

N-Channel 40-V (D-S) 175 °C MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
40	0.0028 at $V_{GS} = 10$ V	110 ^a

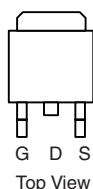
FEATURES

- TrenchFET® Power MOSFET
- Package with Low Thermal Resistance

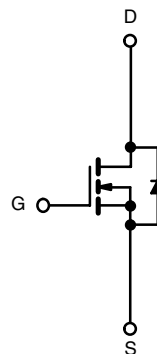


Available
RoHS*
COMPLIANT

TO-263



Ordering Information: SUM110N04-03
SUM110N04-03-E3 (Lead (Pb)-free)



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_C = 25$ °C, unless otherwise noted

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 175$ °C)	I_D	110 ^a	A
		110 ^a	
Pulsed Drain Current	I_{DM}	440	
Avalanche Current	I_{AR}	70	
Repetitive Avalanche Energy ^b	E_{AR}	211	mJ
Maximum Power Dissipation ^b	P_D	437.5 ^c	W
		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	R_{thJA}	40	°C/W
Junction-to-Case (Drain)	R_{thJC}	0.4	

Notes:

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

* PB containing terminations are not RoHS compliant, exemptions may apply.

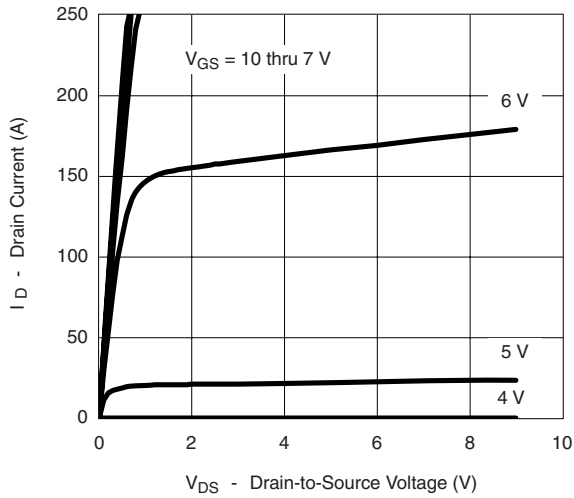
SPECIFICATIONS T _J = 25 °C, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{DS} = 0 V, I _D = 250 μA	40			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2.5		4	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 40 V, V _{GS} = 0 V			1	μA
		V _{DS} = 40 V, V _{GS} = 0 V, T _J = 125 °C			50	
		V _{DS} = 40 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		0.0023	0.0028	Ω
		V _{GS} = 10 V, I _D = 30 A, T _J = 125 °C			0.0045	
		V _{GS} = 10 V, I _D = 30 A, T _J = 175 °C			0.0056	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 30 A	30			S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		8250		pF
Output Capacitance	C _{oss}			1380		
Reverse Transfer Capacitance	C _{rss}			850		
Total Gate Charge ^c	Q _g	V _{DS} = 30 V, V _{GS} = 10 V, I _D = 110 A		165	250	nC
Gate-Source Charge ^c	Q _{gs}			45		
Gate-Drain Charge ^c	Q _{gd}			65		
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 30 V, R _L = 0.27 Ω I _D ≅ 110 A, V _{GEN} = 10 V, R _g = 2.5 Ω		25	40	ns
Rise Time ^c	t _r			170	255	
Turn-Off Delay Time ^c	t _{d(off)}			55	85	
Fall Time ^c	t _f			110	165	
Source-Drain Diode Ratings and Characteristics T _C = 25 °C ^b						
Continuous Current	I _S				110	A
Pulsed Current	I _{SM}				240	
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		60	90	ns
Peak Reverse Recovery Current	I _{RM(REC)}			3.0	5	A
Reverse Recovery Charge	Q _{rr}			0.09	0.22	μC

Notes:

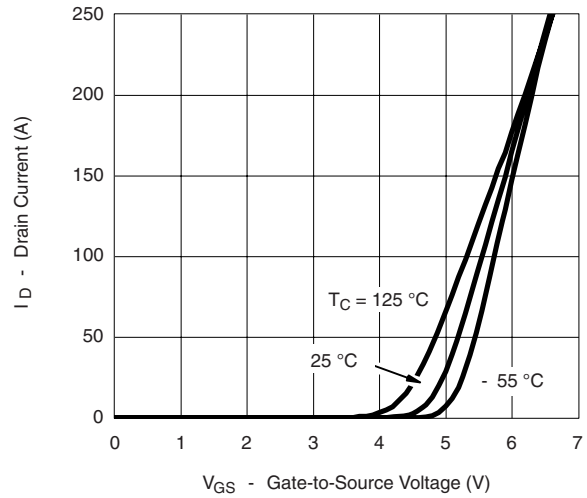
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

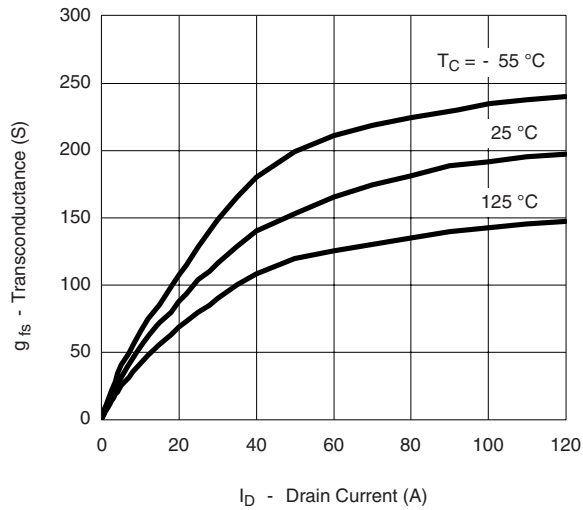
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



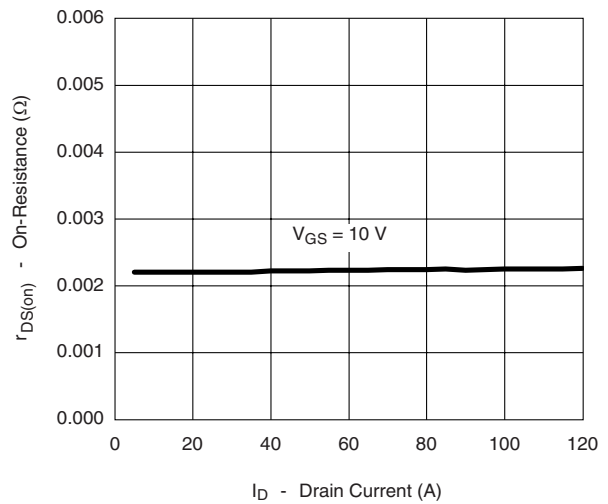
Output Characteristics



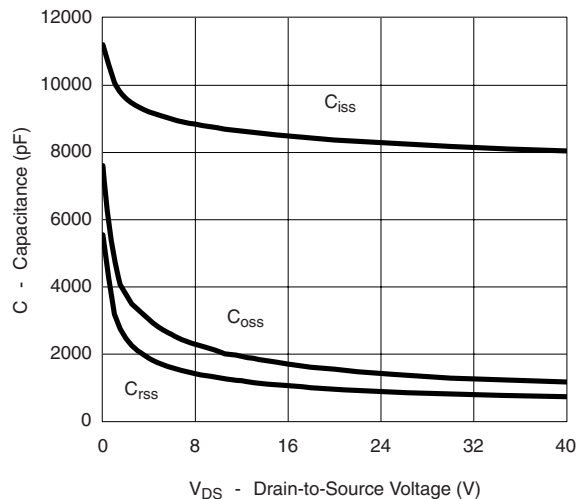
Transfer Characteristics



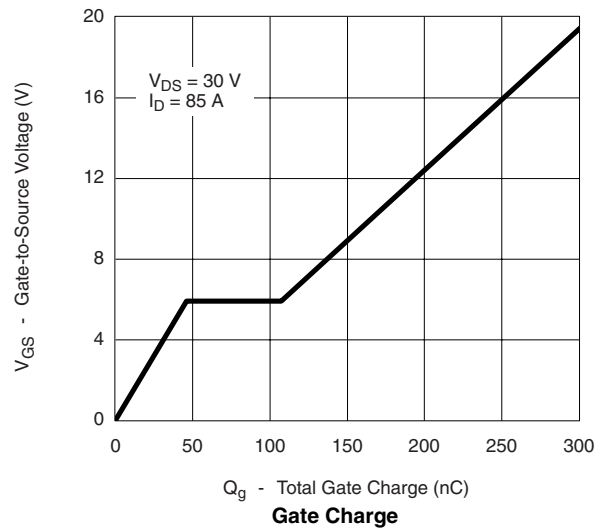
Transconductance



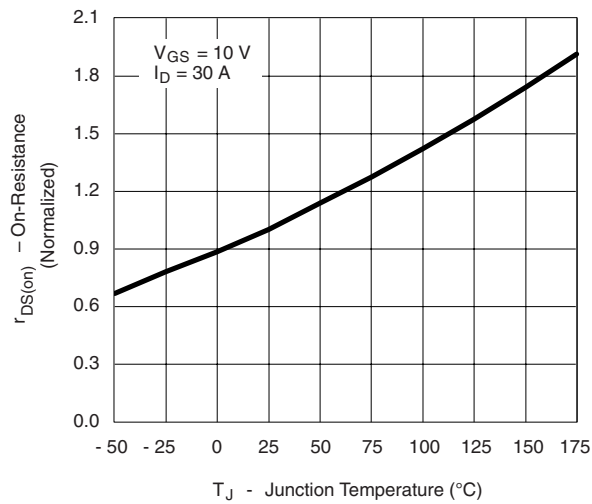
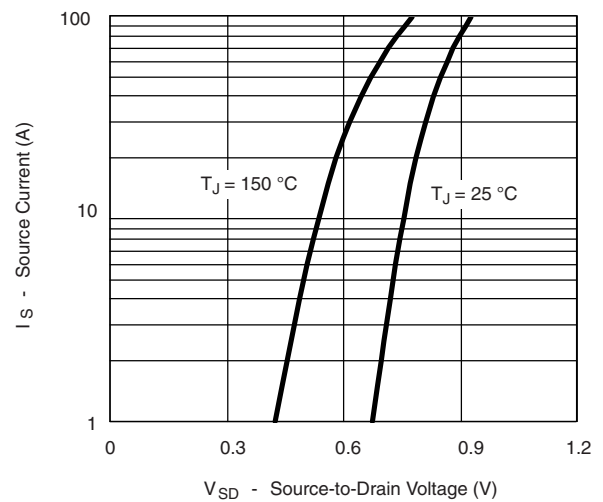
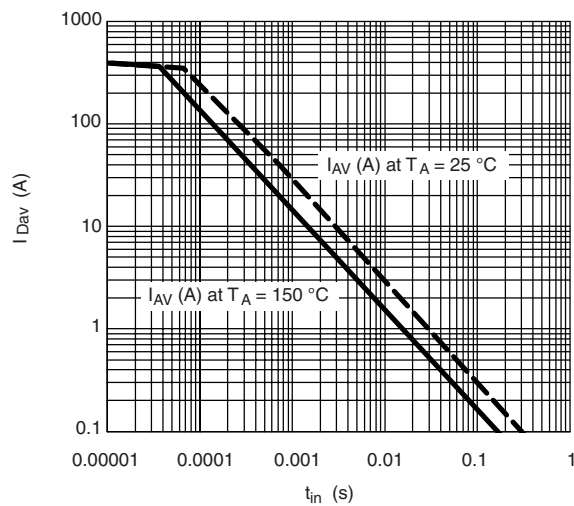
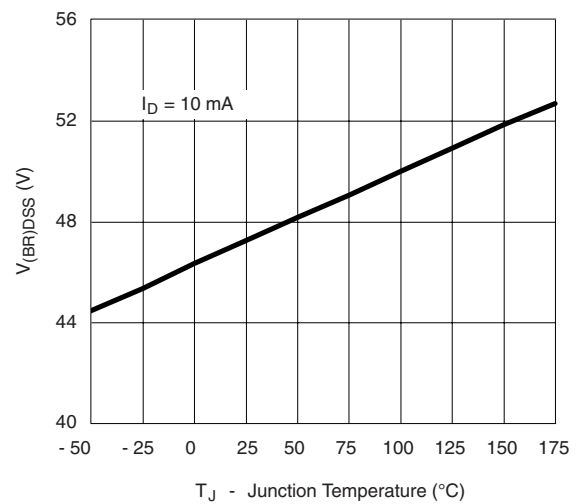
On-Resistance vs. Drain Current



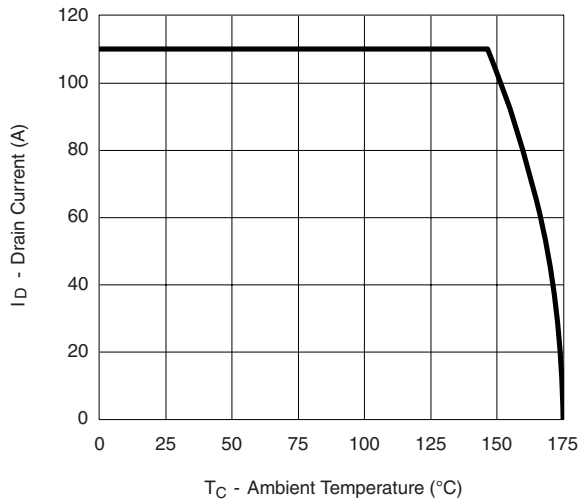
Capacitance



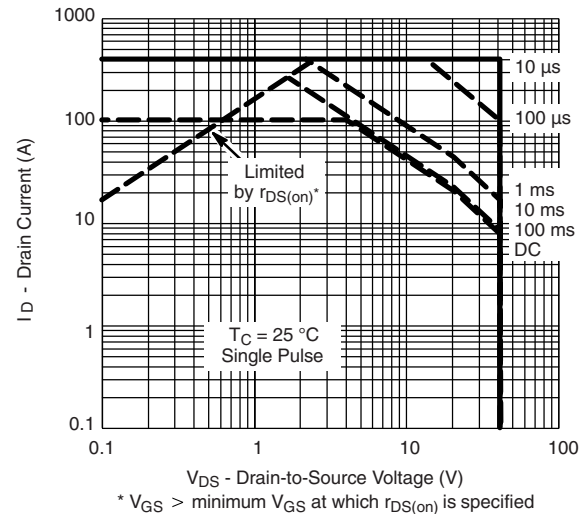
Gate Charge

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

On-Resistance vs. Junction Temperature

Source-Drain Diode Forward Voltage

Avalanche Current vs. Time

Drain Source Breakdown vs. Junction Temperature

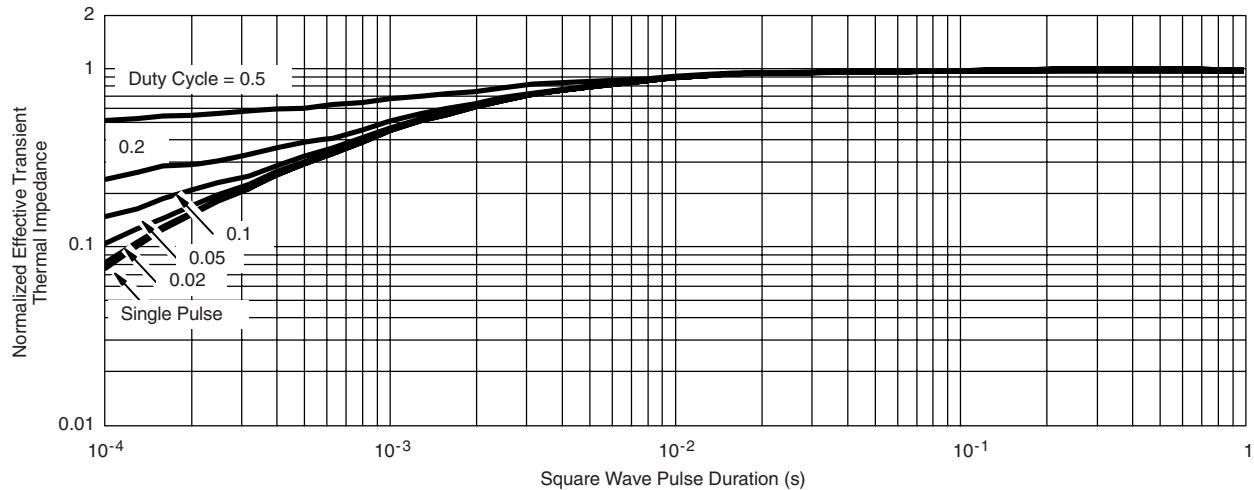
THERMAL RATINGS



**Maximum Avalanche and Drain Current
vs. Case Temperature**



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

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