

N-Channel 200 V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ.)
200	0.053 at $V_{GS} = 15$ V	36	57
	0.054 at $V_{GS} = 10$ V	36	

FEATURES

- TrenchFET® Power MOSFETs
- 175 °C Junction Temperature
- 100 % R_g and UIS Tested
- Compliant to RoHS Directive 2002/95/EC

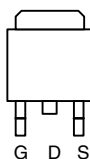


RoHS
COMPLIANT

APPLICATIONS

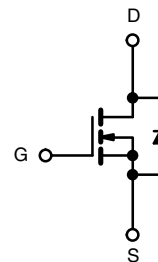
- Power Supply
- Lighting Systems

TO-263



Top View

Ordering Information: SUM36N20-54P-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}	200	V
Gate-Source Voltage	V_{GS}	± 25	
Continuous Drain Current ($T_J = 175$ °C)	I_D	$T_C = 25$ °C	A
		$T_C = 100$ °C	
Pulsed Drain Current	I_{DM}	80	
Single Pulse Avalanche Current	I_{AS}	20	
Single Pulse Avalanche Energy ^a	E_{AS}	20	mJ
Maximum Power Dissipation ^a	P_D	$T_C = 25$ °C	W
		$T_A = 25$ °C ^c	
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 (Drain)	R_{thJC}	0.75	

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 Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	200			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2.5		4.5	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
		V _{DS} = 0 V, V _{GS} = ± 25 V			± 300	
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 = 100 °C			25	
		V _{DS} = 200 V, V _{GS} = 0 V, T _J = 150 °C			250	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 10 V, V _{GS} = 10 V	40			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		0.044	0.054	Ω
		V _{GS} = 15 V, I _D = 20 A		0.0435	0.053	
		V _{GS} = 10 V, I _D = 20 A, T _J = 100 °C			0.098	
		V _{GS} = 10 V, I _D = 20 A, T _J = 150 °C			0.130	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 20 A	25			S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		3100		pF
Output Capacitance	C _{oss}			300		
Reverse Transfer Capacitance	C _{rss}			135		
Total Gate Charge ^c	Q _g	V _{DS} = 100 V, V _{GS} = 15 V, I _D = 50 A		85	127	nC
		V _{DS} = 100 V, V _{GS} = 10 V, I _D = 50 A		57	85	
Gate-Source Charge ^c	Q _{gs}			14		
Gate-Drain Charge ^c	Q _{gd}			20		
Gate Resistance	R _g	f = 1 MHz		1.2	2	Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 100 V, R _L = 2 Ω I _D ≅ 50 A, V _{GEN} = 10 V, R _g = 1 Ω		16	25	ns
Rise Time ^c	t _r			170	260	
Turn-Off Delay Time ^c	t _{d(off)}			27	42	
Fall Time ^c	t _f			9	18	
Source-Drain Diode Ratings and Characteristics T _C = 25 °C ^b						
Continuous Current	I _S				36	A
Pulsed Current	I _{SM}				80	
Forward Voltage ^a	V _{SD}	I _F = 20 A, V _{GS} = 0 V		0.86	1.5	V
Reverse Recovery Time	t _{rr}	I _F = 40 A, dI/dt = 100 A/μs		116	175	ns
Peak Reverse Recovery Current	I _{RM(REC)}			9	14	A
Reverse Recovery Charge	Q _{rr}			0.53	0.8	μC
Reverse Recovery Fall Time	t _a			84		nS
Reverse Recovery Rise Time	t _b			32		

Notes:

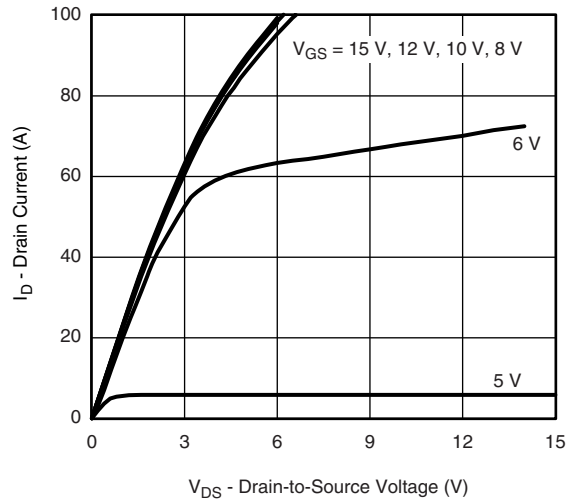
a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

b. Guaranteed by design, not subject to production testing.

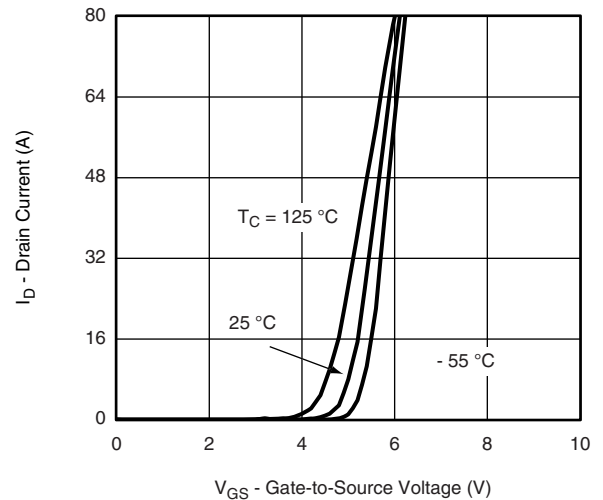
c. Independent of operating temperature.

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.

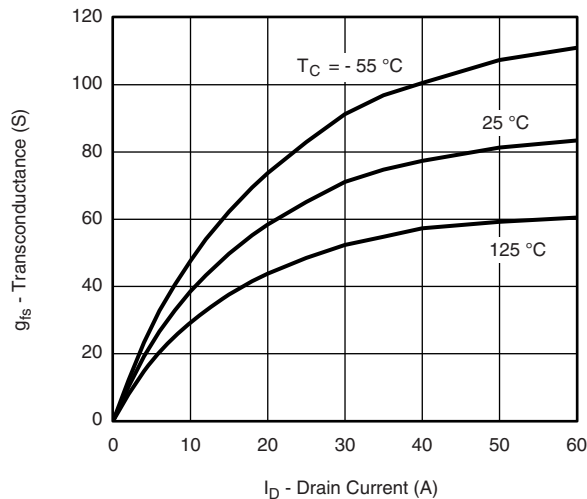
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



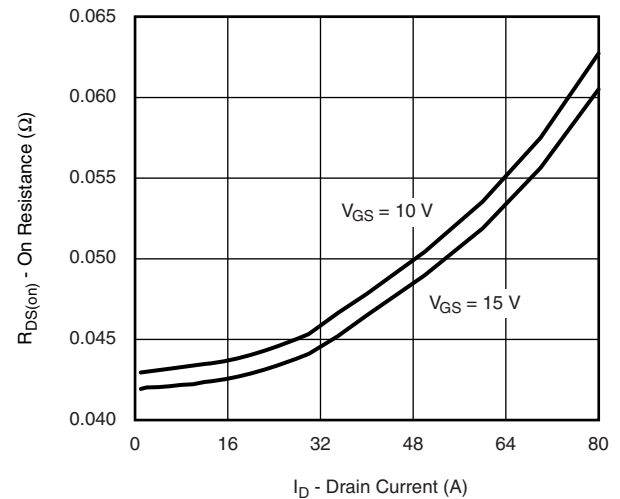
Output Characteristics



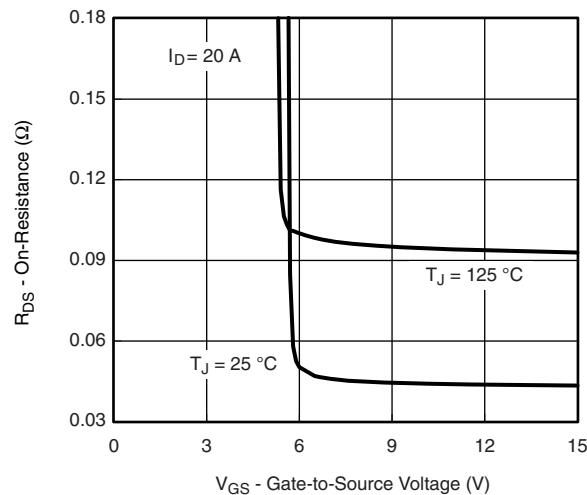
Transfer Characteristics



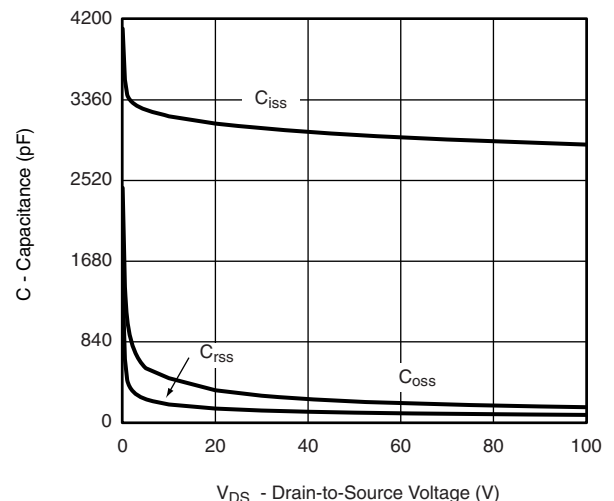
Transconductance



On-Resistance vs. Drain Current

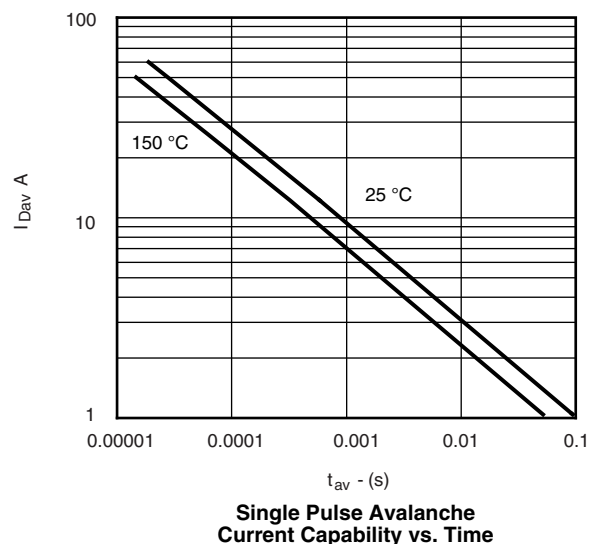
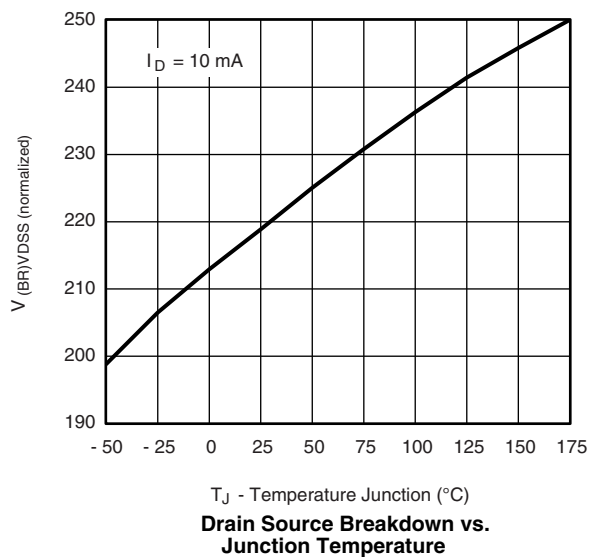
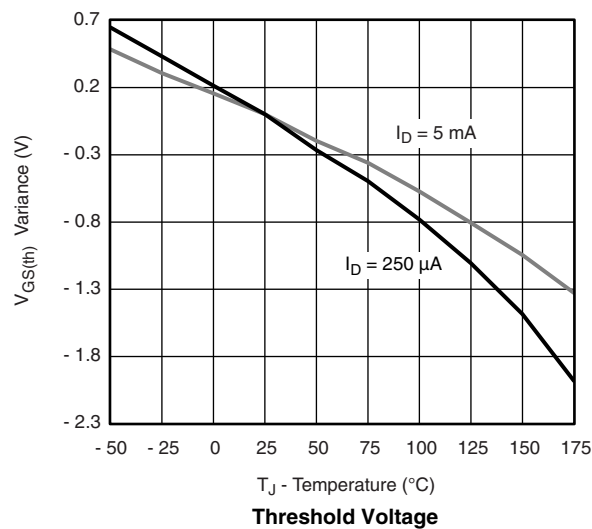
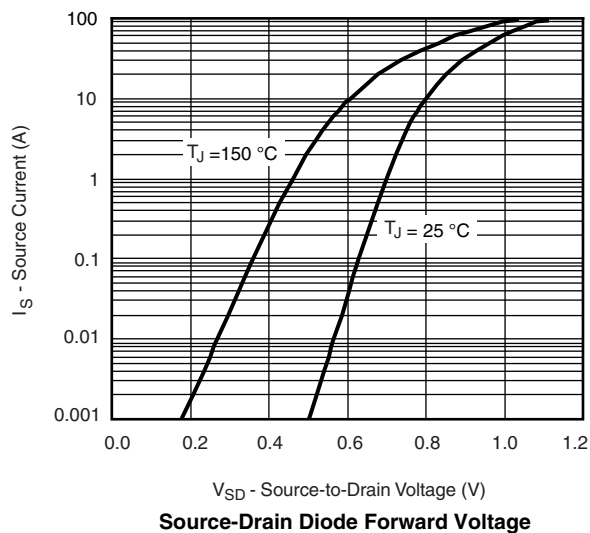
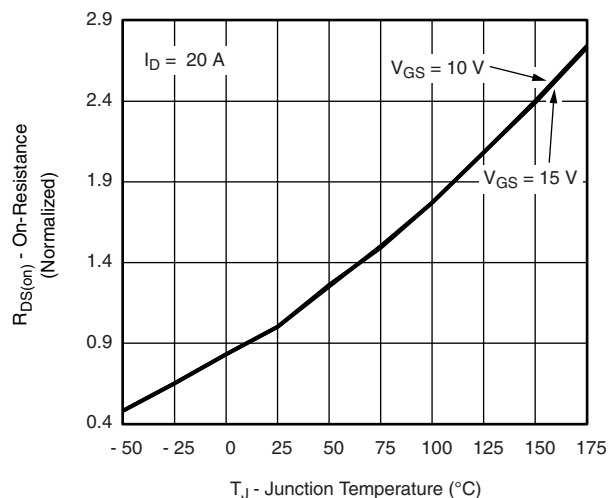
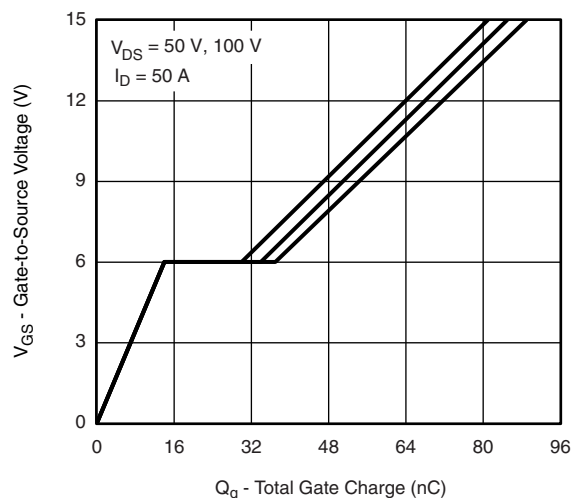


On-Resistance vs. Gate-to-Source Voltage

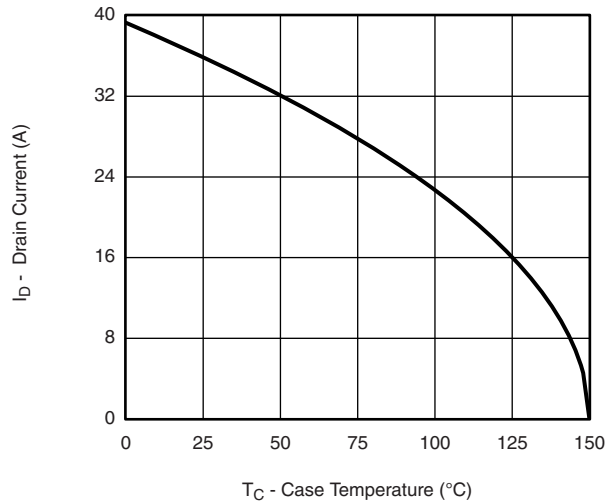


Capacitance

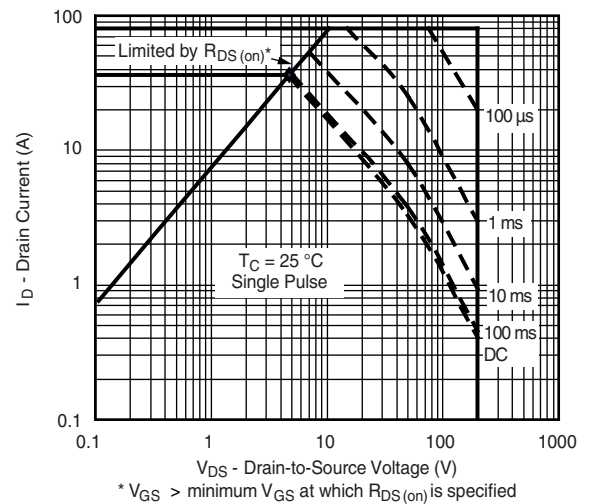
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



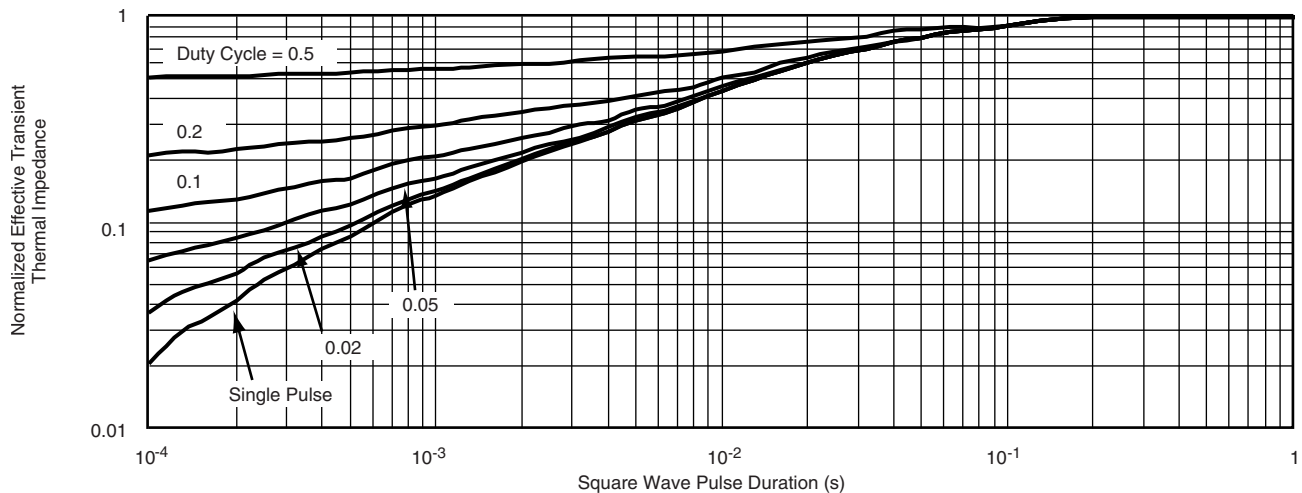
THERMAL RATINGS



Maximum Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

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