N-Channel Reduced Q_g, Fast Switching MOSFET

PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.0075 @ V_{GS} = 10 V	85
	0.0105 @ V_{GS} = 4.5 V	72

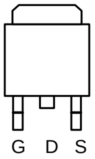
FEATURES

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

APPLICATIONS

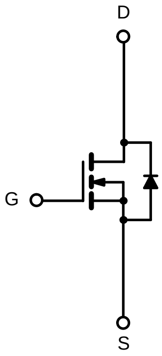
- Buck Converter
  - High Side
  - Low Side
- Synchronous Rectifier
  - Secondary Rectifier

TO-263



Top View

SUM85N03-08P



N-Channel MOSFET

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		60	
Pulsed Drain Current		I_{DM}	200	
Avalanche Current		I_{AR}	50	
Repetitive Avalanche Energy[a]	L = 0.1 mH	E_{AR}	125	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	2		
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0$ V, $V_{GS} = \pm 20$ V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 24$ V, $V_{GS} = 0$ V			1	µA
		$V_{DS} = 24$ V, $V_{GS} = 0$ V, $T_J = 125$°C			50	
		$V_{DS} = 24$ V, $V_{GS} = 0$ V, $T_J = 175$°C			250	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq 5$ V, $V_{GS} = 10$ V	120			A
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	$V_{GS} = 10$ V, $I_D = 30$ A		0.006	0.0075	Ω
		$V_{GS} = 10$ V, $I_D = 30$ A, $T_J = 125$°C			0.011	
		$V_{GS} = 10$ V, $I_D = 30$ A, $T_J = 175$°C			0.014	
		$V_{GS} = 4.5$ V, $I_D = 20$ A		0.0085	0.0105	
Forward Transconductance[a]	g_{fs}	$V_{DS} = 15$ V, $I_D = 30$ A	20			S
Dynamic[b]						
Input Capacitance	C_{iss}	$V_{GS} = 0$ V, $V_{DS} = 25$ V, f = 1 MHz		1725		pF
Output Capacitance	C_{oss}			425		
Reverse Transfer Capacitance	C_{rss}			120		
Gate-Resistance	R_G			1.9		Ω
Total Gate Charge[b]	Q_g	$V_{DS} = 15$ V, $V_{GS} = 4.5$ V, $I_D = 30$ A		13	18	nC
Gate-Source Charge[b]	Q_{gs}			4.5		
Gate-Drain Charge[b]	Q_{gd}			4.0		
Turn-On Delay Time[b]	$t_{d(on)}$	$V_{DD} = 15$ V, $R_L = 0.5$ Ω $I_D \cong 30$ A, $V_{GEN} = 10$ V, $R_G = 2.5$ Ω		10	15	ns
Rise Time[b]	t_r			160	240	
Turn-Off Delay Time[b]	$t_{d(off)}$			30	45	
Fall Time[b]	t_f			55	85	
Source-Drain Diode Ratings and Characteristics (T_C = 25°C)[c]						
Continuous Current	I_S				70	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}	$I_F = 85$ A, di/dt = 100 A/µs		80	110	ns

Notes

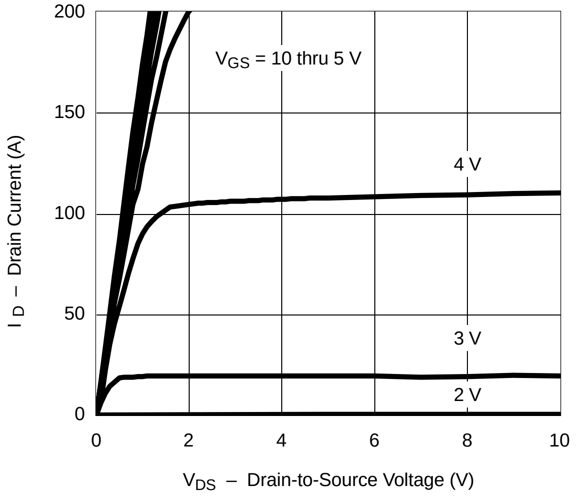
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%.

b. Independent of operating temperature.

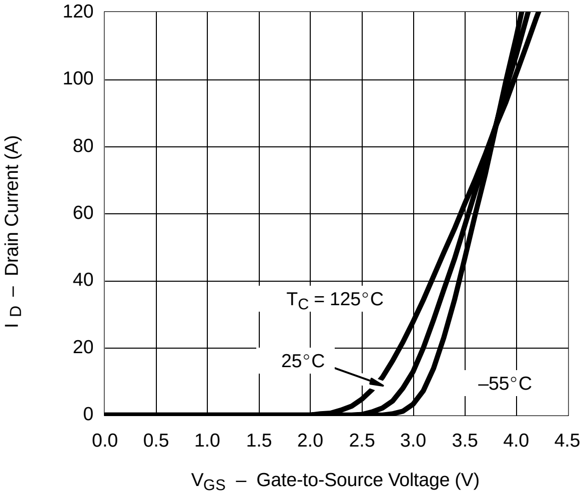
c. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

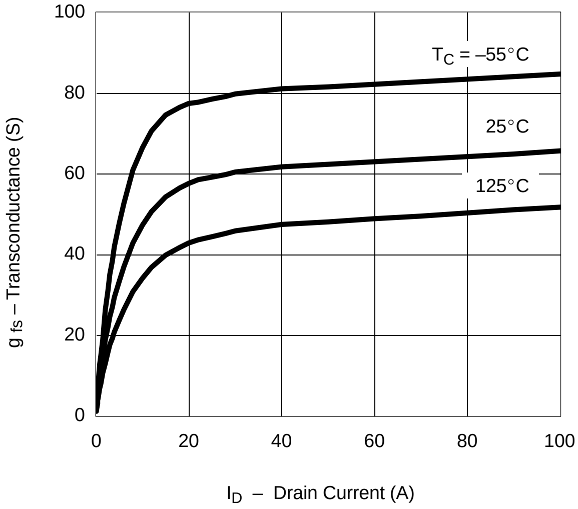
Output Characteristics



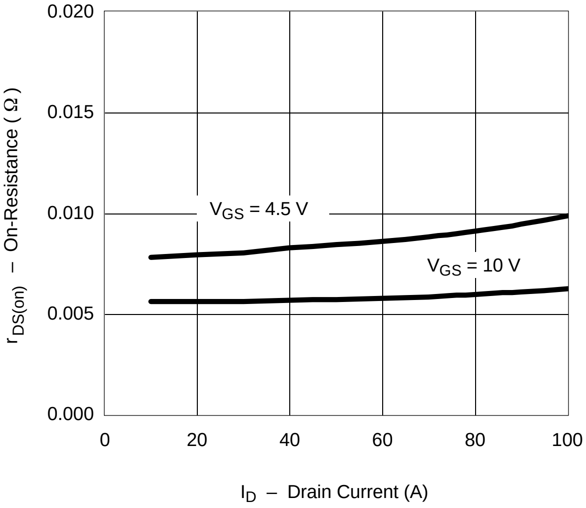
Transfer Characteristics



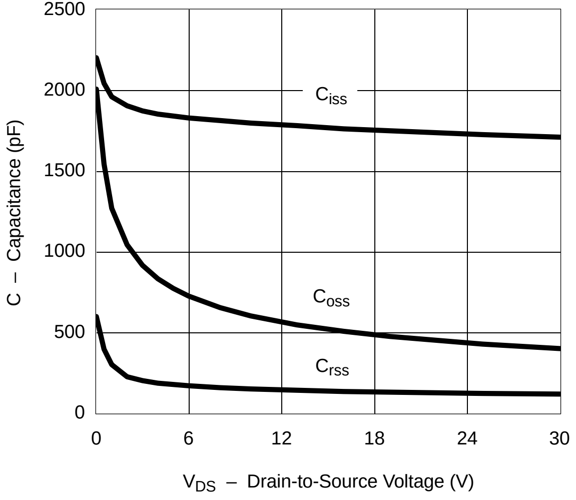
Transconductance



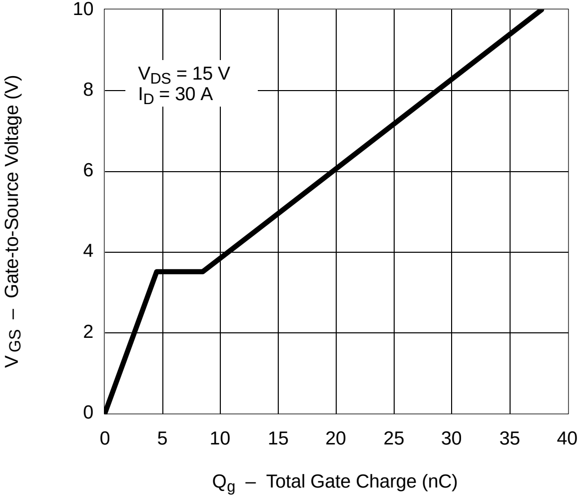
On-Resistance vs. Drain Current



Capacitance



Gate Charge



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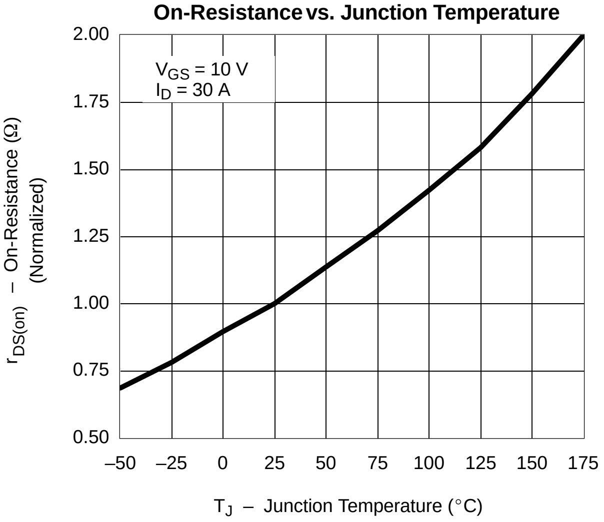

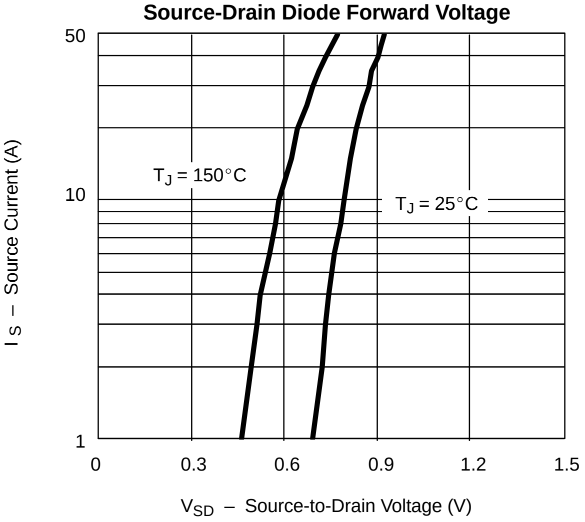

THERMAL RATINGS