N-Channel 20-V (D-S) 175°C MOSFET

PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)[a]
20	0.0032 @ V_{GS} = 10 V	110[a]
	0.0052 @ V_{GS} = 4.5 V	110[a]

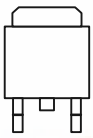
FEATURES

- TrenchFET® Power MOSFET
- 175°C Junction Temperature
- Optimized for Low-Side Synchronous Rectifier

APPLICATIONS

- Synchronous Buck DC/DC Conversion
  - Desktop
  - Server
- Load Switch

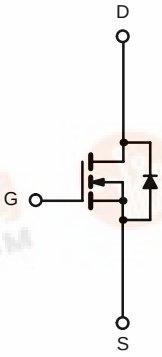
TO-263



Top View

SUM110N02-03P

DRAIN connected to TAB



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current (T_J = 175°C)	T_C = 25°C	I_D	110[a]	A
	T_C = 100°C		102	
Pulsed Drain Current		I_{DM}	300	
Maximum Power Dissipation[b]	T_C = 25°C	P_D	120[c]	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)[d]	R_{thJA}	40	°C/W
Junction-to-Case	R_{thJC}	1.25	

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

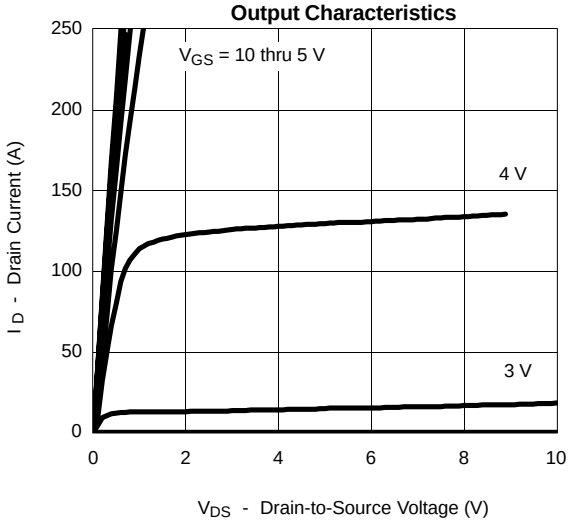
SPECIFICATIONS (T_J =25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{DS} = 0 V, I_D = 250 µA	20			V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	0.8		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} = 16 V, V_{GS} = 0 V			1	µA
		V_{DS} = 16 V, V_{GS} = 0 V, T_J = 125°C			50	
		V_{DS} = 16 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 = 30 A		0.0026	0.0032	Ω
		V_{GS} = 10 V, I_D = 30 A, T_J = 125°C			0.0048	
		V_{GS} = 10 V, I_D = 30 A, T_J = 175°C			0.0055	
		V_{GS} = 4.5 V, I_D = 20 A		0.0042	0.052	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 30 A	15			S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 10 V, f = 1 MHz		5100		pF
Output Capacitance	C_{oss}			1650		
Reverse Transfer Capacitance	C_{rss}			750		
Total Gate Charge[b]	Q_g	V_{DS} = 10V, V_{GS} = 4.5 V, I_D = 110 A		40	60	nC
Gate-Source Charge[b]	Q_{gs}			14		
Gate-Drain Charge[b]	Q_{gd}			13		
Gate Resistance	R_G			0.85		Ω
Turn-On Delay Time[b]	$t_{d(on)}$	V_{DD} = 10 V, R_L = 0.2 Ω I_D ≅ 110 A, V_{GEN} = 10 V, R_G = 2.5 Ω		15	25	ns
Rise Time[b]	t_r			11	20	
Turn-Off Delay Time[b]	$t_{d(off)}$			45	70	
Fall Time[b]	t_f			10	15	
Source-Drain Diode Ratings and Characteristics (T_C = 25°C)[c]						
Continuous Current	I_S				110	A
Pulsed Current	I_{SM}				300	
Forward Voltage[a]	V_{SD}	I_F = 110 A, V_{GS} = 0 V		1.1	1.5	V
Reverse Recovery Time	t_{rr}	I_F = 50 A, di/dt = 100 A/µs		45	70	ns
Peak Reverse Recovery Current	I_{RM}			1.8	2.7	A
Reverse Recovery Charge	Q_{rr}			0.041	0.095	µC

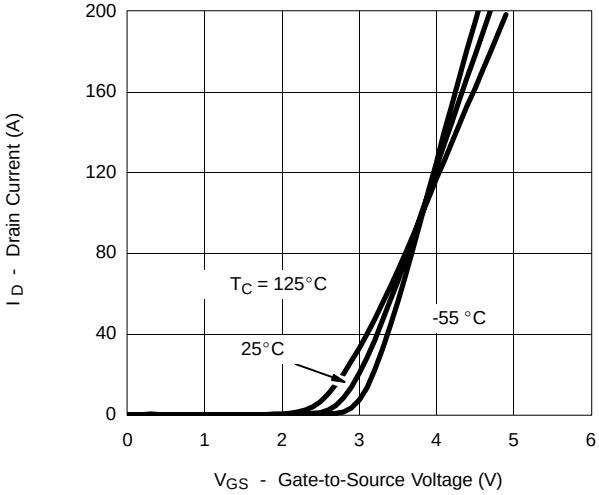
Notes
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%.
b. Independent of operating temperature.
c. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

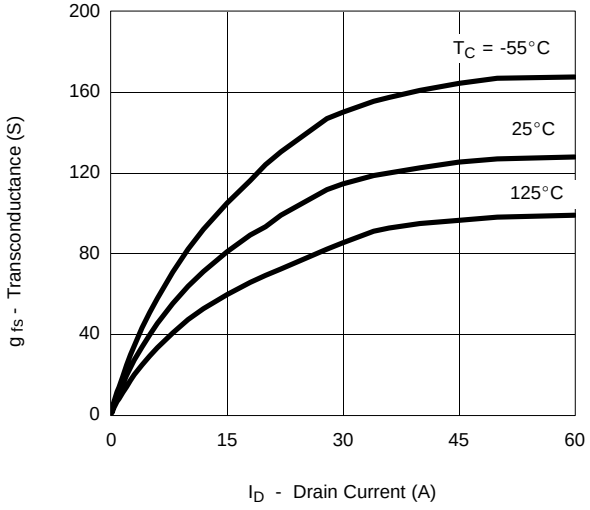
Output Characteristics



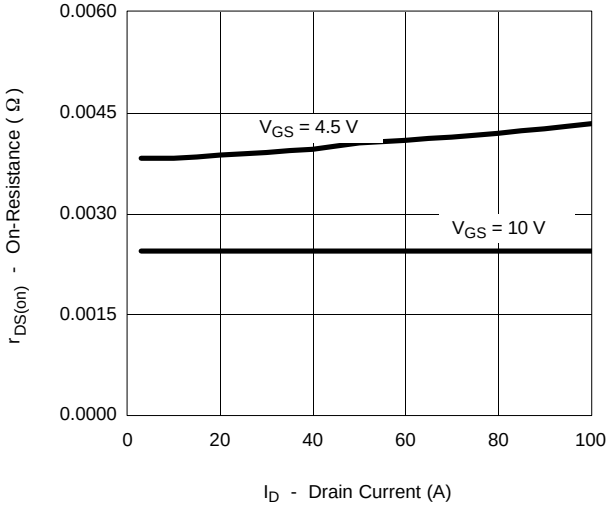
Transfer Characteristics



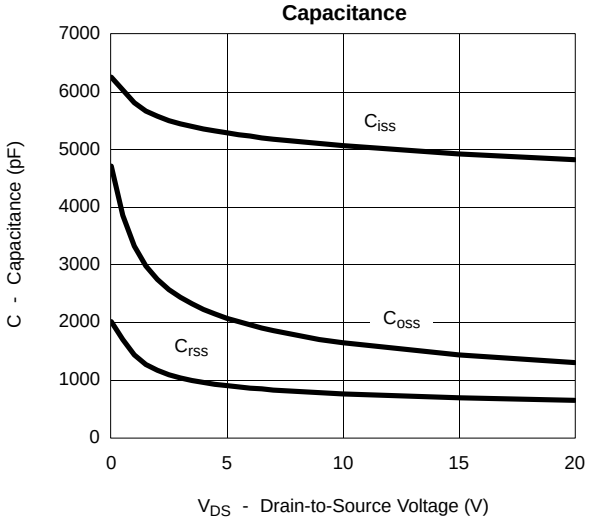
Transconductance



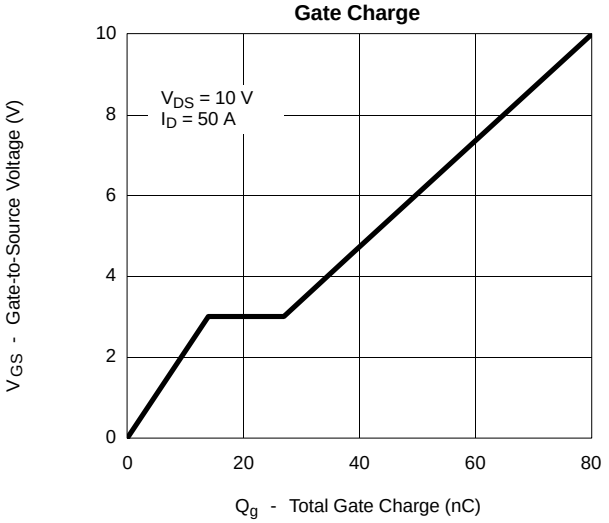
On-Resistance vs. Drain Current



Capacitance

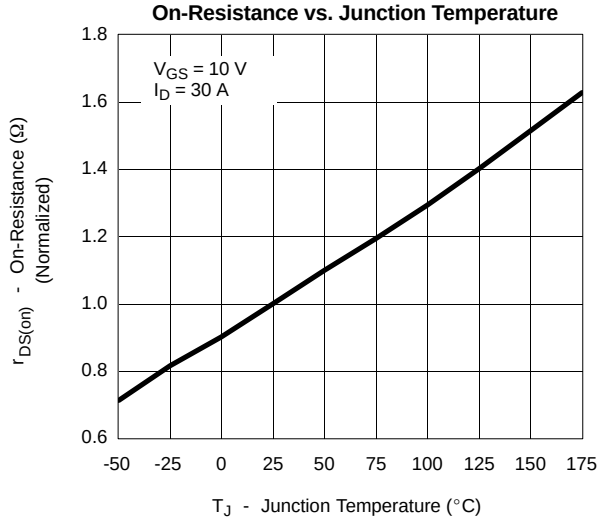


Gate Charge

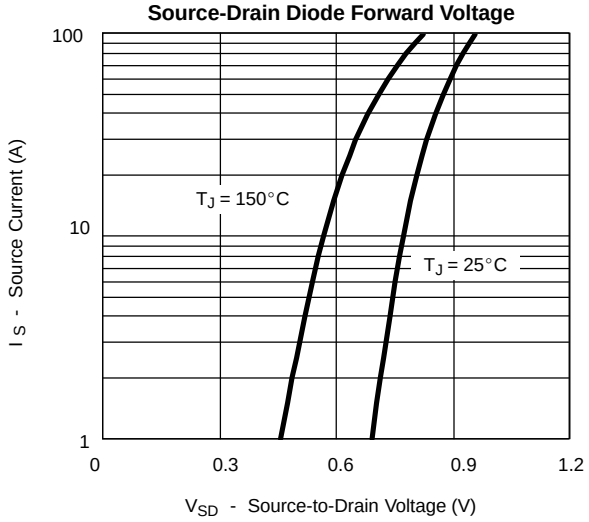


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

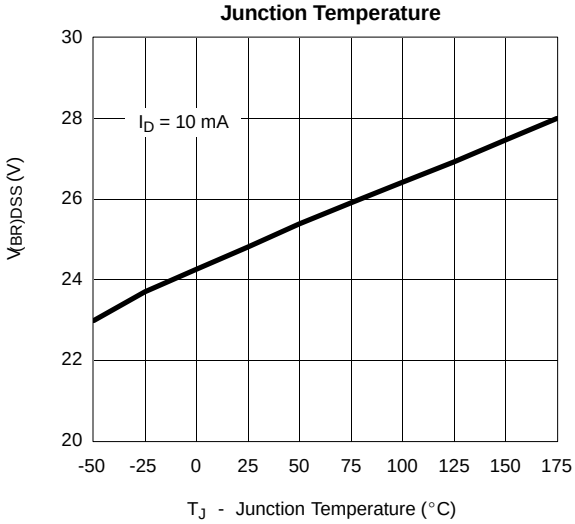
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

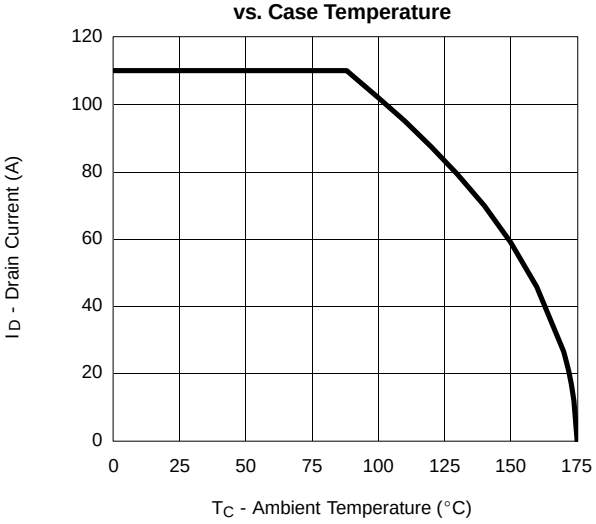


Drain Source Breakdown vs. Junction Temperature

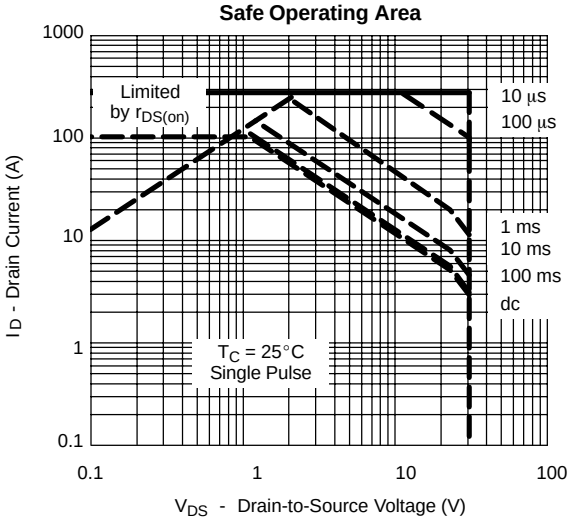


THERMAL RATINGS

Maximum Avalanche and Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case