



N-Channel 20-V (D-S) 175°C MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A) ^a
20	0.0026 @ $V_{GS} = 10$ V	110 ^a

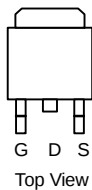
FEATURES

- TrenchFET® Power MOSFET
- 175°C Junction Temperature
- Low Thermal Resistance Package
- High Threshold Voltage

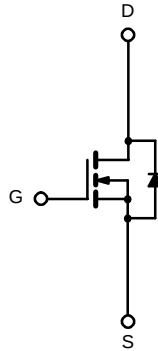
APPLICATIONS

- Automotive

TO-263



DRAIN connected to TAB



N-Channel MOSFET

Ordering Information: SUM110N02-03—E3

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ($T_J = 175^\circ\text{C}$)	$T_C = 25^\circ\text{C}$	I_D	110 ^a	A
	$T_C = 125^\circ\text{C}$		110 ^a	
Pulsed Drain Current		I_{DM}	300 ^b	
Avalanche Current		I_{AR}	60	mJ
Repetitive Avalanche Energy ^c		E_{AR}	180	
Maximum Power Dissipation ^c	$T_C = 25^\circ\text{C}$	P_D	230 ^d	W
	$T_A = 25^\circ\text{C}$ ^e		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 (PCB Mount) ^e	R_{thJA}	40	$^\circ\text{C/W}$
Junction-to-Case	R_{thJC}	0.65	

Notes

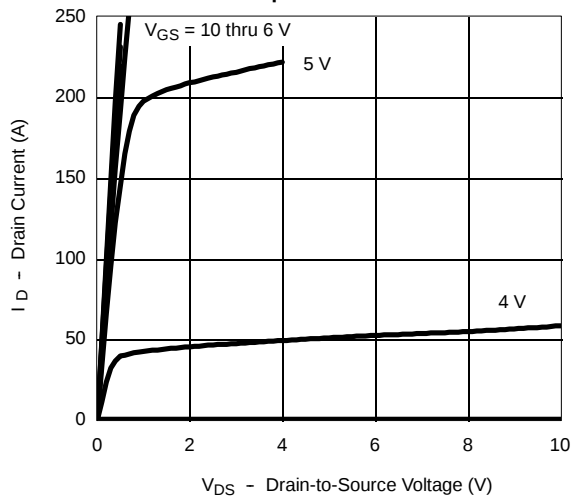
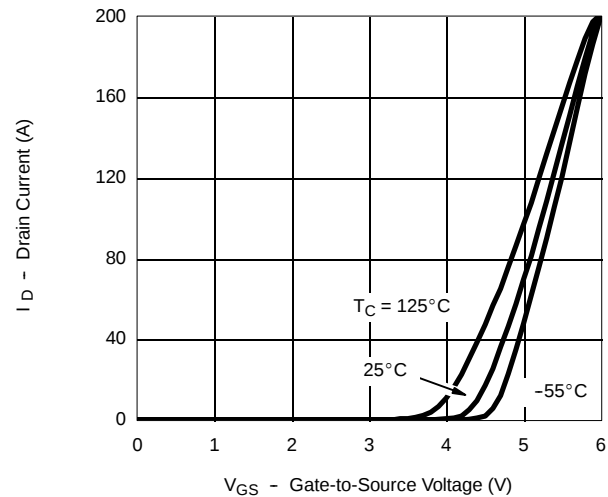
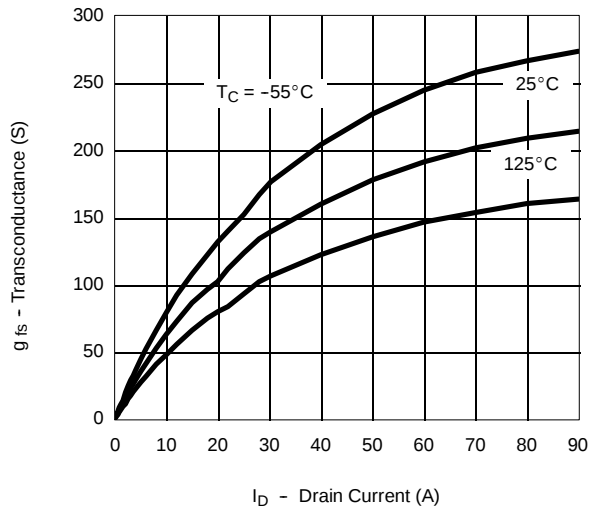
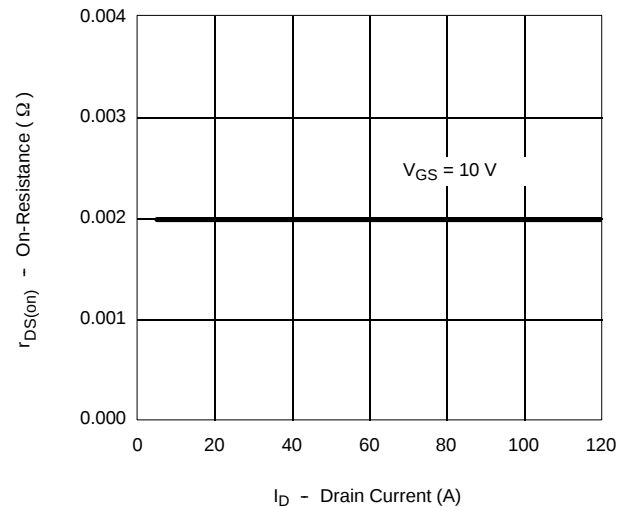
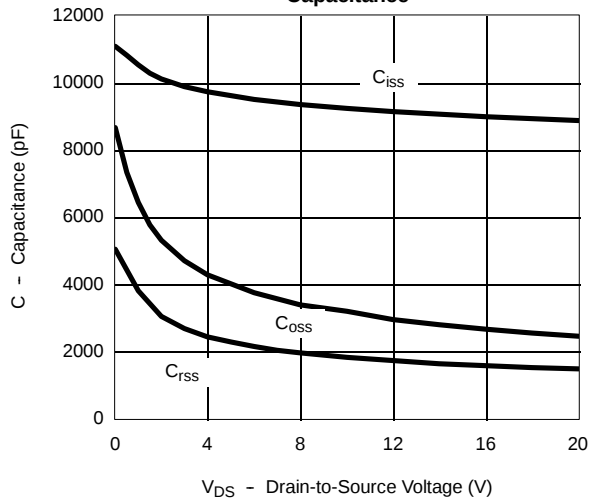
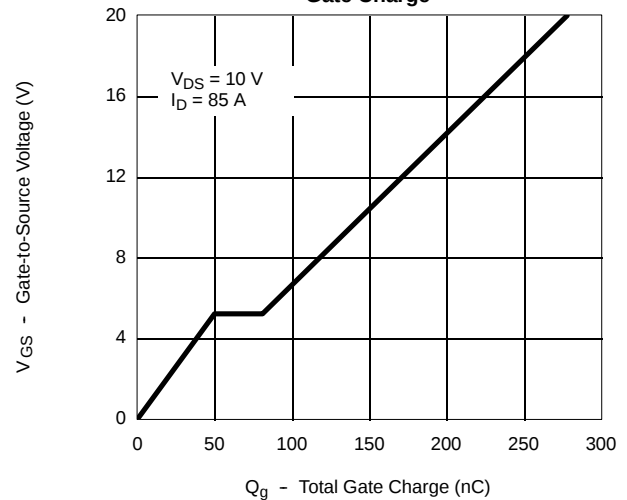
- Package limited.
- Pulse width ≤ 300 μs , single pulse
- Duty cycle $\leq 1\%$.
- See SOA curve for voltage derating.
- When mounted on 1" square PCB (FR-4 material).

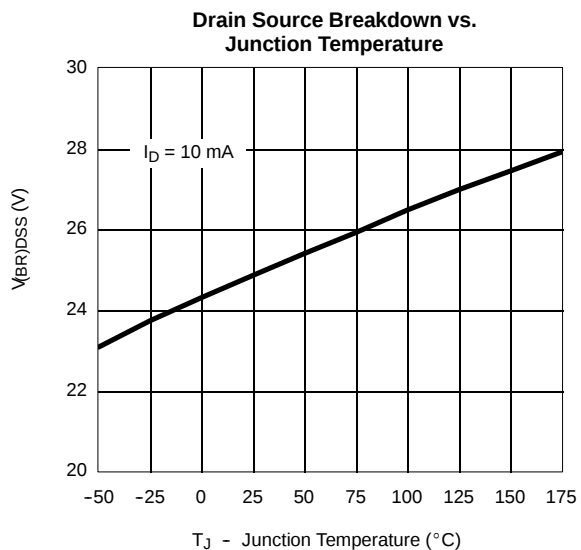
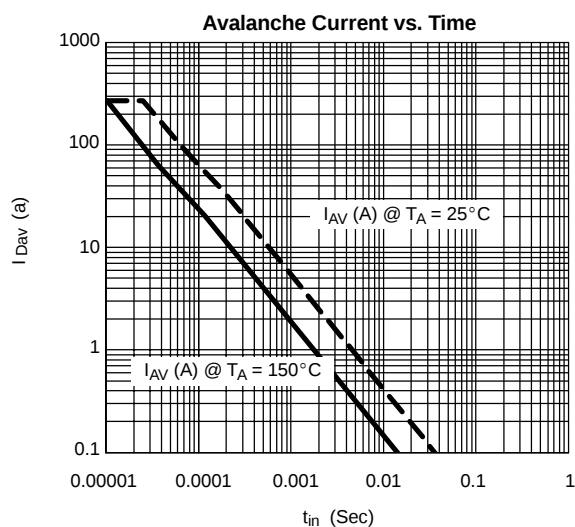
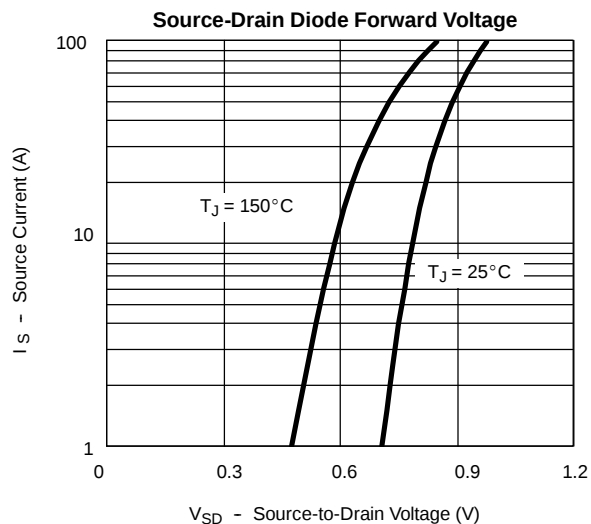
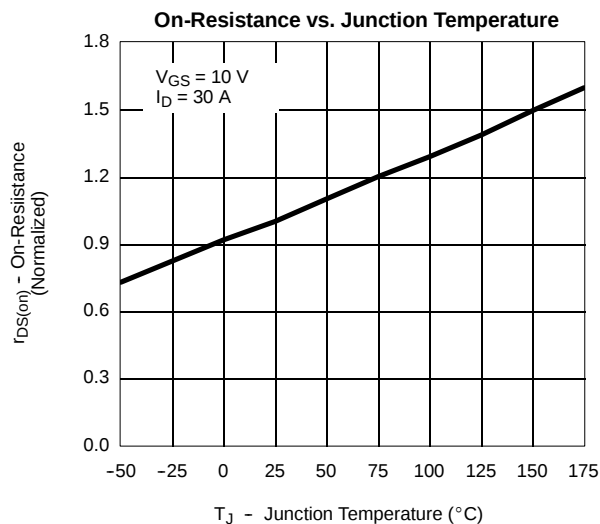
SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

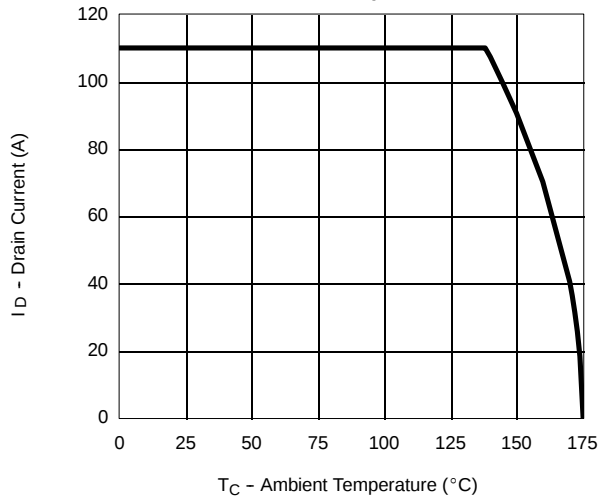
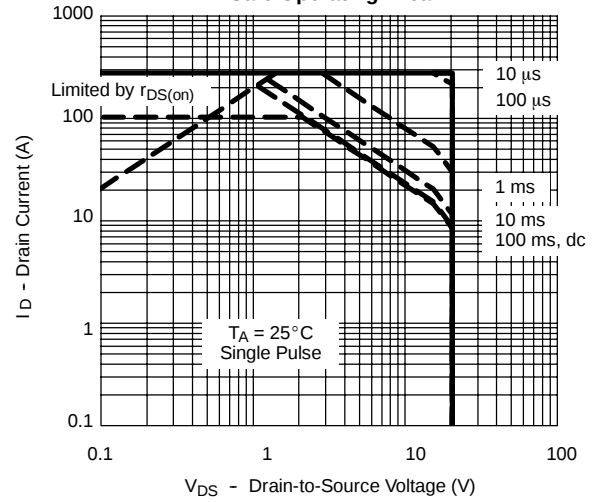
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{DS} = 0 V, I _D = 250 μA	20			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2.5	3	4	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V			1	μA
		V _{DS} = 20 V, V _{GS} = 0 V, T _J = 125°C			50	
		V _{DS} = 20 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		0.002	0.0026	Ω
		V _{GS} = 10 V, I _D = 30 A, T _J = 125°C			0.0037	
		V _{GS} = 10 V, I _D = 30 A, T _J = 175°C			0.0047	
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} = 10 V, f = 1 MHz		9300		pF
Output Capacitance	C _{oss}			3200		
Reverse Transfer Capacitance	C _{rss}			1820		
Total Gate Charge ^b	Q _g	V _{DS} = 10 V, V _{GS} = 10 V, I _D = 85 A		145	220	nC
Gate-Source Charge ^b	Q _{gs}			50		
Gate-Drain Charge ^b	Q _{gd}			30		
Turn-On Delay Time ^b	t _{d(on)}	V _{DD} = 10 V, R _L = 0.117 Ω I _D ≅ 85 A, V _{GEN} = 10 V, R _g = 2.5 Ω		30	45	ns
Rise Time ^b	t _r			80	120	
Turn-Off Delay Time ^b	t _{d(off)}			55	90	
Fall Time ^b	t _f			30	45	
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 = 85 A, V _{GS} = 0 V		1.1	1.5	V
Reverse Recovery Time	t _{rr}	I _F = 85 A, di/dt = 100 A/μs		65	120	ns
Peak Reverse Recovery Current	I _{RM}			1.8	4	A
Reverse Recovery Charge	Q _{rr}			0.06	0.24	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)


**THERMAL RATINGS****Maximum Avalanche and Drain Current
vs. Case Temperature****Safe Operating Area****Normalized Thermal Transient Impedance, Junction-to-Case**