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

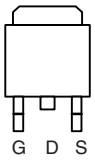
PRODUCT SUMMARY		
$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
55	0.019 at V_{GS} = 10 V	40
	0.025 at V_{GS} = 4.5 V	35

FEATURES

- TrenchFET® Power MOSFET
- 175 °C Junction Temperature

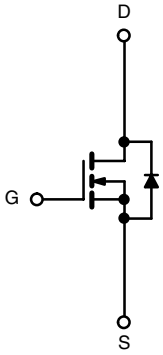
Available
RoHS* COMPLIANT

TO-263



Top View

DRAIN connected to TAB



N-Channel MOSFET

Ordering Information: SUM40N05-19L-E3 (Lead (Pb)-free)

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)	T_C = 25 °C	I_D	40	A
	T_C = 100 °C		28	
Pulsed Drain Current		I_{DM}	80	
Avalanche Current, Single Pulse		I_{AS}	30	
Avalanche Energy, Single Pulse	L = 0.1 mH	E_{AS}	45	mJ
Power Dissipation	T_C = 25 °C	P_D	65[a]	W
	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	(PCB Mount)[b]	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 ≤ 10 s.

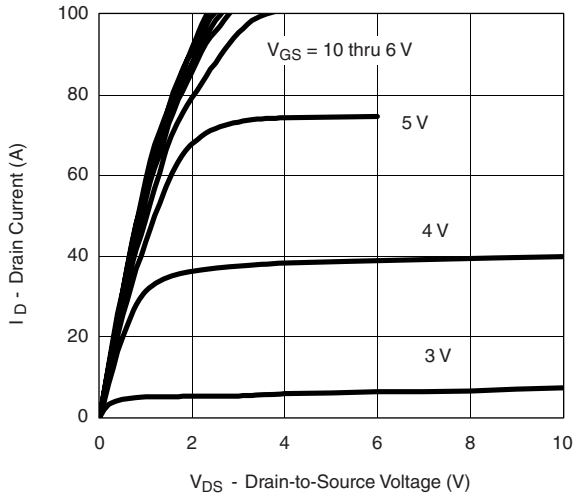
* Pb containing terminations are not RoHS compliant, exemptions may apply.

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_{GS} = 0 V, I_D = 250 µA	55			V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_{DS} = 250 µA	1.0	2.0	3.0	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 55 V, V_{GS} = 0 V			1	µA
		V_{DS} = 55 V, V_{GS} = 0 V, T_J = 125 °C			50	
		V_{DS} = 55 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	40			A
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 20 A		0.0155	0.019	Ω
		V_{GS} = 10 V, I_D = 20 A, T_J = 125 °C			0.033	
		V_{GS} = 10 V, I_D = 20 A, T_J = 175 °C			0.040	
		V_{GS} = 4.5 V, I_D = 15 A		0.020	0.025	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 20 A		50		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		885		pF
Output Capacitance	C_{oss}			185		
Reverse Transfer Capacitance	C_{rss}			80		
Total Gate Charge[c]	Q_g	V_{DS} = 25 V, V_{GS} = 10 V, I_D = 35 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 MHz		5.0		Ω
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 25 V, R_L = 0.3 Ω I_D ≅ 35 A, V_{GEN} = 10 V, R_G = 2.5 Ω		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 °C[b]						
Continuous Current	I_S				35	A
Pulsed Current	I_{SM}				80	
Forward Voltage[a]	V_{SD}	I_F = 35 A, V_{GS} = 0 V		1.0	1.5	V
Reverse Recovery Time	t_{rr}	I_F = 35 A, di/dt = 100 A/µs		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

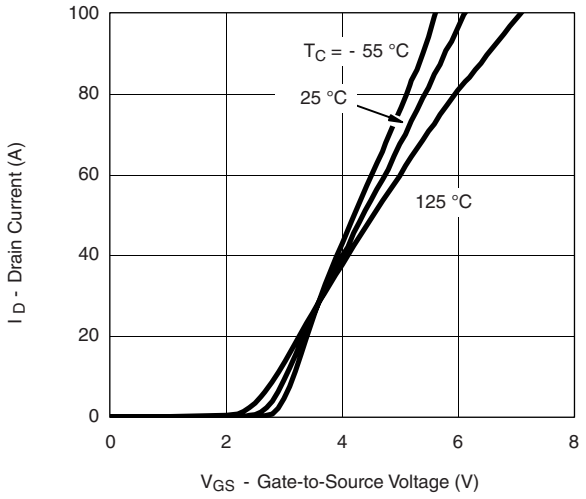
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

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.

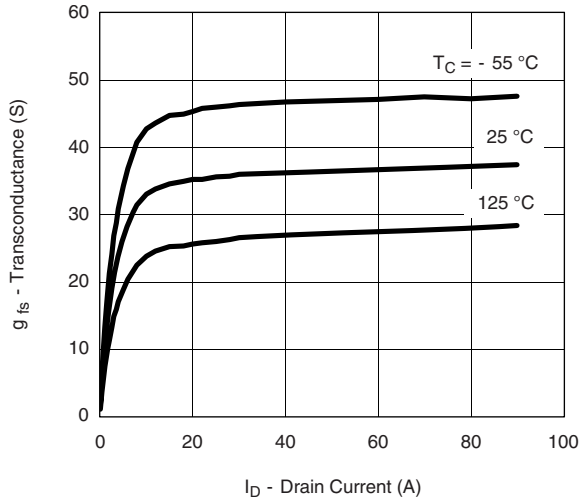
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



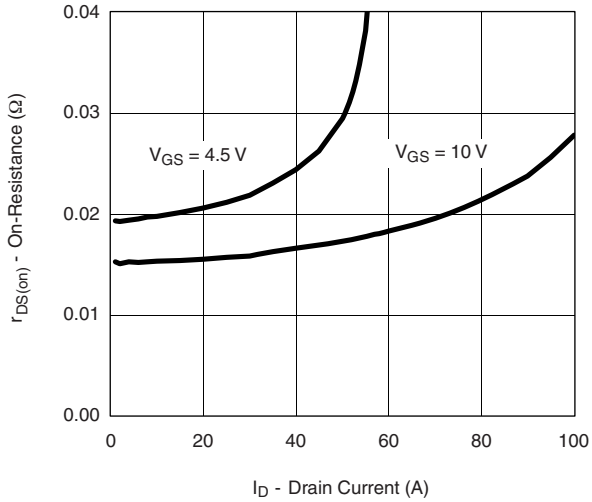
Output Characteristics



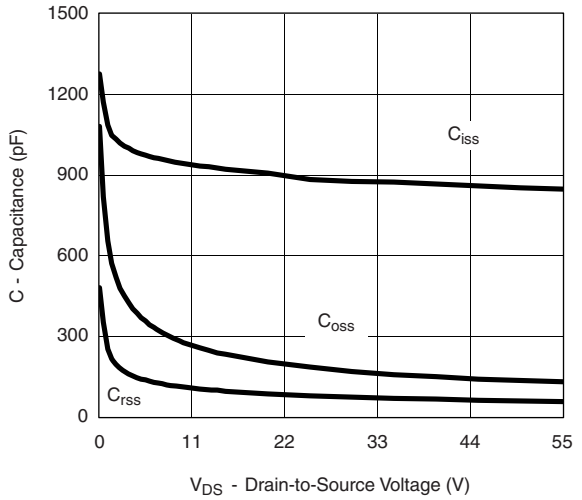
Transfer Characteristics



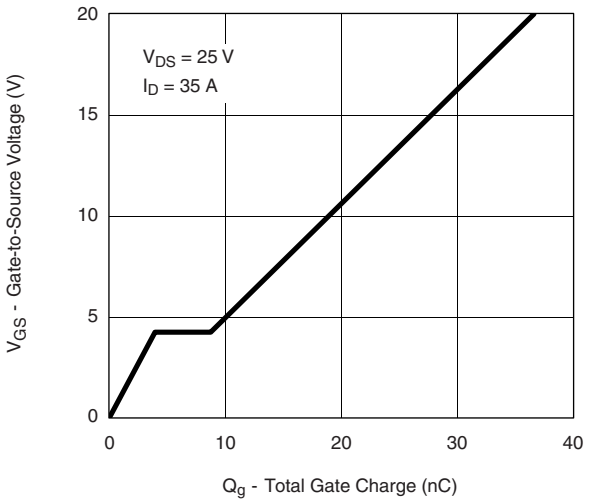
Transconductance



On-Resistance vs. Drain Current

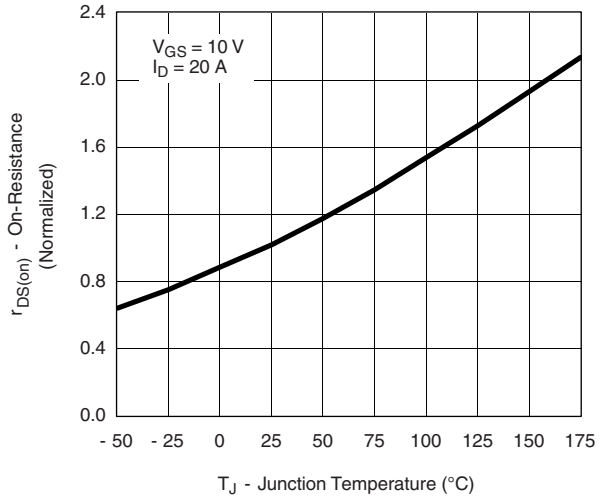


Capacitance

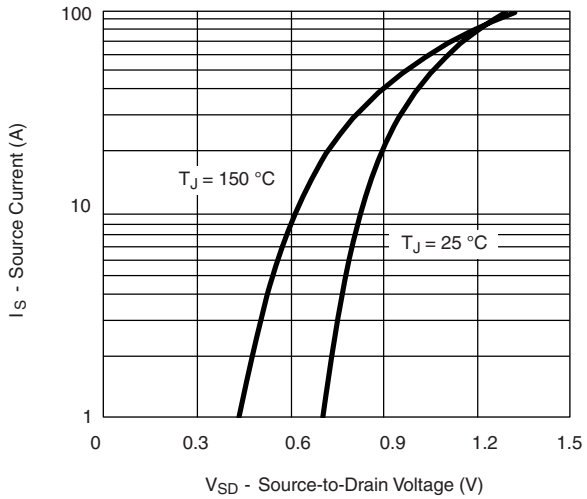


Gate Charge

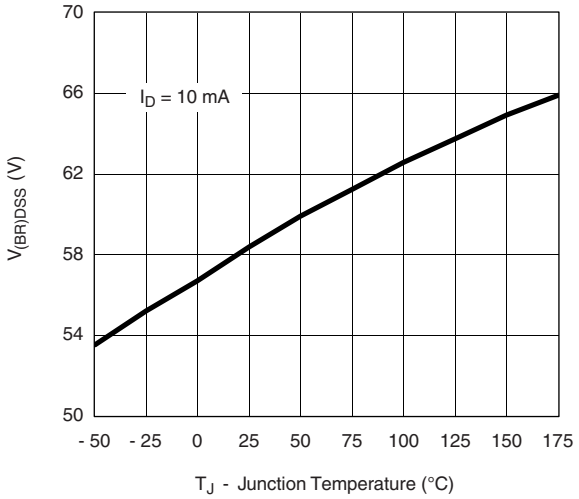
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



On-Resistance vs. Junction Temperature

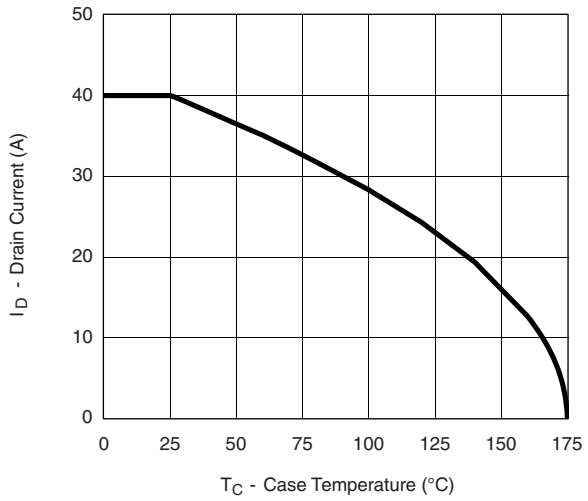


Source-Drain Diode Forward Voltage

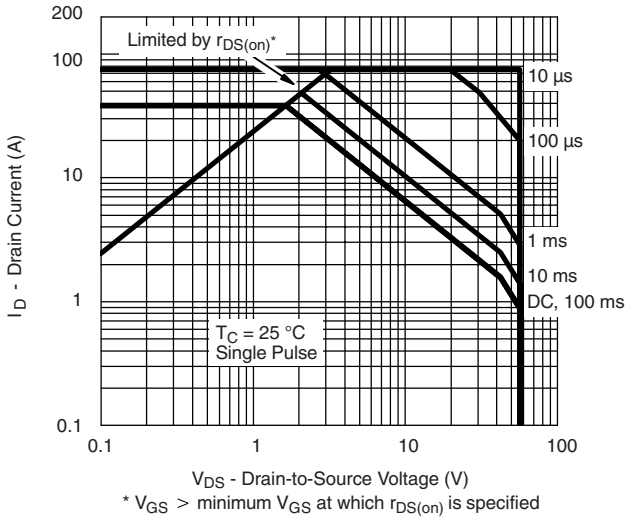


Drain Source Breakdown vs. Junction Temperature

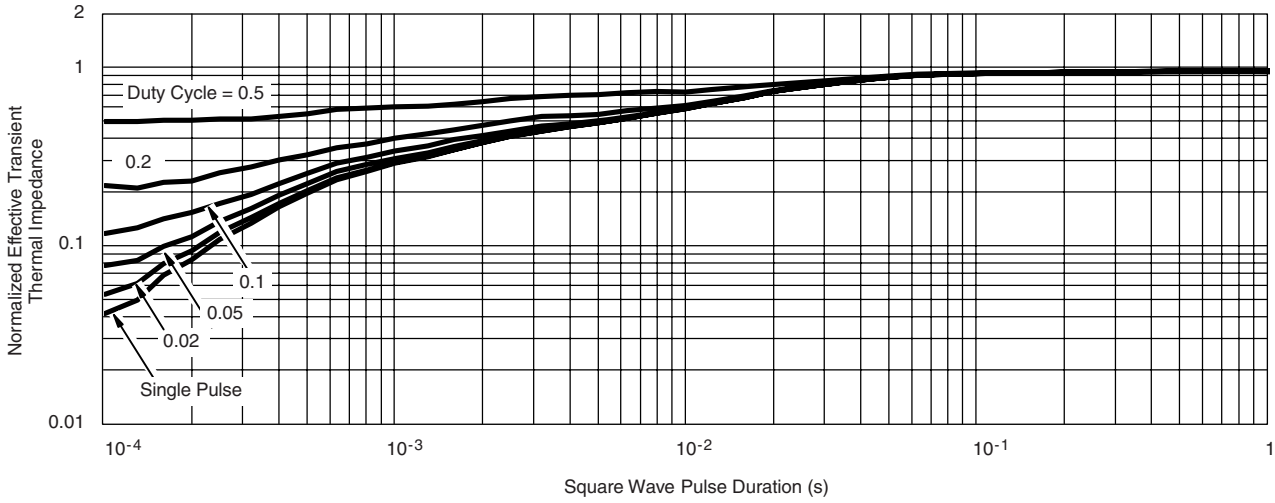
THERMAL RATINGS



Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

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