N-Channel 30-V (D-S) 175°C MOSFET

PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
30	0.016 @ V_{GS} = 10 V	55
	0.024 @ V_{GS} = 4.5 V	45

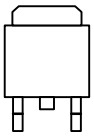
FEATURES

- TrenchFET® Power MOSFET
- 175°C Junction Temperature
- PWM Optimized
- 100% R_g Tested

APPLICATIONS

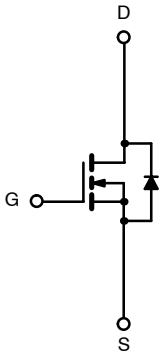
- High-Side Core DC/DC
  - Desktop
  - Server
- DDR DC/DC Converter

TO-263



Top View

DRAIN connected to TAB



N-Channel MOSFET

Ordering Information: SUM55N03-16P—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	55	A
	T_C = 100°C		39	
Pulsed Drain Current		I_{DM}	50	
Avalanche Current		I_{AR}	25	
Repetitive Avalanche Energy[a]	L = 0.1 mH	E_{AR}	31.25	mJ
Maximum Power Dissipation[a]	T_C = 25°C	P_D	93[b]	W
	T_A = 25°C [d]		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
Junction-to-Case		R_{thJC}	1.6	

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

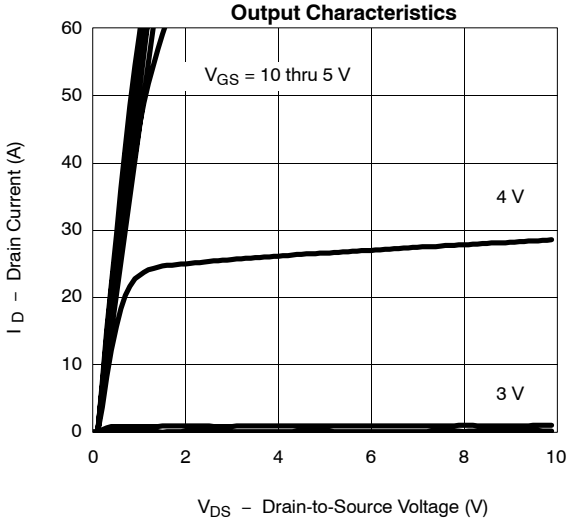
SPECIFICATIONS (T_J =25°C UNLESS OTHERWISE NOTED)

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	
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	50			A
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 15 A		0.0128	0.016	Ω
		V_{GS} = 10 V, I_D = 15 A, T_J = 125°C			0.025	
		V_{GS} = 10 V, I_D = 15 A, T_J = 175°C			0.031	
		V_{GS} = 4.5 V, I_D = 10 A		0.019	0.024	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 20 A	10			S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		1150		pF
Output Capacitance	C_{oss}			215		
Reverse Transfer Capacitance	C_{rss}			70		
Total Gate Charge[b]	Q_g	V_{DS} = 15 V, V_{GS} = 10 V, I_D = 50 A		17	26	nC
Gate-Source Charge[b]	Q_{gs}			5		
Gate-Drain Charge[b]	Q_{gd}			2.5		
Gate Resistance	R_g		2.7	5.5	8.25	Ω
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		7	15	ns
Rise Time[b]	t_r			20	30	
Turn-Off Delay Time[b]	$t_{d(off)}$			25	40	
Fall Time[b]	t_f			12	20	
Source-Drain Diode Ratings and Characteristics (T_C = 25°C)[c]						
Continuous Current	I_S				55	A
Pulsed Current	I_{SM}				50	
Forward Voltage[a]	V_{SD}	I_F = 20 A, V_{GS} = 0 V		1.0	1.5	V
Reverse Recovery Time	t_{rr}	I_F = 40 A, di/dt = 100 A/μs		25	70	ns
Peak Reverse Recovery Current	I_{RM}			1.2	2.5	A
Reverse Recovery Charge	Q_{rr}			0.15	0.09	μC

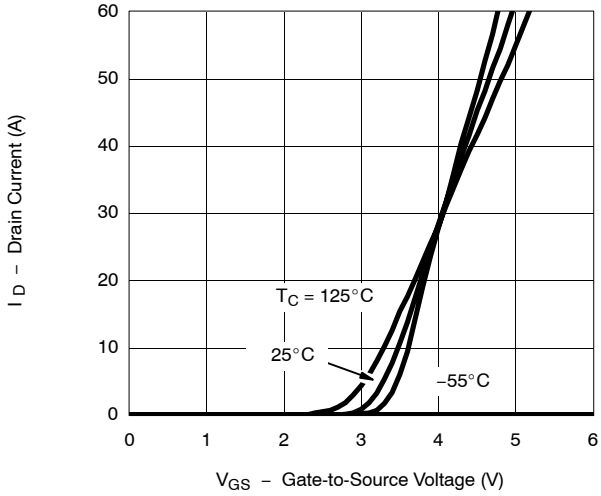
Notes
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
b. Independent of operating temperature.
c. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

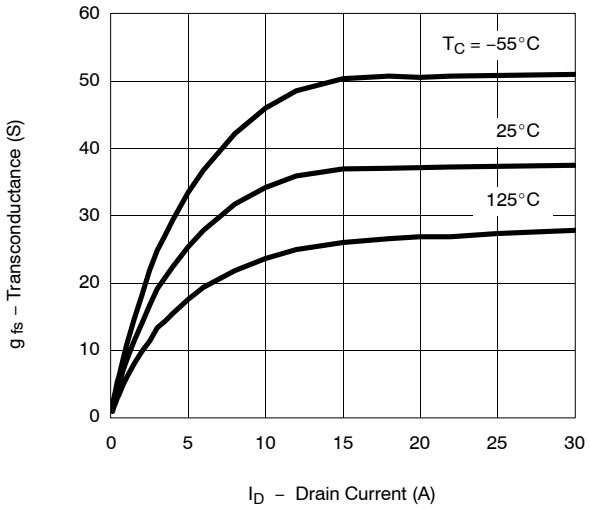
Output Characteristics



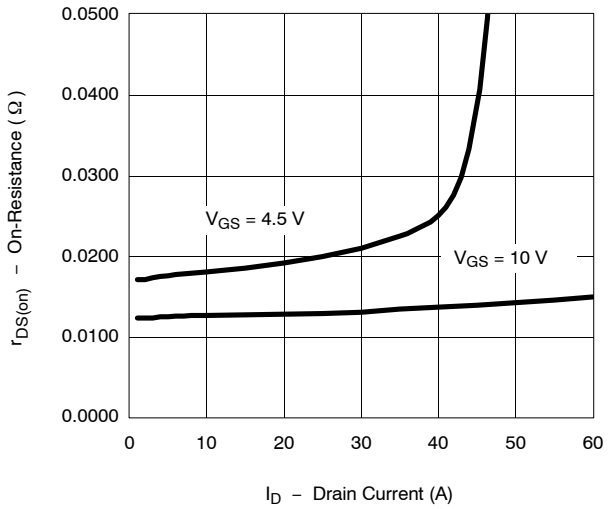
Transfer Characteristics



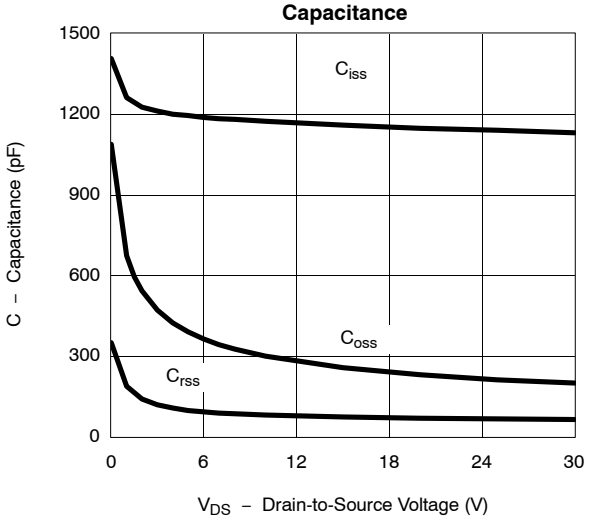
Transconductance



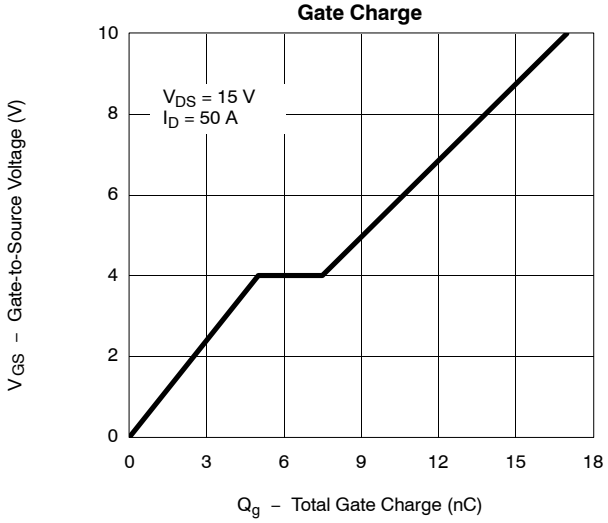
On-Resistance vs. Drain Current



Capacitance

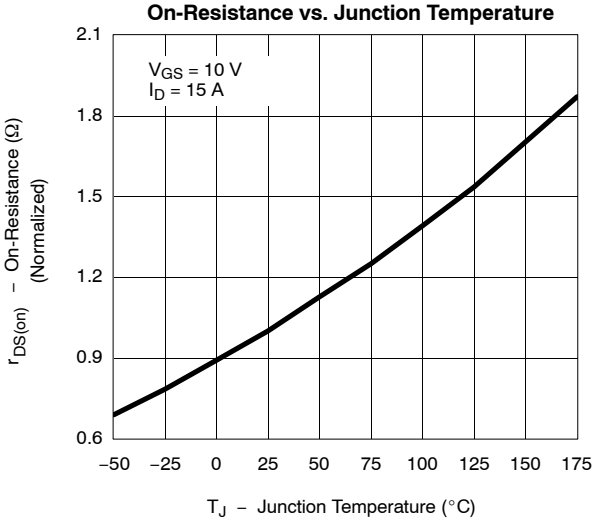


Gate Charge

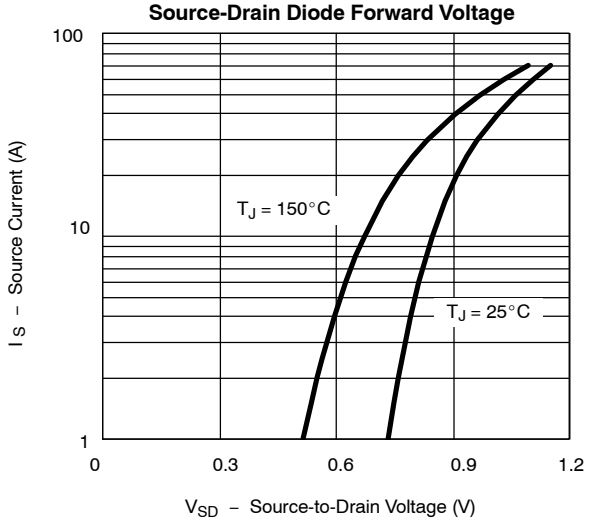


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

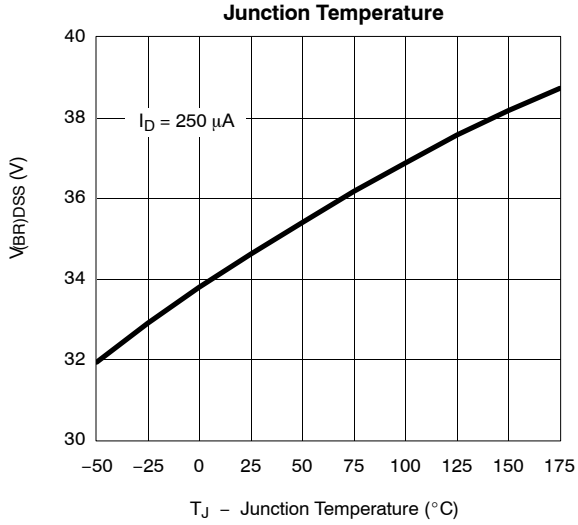
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

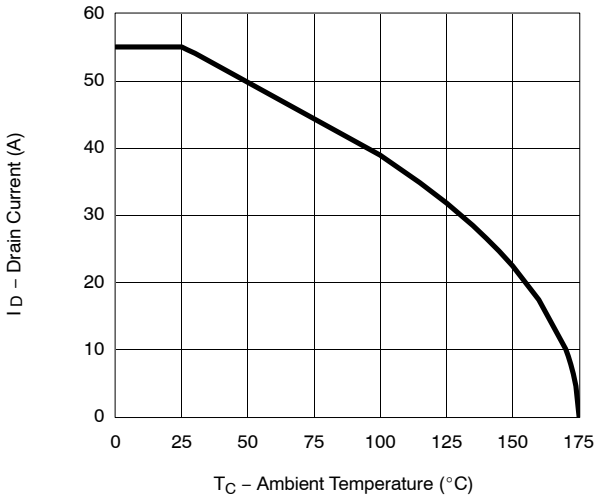


Drain Source Breakdown vs. Junction Temperature

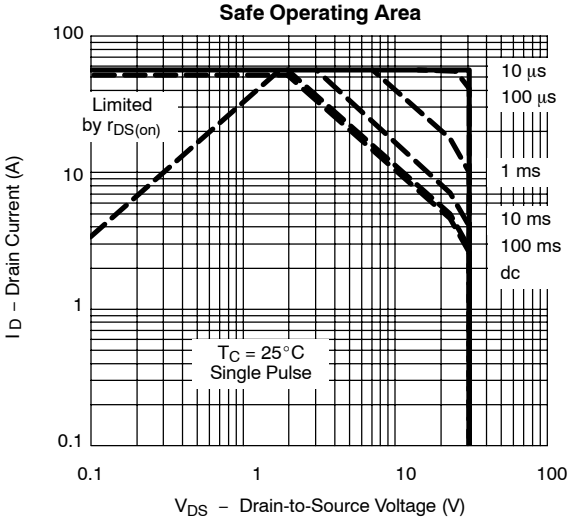


THERMAL RATINGS

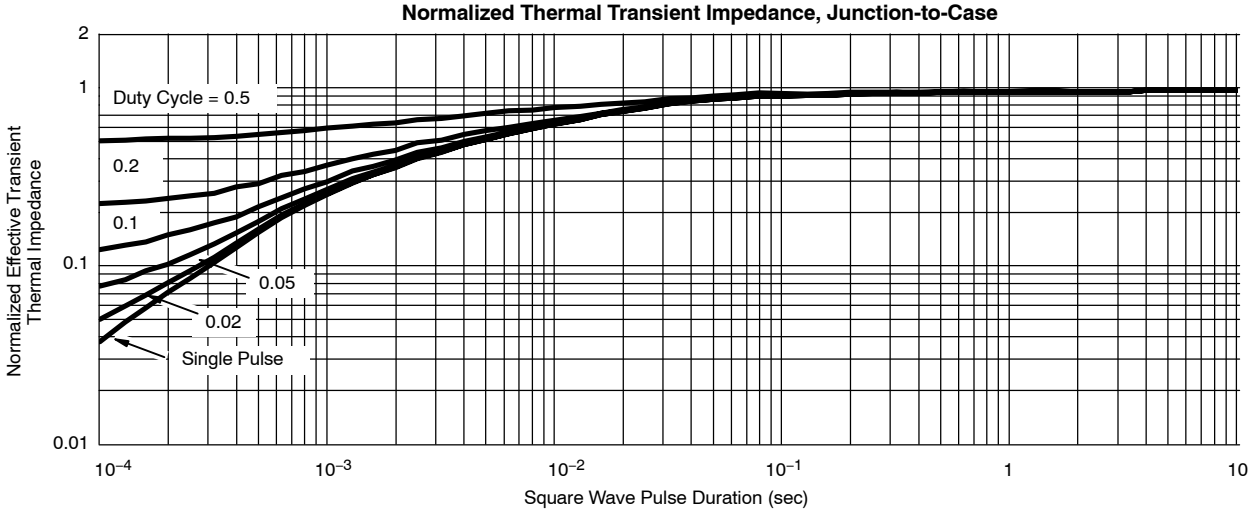
Maximum Avalanche and Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case



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