Characteristics



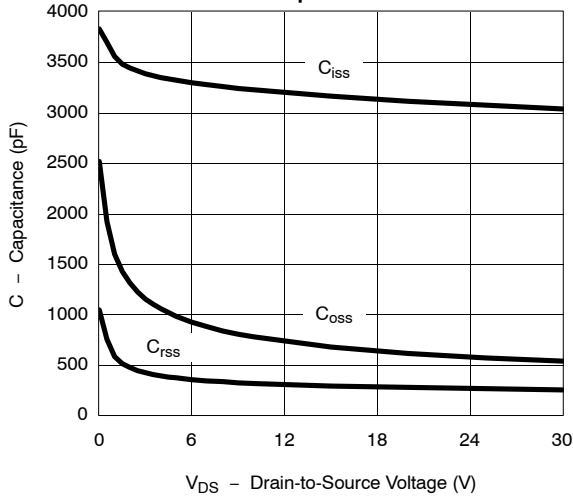
Transconductance



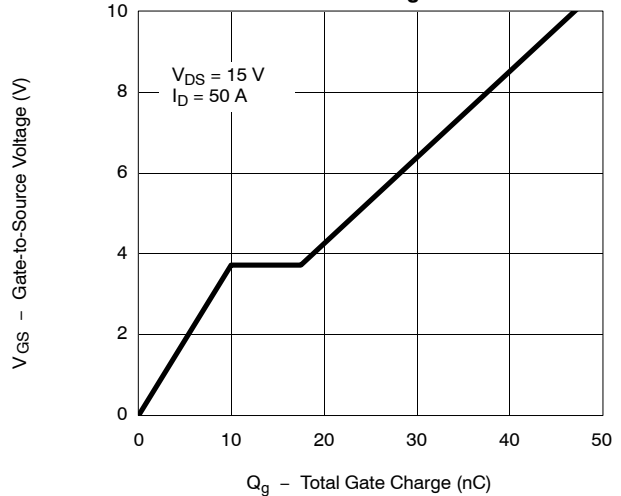
On-Resistance vs. Drain Current



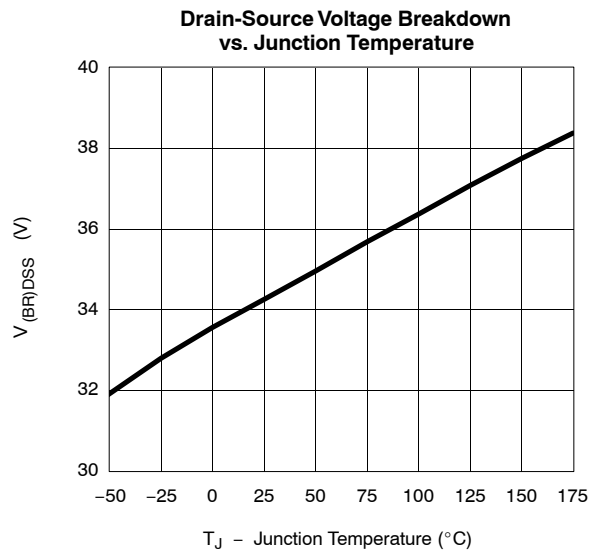
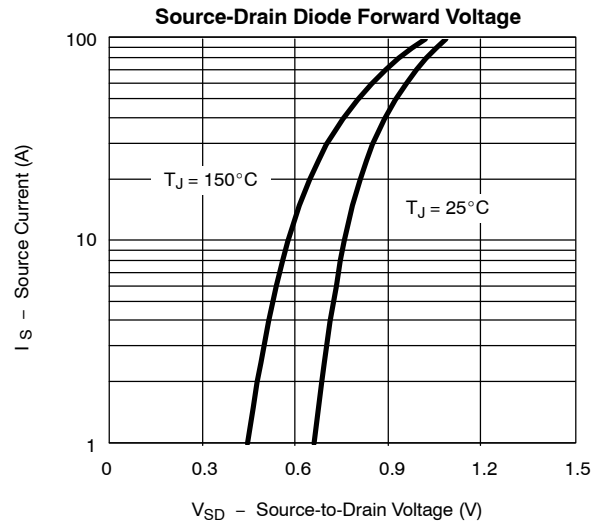
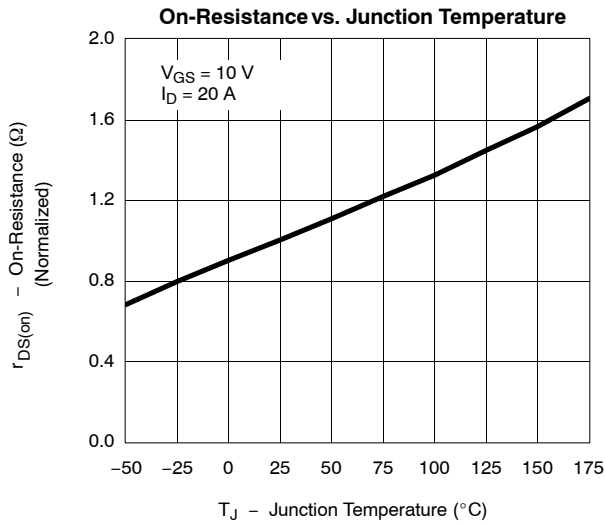
Capacitance



Gate Charge



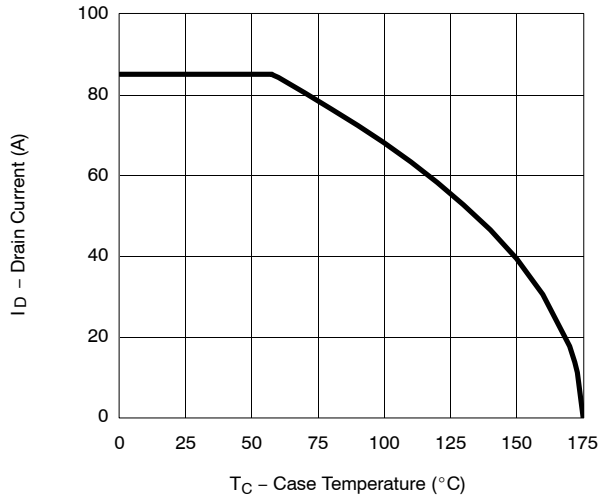
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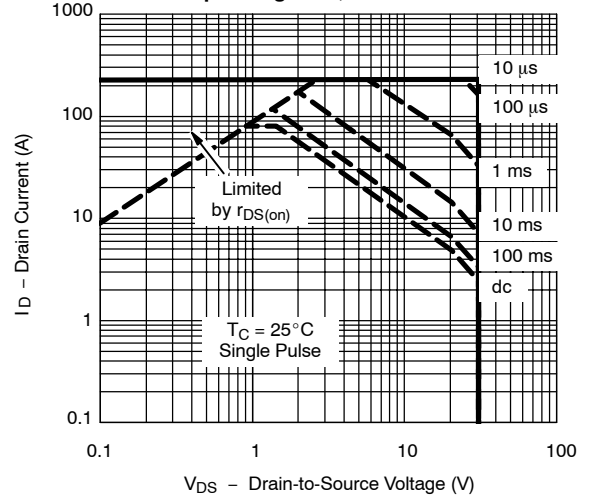


THERMAL RATINGS

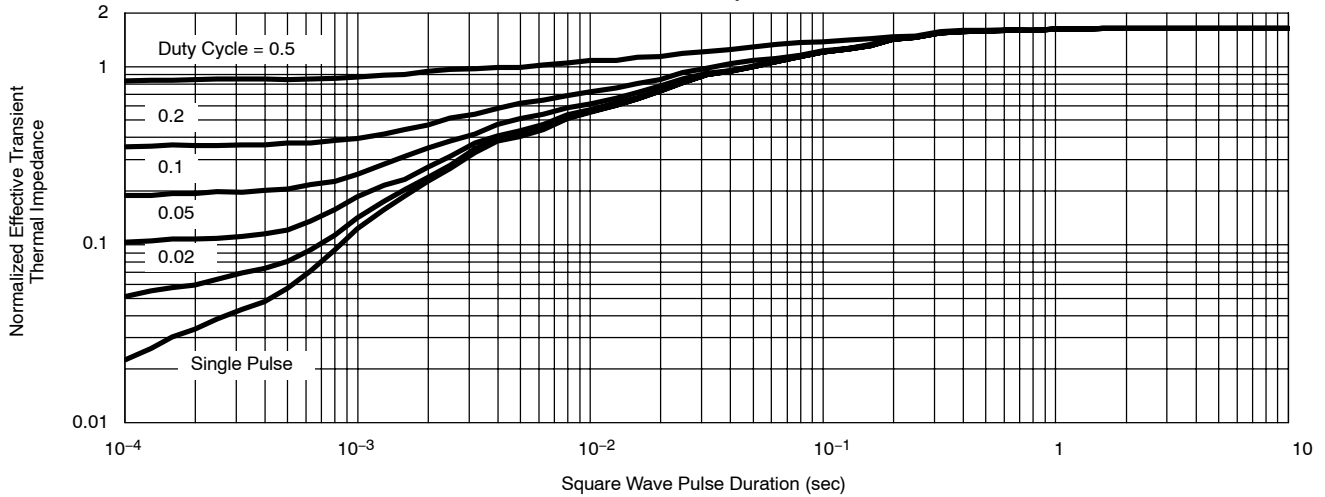
Maximum Avalanche Drain Current vs. Case Temperature



Safe Operating Area, Junction-to-Case



Normalized Thermal Transient Impedance, Junction-to-Case





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