

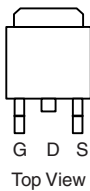
N-Channel 55-V (D-S), 175 °C MOSFET, Logic Level

PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
55	0.019 at $V_{GS} = 10$ V	40
	0.025 at $V_{GS} = 4.5$ V	35

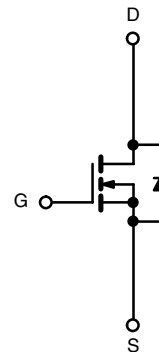
FEATURES

- TrenchFET[®] Power MOSFET
- 175 °C Junction Temperature


 Available
RoHS*
 COMPLIANT

TO-263


DRAIN connected to TAB

Ordering Information: SUM40N05-19L-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}	55	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 175$ °C)	I_D	$T_C = 25$ °C	40
		$T_C = 100$ °C	28
Pulsed Drain Current	I_{DM}	80	A
Avalanche Current, Single Pulse	I_{AS}	30	
Avalanche Energy, Single Pulse	E_{AS}	45	mJ
Power Dissipation	P_D	$T_C = 25$ °C	65 ^a
		$T_A = 25$ °C ^c	3.1 ^b
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	R_{thJC}	2.3	

Notes:

a. See SOA curve for voltage derating.

 b. Surface Mounted on FR4 board, $t \leq 10$ s.

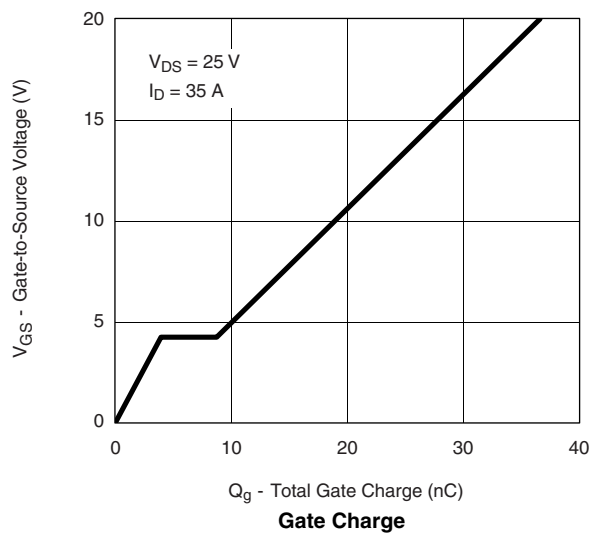
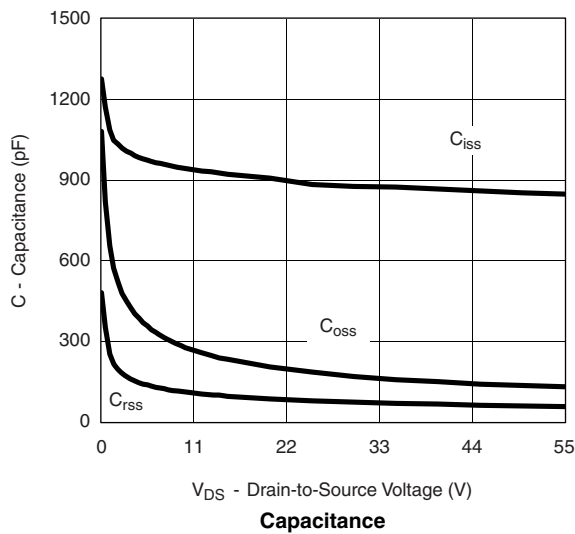
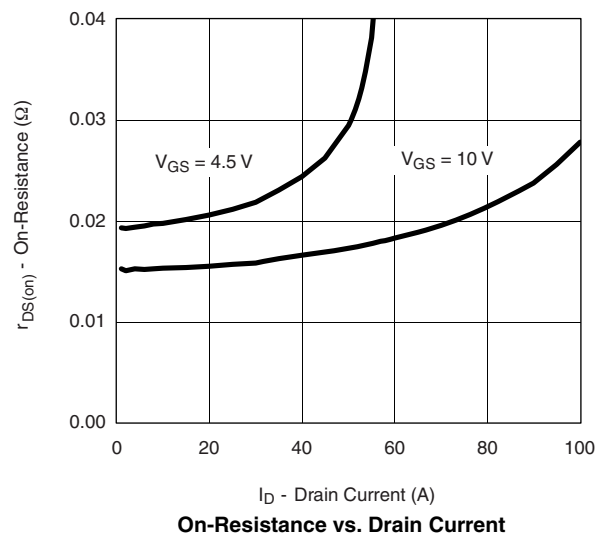
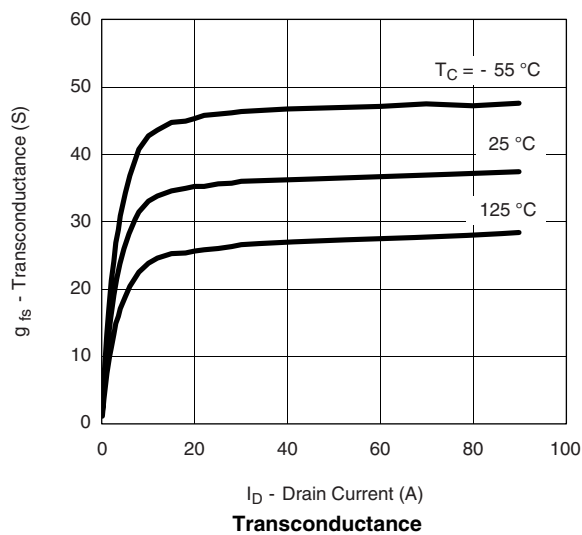
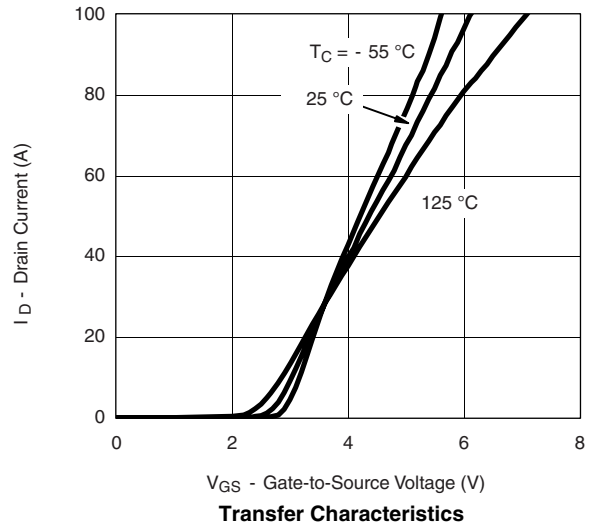
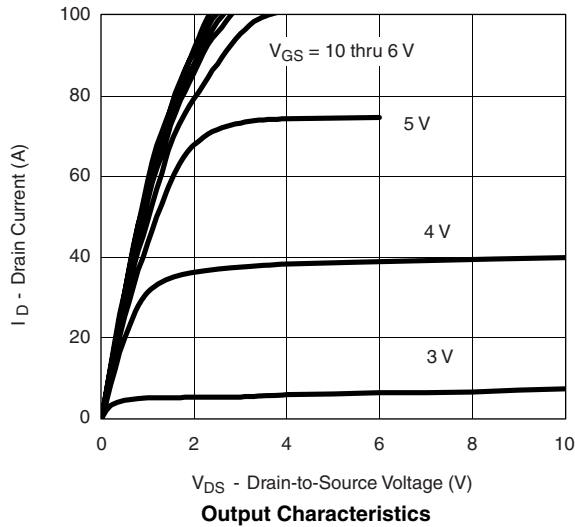
* Pb containing terminations are not RoHS compliant, exemptions may apply.

SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	55			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_{DS} = 250\text{ }\mu\text{A}$	1.0	2.0	3.0	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 55\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 55\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			50	
		$V_{DS} = 55\text{ V}, V_{GS} = 0\text{ V}, T_J = 175\text{ }^\circ\text{C}$			250	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	40			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$		0.0155	0.019	Ω
		$V_{GS} = 10\text{ V}, I_D = 20\text{ A}, T_J = 125\text{ }^\circ\text{C}$			0.033	
		$V_{GS} = 10\text{ V}, I_D = 20\text{ A}, T_J = 175\text{ }^\circ\text{C}$			0.040	
		$V_{GS} = 4.5\text{ V}, I_D = 15\text{ A}$		0.020	0.025	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 20\text{ A}$		50		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		885		μF
Output Capacitance	C_{oss}			185		
Reverse Transfer Capacitance	C_{rss}			80		
Total Gate Charge ^c	Q_g	$V_{DS} = 25\text{ V}, V_{GS} = 10\text{ V}, I_D = 35\text{ A}$		10.5	13	nC
Gate-Source Charge ^c	Q_{gs}			4		
Gate-Drain Charge ^c	Q_{gd}			4.8		
Gate Resistance	R_g	$f = 1.0\text{ MHz}$		5.0		Ω
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = 25\text{ V}, R_L = 0.3\text{ }\Omega$ $I_D \cong 35\text{ A}, V_{GEN} = 10\text{ V}, R_G = 2.5\text{ }\Omega$		5	8	ns
Rise Time ^c	t_r			18	30	
Turn-Off Delay Time ^c	$t_{d(off)}$			20	30	
Fall Time ^c	t_f			100	150	
Source-Drain Diode Ratings and Characteristics $T_C = 25\text{ }^\circ\text{C}$ ^b						
Continuous Current	I_S				35	A
Pulsed Current	I_{SM}				80	
Forward Voltage ^a	V_{SD}	$I_F = 35\text{ A}, V_{GS} = 0\text{ V}$		1.0	1.5	V
Reverse Recovery Time	t_{rr}	$I_F = 35\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		25	40	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			1.5	2.5	A
Reverse Recovery Charge	Q_{rr}			0.019	0.05	μC

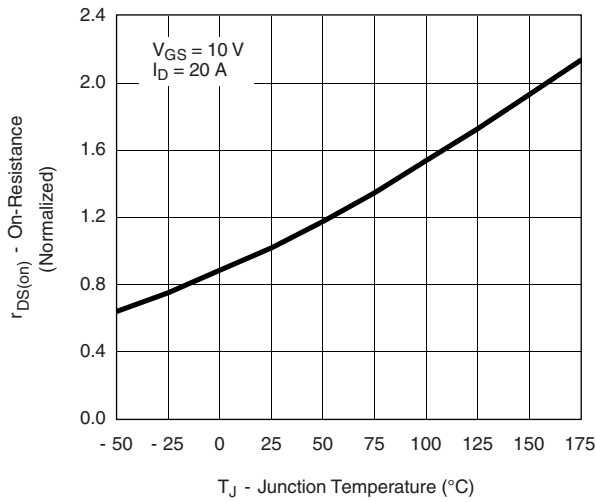
Notes:

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

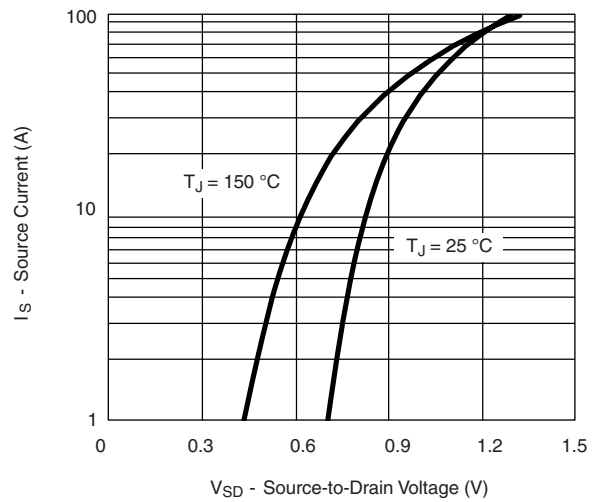
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


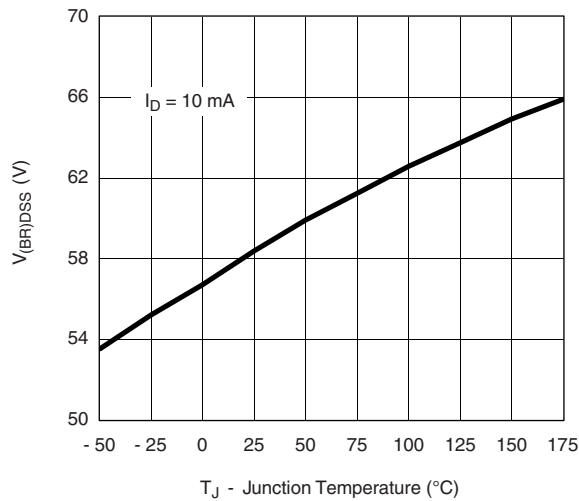
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



On-Resistance vs. Junction Temperature

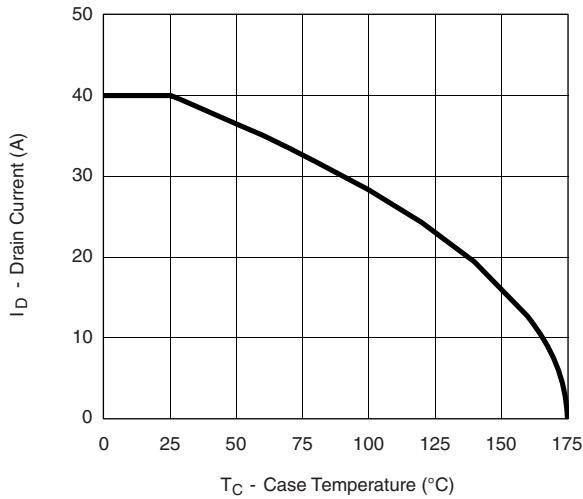


Source-Drain Diode Forward Voltage

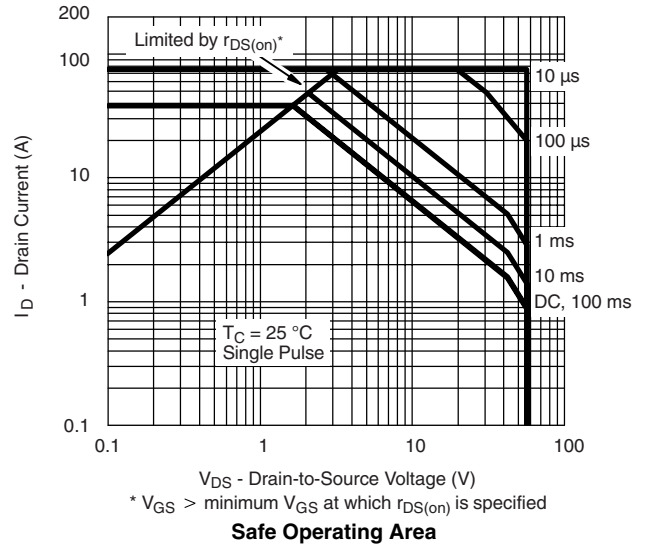


Drain Source Breakdown vs. Junction Temperature

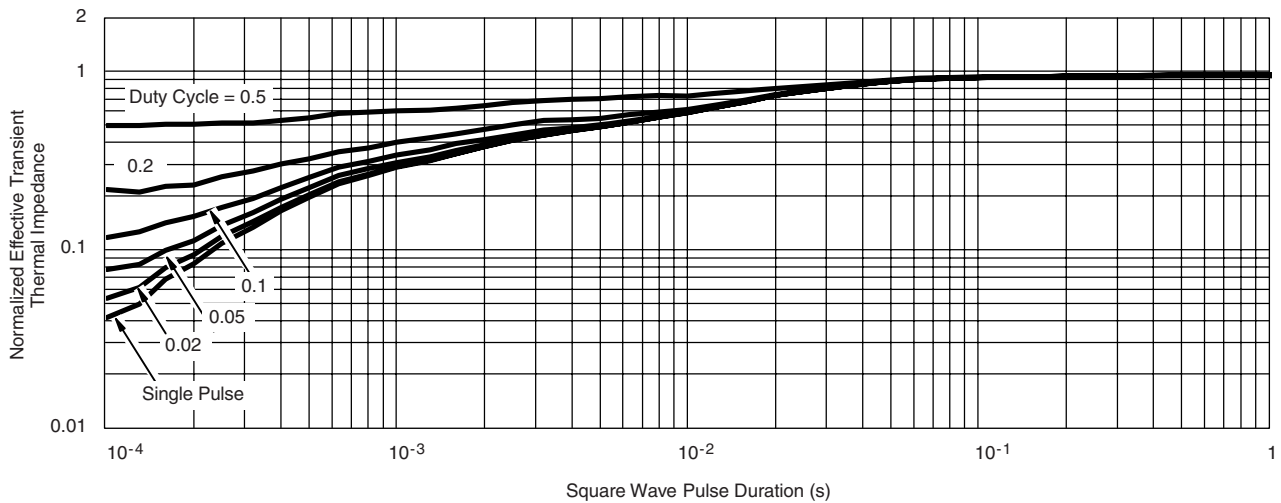
THERMAL RATINGS



Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

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