

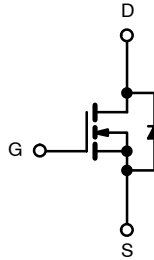
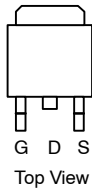


N-Channel 200-V (D-S) 175°C MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
200	0.030 @ $V_{GS} = 10$ V	65 ^a

TO-263



Ordering Information: SUM65N20-30—E3

N-Channel MOSFET

FEATURES

- TrenchFET® Power MOSFET
- 175°C Junction Temperature
- New Low Thermal Resistance Package
- 100% R_g Tested
- RoHS Compliant



Termination is Pb-free

APPLICATIONS

- Automotive
 - 42-V EPS and ABS
 - DC/DC Conversion
 - Motor Drives
- Isolated DC/DC converters

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	200	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 175^\circ\text{C}$)	I_D	$T_C = 25^\circ\text{C}$	65 ^a
		$T_C = 125^\circ\text{C}$	37 ^a
Pulsed Drain Current	I_{DM}	140	A
Avalanche Current	I_{AS}	35	
Single Pulse Avalanche Energy ^b	E_{AS}	61	
Maximum Power Dissipation ^b	P_D	$T_C = 25^\circ\text{C}$	375 ^c
		$T_A = 25^\circ\text{C}^d$	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	R_{thJA}	40	$^\circ\text{C/W}$
Junction-to-Case (Drain)	R_{thJC}	0.4	

Notes

- Package limited.
- 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	200			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2		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} = 200 V, V _{GS} = 0 V			1	μA
		V _{DS} = 200 V, V _{GS} = 0 V, T _J = 125 °C			50	
		V _{DS} = 200 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		0.023	0.030	Ω
		V _{GS} = 10 V, I _D = 30 A, T _J = 125 °C			0.063	
		V _{GS} = 10 V, I _D = 30 A, T _J = 175 °C			0.084	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 30 A	25			S
Dynamic^{a,b}						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		5100		pF
Output Capacitance	C _{oss}			480		
Reverse Transfer Capacitance	C _{rss}			210		
Total Gate Charge ^c	Q _g	V _{DS} = 100 V, V _{GS} = 10 V, I _D = 85 A		90	130	nC
Gate-Source Charge ^c	Q _{gs}			23		
Gate-Drain Charge ^c	Q _{gd}			34		
Gate Resistance	R _g		0.5	1.7	3.3	Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 100 V, R _L = 1.5 Ω I _D ≅ 65 A, V _{GEN} = 10 V, R _g = 2.5 Ω		24	35	ns
Rise Time ^c	t _r			220	330	
Turn-Off Delay Time ^c	t _{d(off)}			45	70	
Fall Time ^c	t _f			200	300	
Source-Drain Diode Ratings and Characteristics (T_C = 25 °C)^b						
Continuous Current	I _S				65	A
Pulsed Current	I _{SM}				140	
Forward Voltage ^a	V _{SD}	I _F = 65 A, V _{GS} = 0 V		1.0	1.5	V
Reverse Recovery Time	t _{rr}	I _F = 50 A, di/dt = 100 A/μs		130	200	ns
Peak Reverse Recovery Current	I _{RM(REC)}			8	12	A
Reverse Recovery Charge	Q _{rr}			0.52	1.2	μC

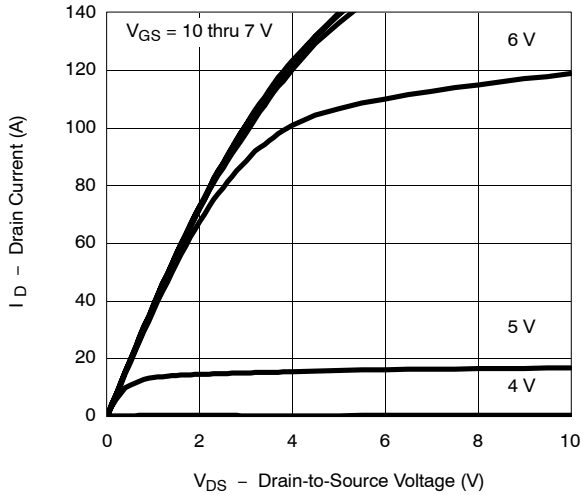
Notes

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

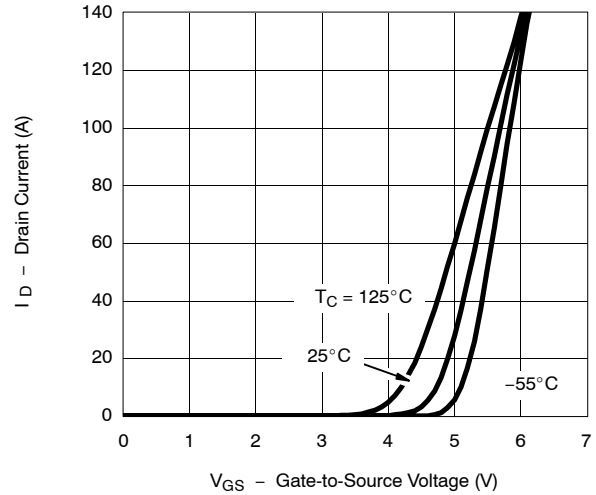
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

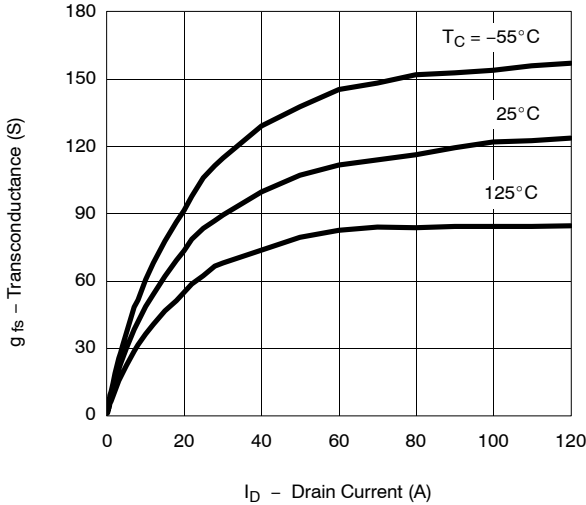
Output Characteristics



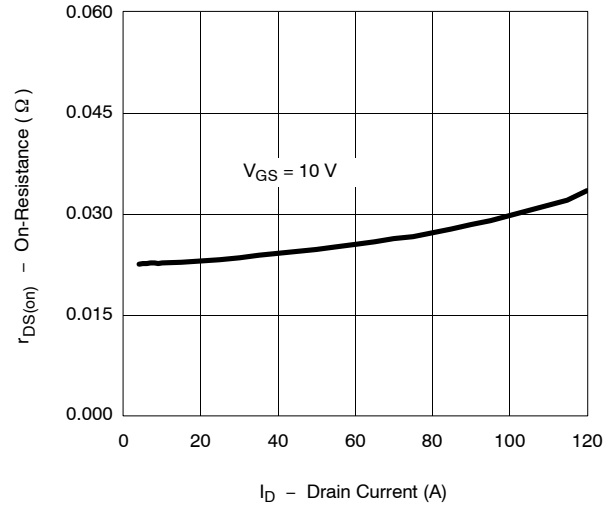
Transfer Characteristics



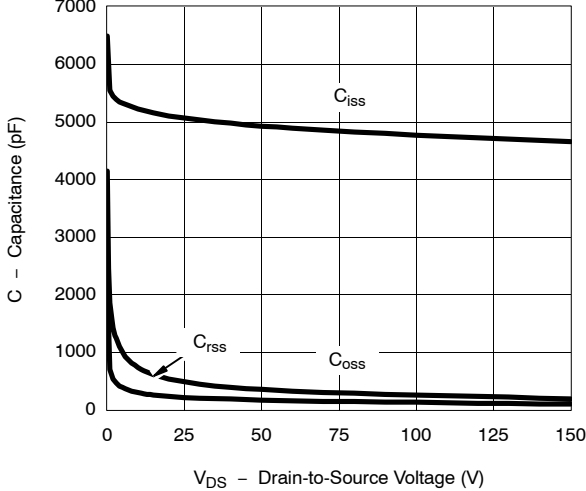
Transconductance



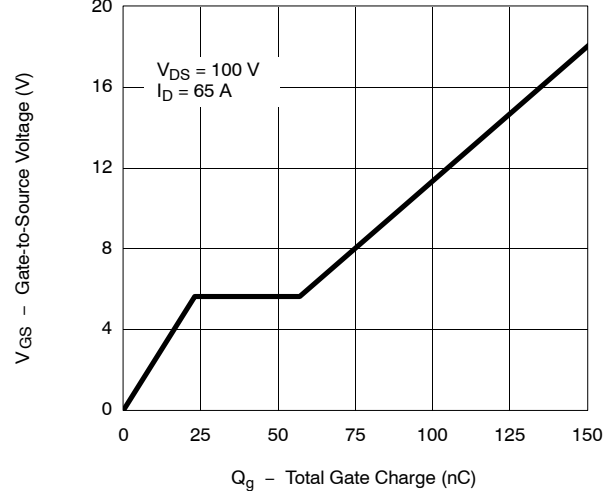
On-Resistance vs. Drain Current



Capacitance

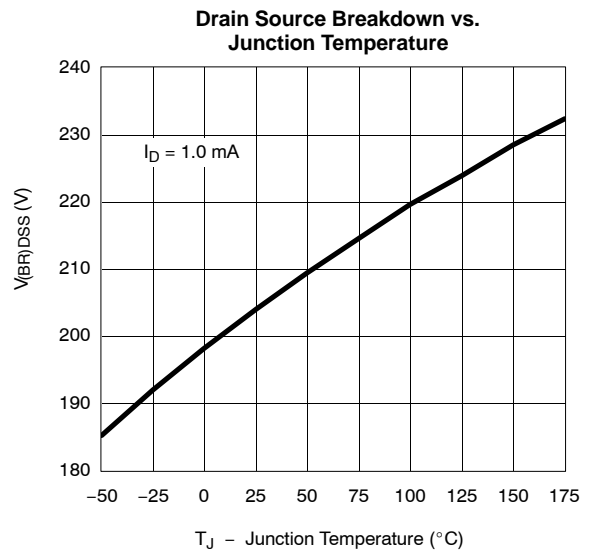
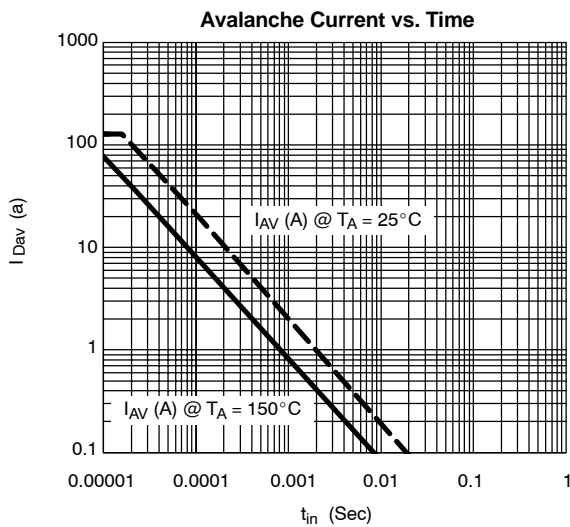
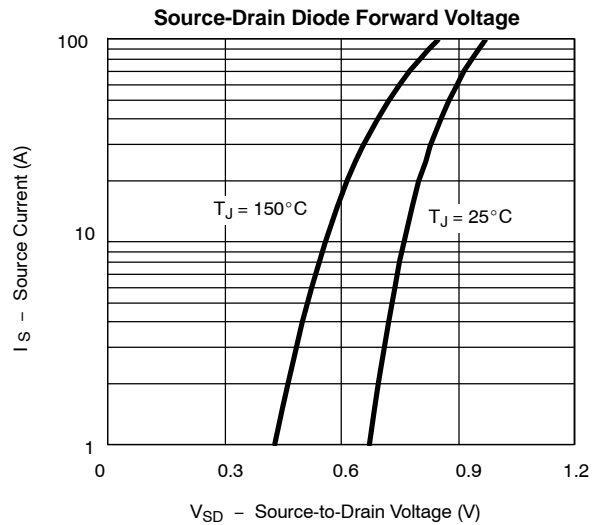
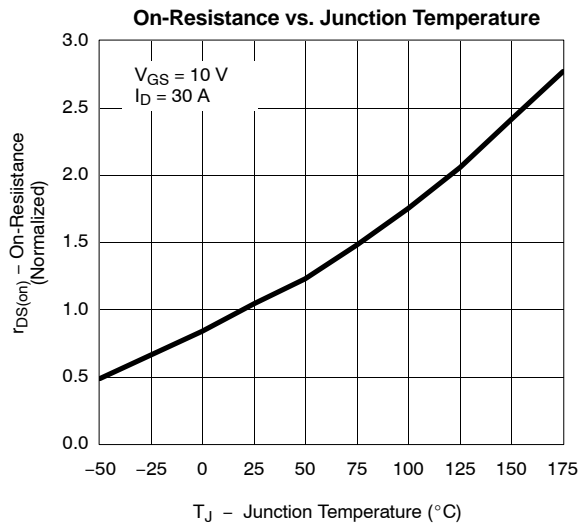


Gate Charge



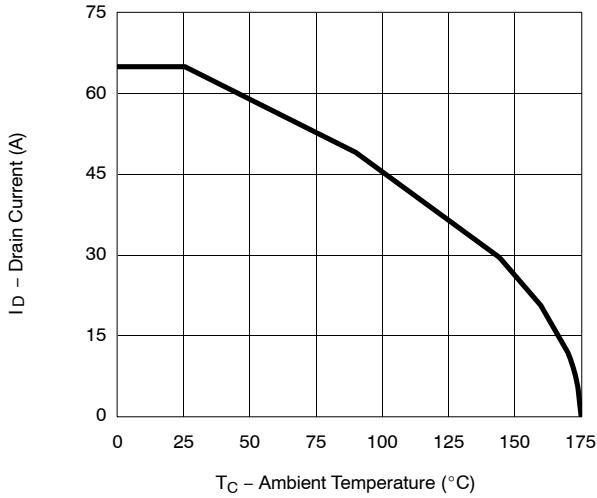


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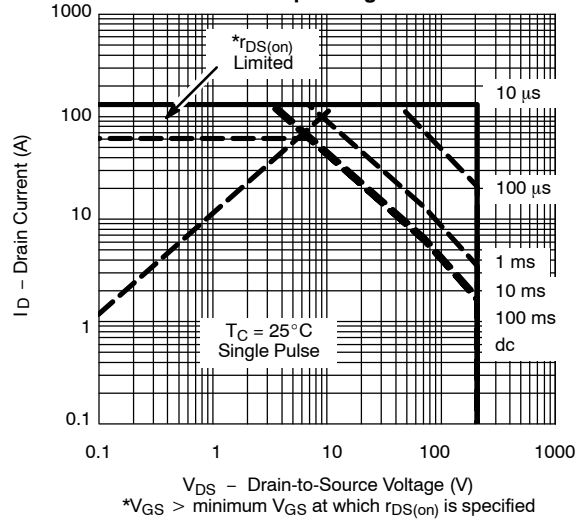


THERMAL RATINGS

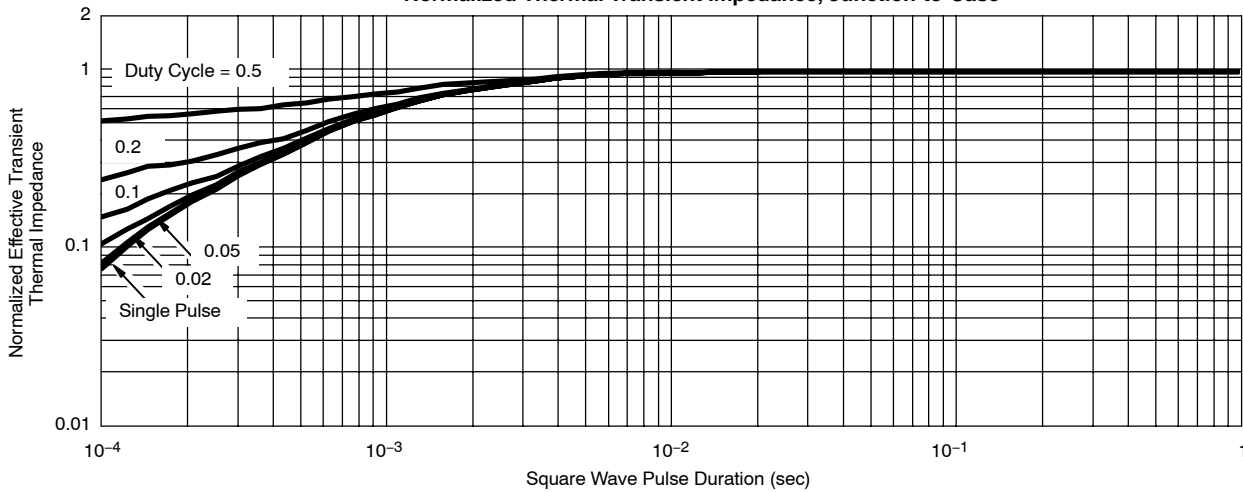
Maximum Avalanche and Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case



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