



N-Channel 100-V (D-S) 175 °C MOSFET

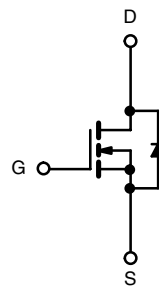
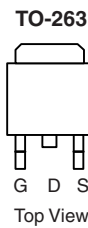
PRODUCT SUMMARY		
V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A)
100	0.024 at V _{GS} = 10 V	47
	0.027 at V _{GS} = 4.5 V	44

FEATURES

- TrenchFET[®] Power MOSFET
- 175 °C Maximum Junction Temperature
- 100 % R_g Tested



RoHS COMPLIANT



Ordering Information: SUM47N10-24L-E3 (Lead (Pb)-free)

N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V _{DS}	100	V
Gate-Source Voltage		V _{GS}	± 20	
Continuous Drain Current (T _J = 175 °C) ^b	T _C = 25 °C	I _D	47	A
	T _C = 125 °C		27	
Pulsed Drain Current		I _{DM}	70	
Continuous Source Current (Diode Conduction)		I _S	47	
Single Pulse Avalanche Current		I _{AS}	40	
Single Pulse Avalanche Energy (Duty Cycle ≤ 1 %)	L = 0.1 mH	E _{AS}	80	mJ
Maximum Power Dissipation	T _C = 25 °C	P _D	136 ^b	W
	T _A = 25 °C		3.75 ^a	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS				
Parameter		Symbol	Maximum	Unit
Junction-to-Ambient	PCB Mount	R _{thJA}	40	°C/W
	Free Air		62.5	
Junction-to-Case		R _{thJC}	1.1	

Notes:

a. Surface Mounted on 1" x 1" FR4 Board.

b. See SOA curve for voltage derating.



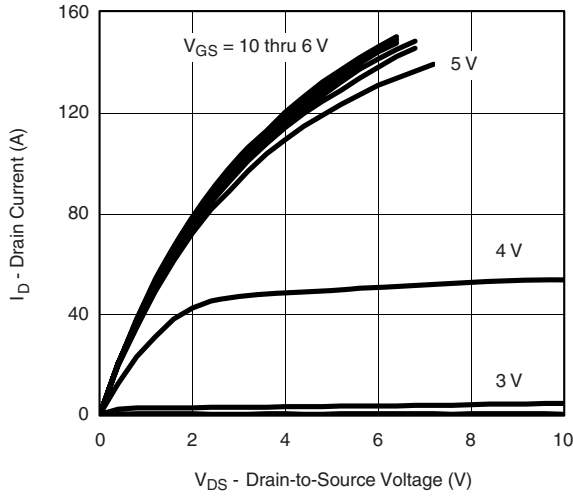
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	100			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1.0		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}	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			50	
		$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}, T_J = 175\text{ }^\circ\text{C}$			250	
On-State Drain Current ^b	$I_{D(on)}$	$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	70			A
Drain-Source On-State Resistance ^b	$r_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 40\text{ A}$		0.019	0.024	Ω
		$V_{GS} = 10\text{ V}, I_D = 40\text{ A}, T_J = 125\text{ }^\circ\text{C}$			0.048	
		$V_{GS} = 10\text{ V}, I_D = 40\text{ A}, T_J = 175\text{ }^\circ\text{C}$			0.060	
		$V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}$		0.021	0.027	
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 40\text{ A}$		70		S
Dynamic^a						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, F = 1\text{ MHz}$		2400		μF
Output Capacitance	C_{oss}			290		
Reverse Transfer Capacitance	C_{rss}			120		
Total Gate Charge ^c	Q_g	$V_{DS} = 50\text{ V}, V_{GS} = 10\text{ V}, I_D = 40\text{ A}$		40	60	nC
Gate-Source Charge ^c	Q_{gs}			11		
Gate-Drain Charge ^c	Q_{gd}			9		
Gate Resistance	R_g	$f = 1\text{ MHz}$	1	2.2	3.5	Ω
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = 50\text{ V}, R_L = 1.25\text{ }\Omega$ $I_D \cong 47\text{ A}, V_{GEN} = 10\text{ V}, R_g = 2.5\text{ }\Omega$		8	13	ns
Rise Time ^c	t_r			40	60	
Turn-Off Delay Time ^c	$t_{d(off)}$			15	25	
Fall Time ^c	t_f			80	120	
Source-Drain Diode Ratings and Characteristics $T_C = 25\text{ }^\circ\text{C}$						
Pulsed Current	I_{SM}				70	A
Diode Forward Voltage ^b	V_{SD}	$I_F = 40\text{ A}, V_{GS} = 0\text{ V}$		1.0	1.5	V
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 47\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		75	120	ns

Notes:

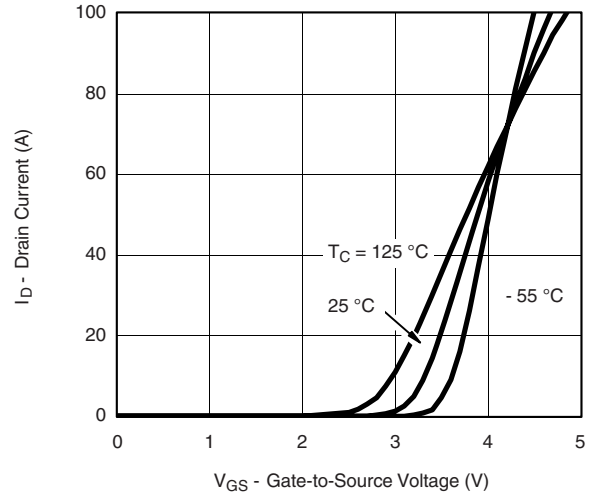
- a. Guaranteed by design, not subject to production testing.
- b. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- c. Independent of operating temperature.

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.

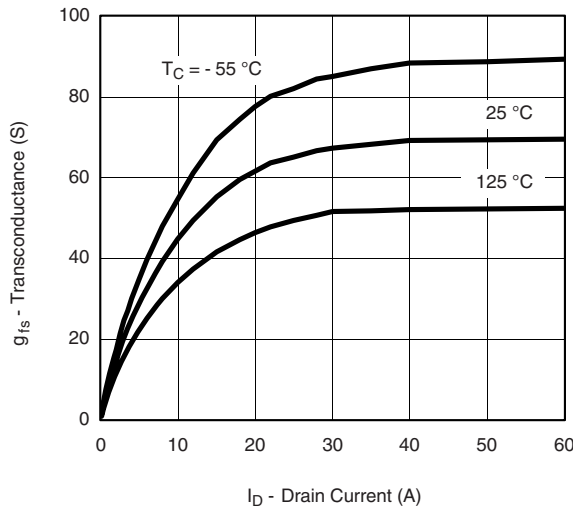
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



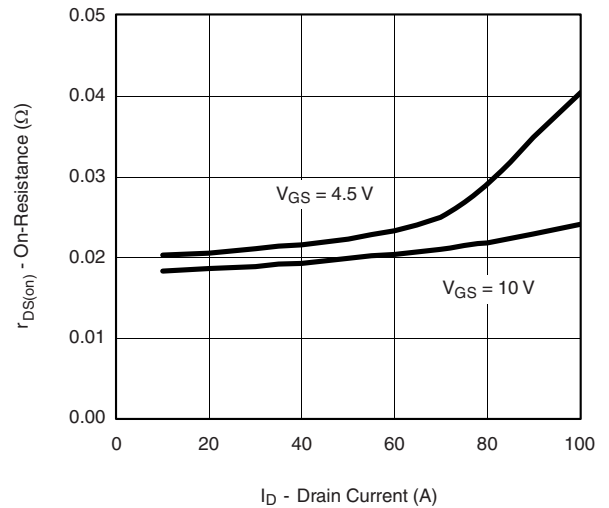
Output Characteristics



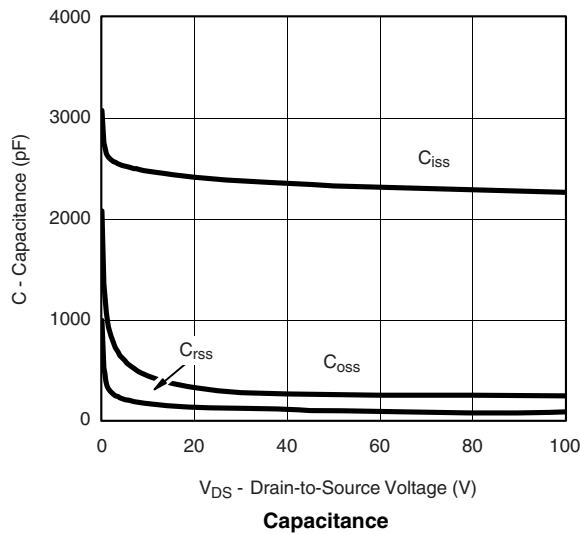
Transfer Characteristics



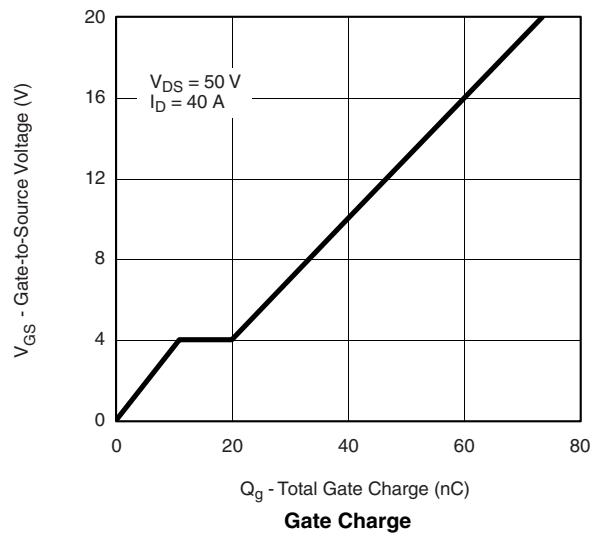
Transconductance



On-Resistance vs. Drain Current

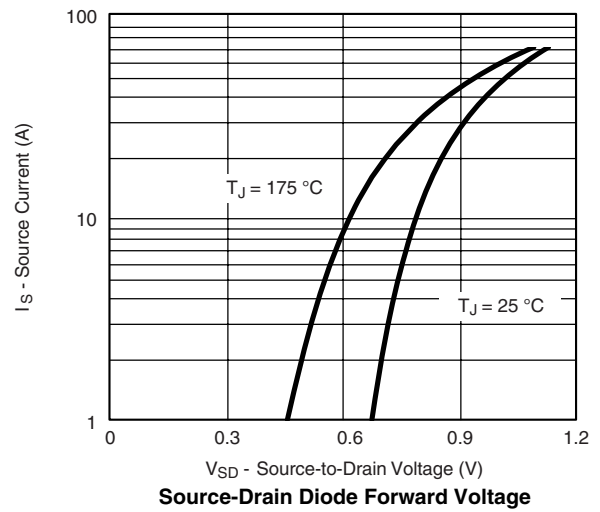
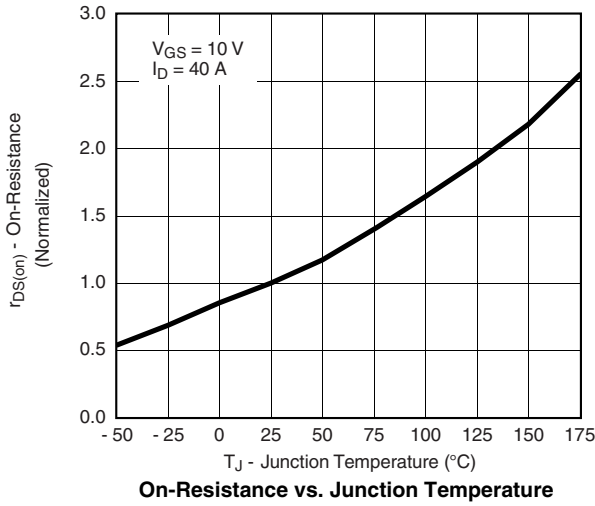


Capacitance

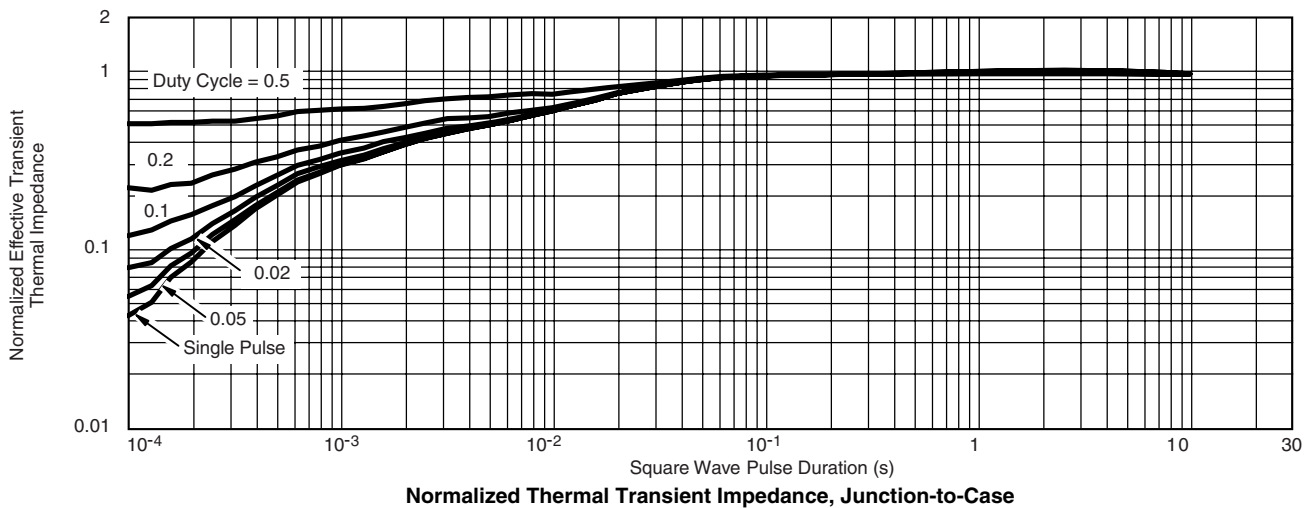
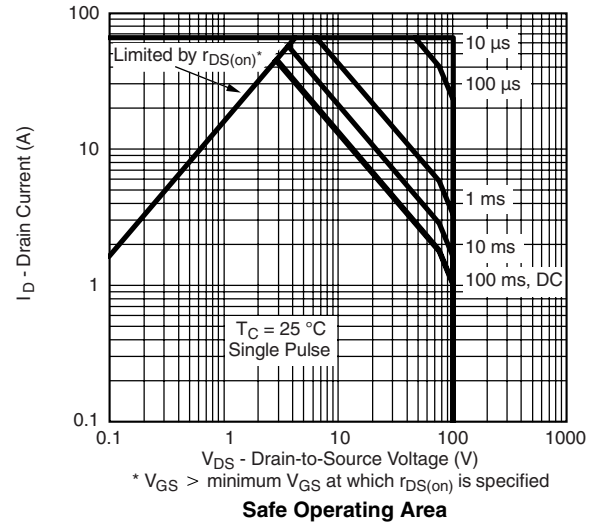
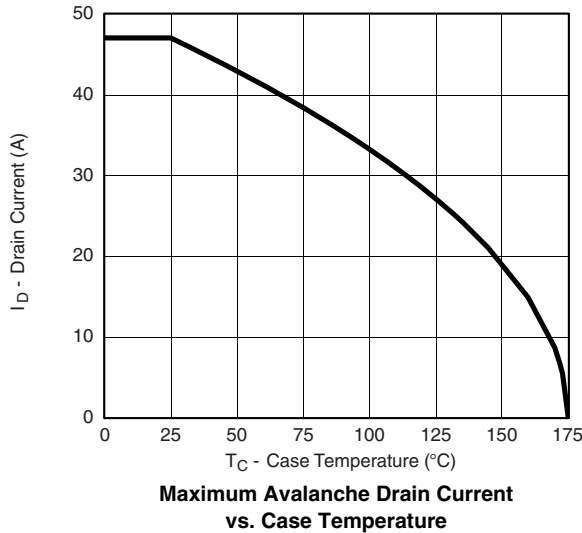


Gate Charge

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



THERMAL RATINGS



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