



N-Channel 100-V (D-S) 175°C MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
100	0.024 @ $V_{GS} = 10$ V	47
	0.027 @ $V_{GS} = 4.5$ V	44

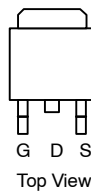
FEATURES

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

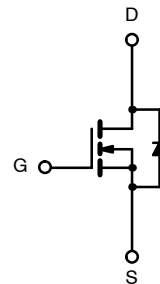
APPLICATIONS

- Automotive Such As:
 - HID Lamp
 - Ignition Systems
 - Injection Systems

TO-263



Ordering Information: SUM47N10-24L—E3



N-Channel MOSFET

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

Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V_{DS}	100	V	
Gate-Source Voltage	V_{GS}	± 20		
Continuous Drain Current ($T_J = 175^\circ\text{C}$) ^b	I_D	$T_C = 25^\circ\text{C}$	A	
		$T_C = 125^\circ\text{C}$		27
Pulsed Drain Current	I_{DM}	70	A	
Continuous Source Current (Diode Conduction)	I_S	47		
Single Pulse Avalanche Current	I_{AS}	40		
Single Pulse Avalanche Energy (Duty Cycle $\leq 1\%$)	E_{AS}	80	mJ	
Maximum Power Dissipation	P_D	$T_C = 25^\circ\text{C}$	136 ^b	W
		$T_A = 25^\circ\text{C}$	3.75 ^a	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 175	$^\circ\text{C}$	

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Maximum	Unit
Junction-to-Ambient	R_{thJA}	PCB Mount	$^\circ\text{C}/\text{W}$
		Free Air	
Junction-to-Case	R_{thJC}	1.1	

Notes

- Surface Mounted on 1" x1" FR4 Board.
- See SOA curve for voltage derating.



SPECIFICATIONS (T _J = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ ^a	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 250 μA	100			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1.0		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} = 100 V, V _{GS} = 0 V			1	μA
		V _{DS} = 100 V, V _{GS} = 0 V, T _J = 125 °C			50	
		V _{DS} = 100 V, V _{GS} = 0 V, T _J = 175 °C			250	
On-State Drain Current ^b	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V	70			A
Drain-Source On-State Resistance ^b	r _{DS(on)}	V _{GS} = 10 V, I _D = 40 A		0.019	0.024	Ω
		V _{GS} = 10 V, I _D = 40 A, T _J = 125 °C			0.048	
		V _{GS} = 10 V, I _D = 40 A, T _J = 175 °C			0.060	
		V _{GS} = 4.5 V, I _D = 20 A		0.021	0.027	
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 40 A		70		S
Dynamic^a						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, F = 1 MHz		2400		pF
Output Capacitance	C _{oss}			290		
Reverse Transfer Capacitance	C _{rss}			120		
Total Gate Charge ^c	Q _g	V _{DS} = 50 V, V _{GS} = 10 V, I _D = 40 A		40	60	nC
Gate-Source Charge ^c	Q _{gs}			11		
Gate-Drain Charge ^c	Q _{gd}			9		
Gate Resistance	R _g	f = 1 MHz	1	2.2	3.5	Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 50 V, R _L = 1.25 Ω I _D ≅ 47 A, V _{GEN} = 10 V, R _g = 2.5 Ω		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 Characteristic (T_C = 25 °C)						
Pulsed Current	I _{SM}				70	A
Diode Forward Voltage ^b	V _{SD}	I _F = 40 A, V _{GS} = 0 V		1.0	1.5	V
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 47 A, di/dt = 100 A/μs		75	120	ns

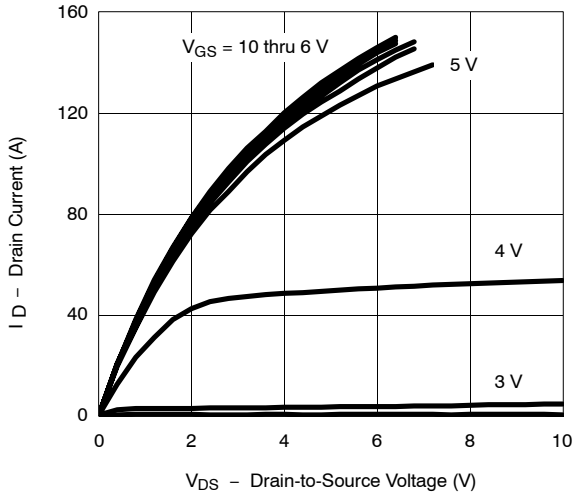
Notes

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

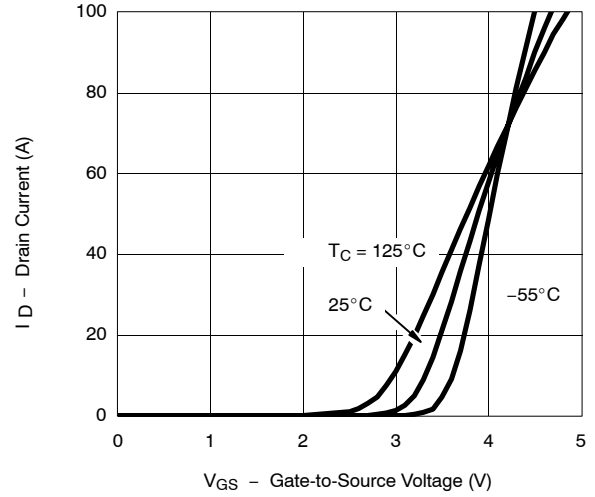


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

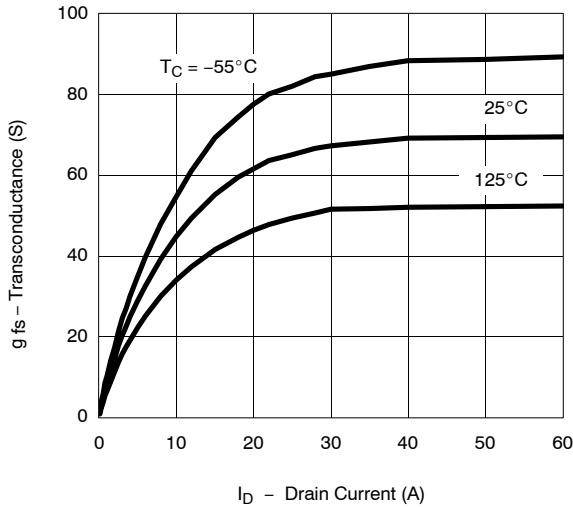
Output Characteristics



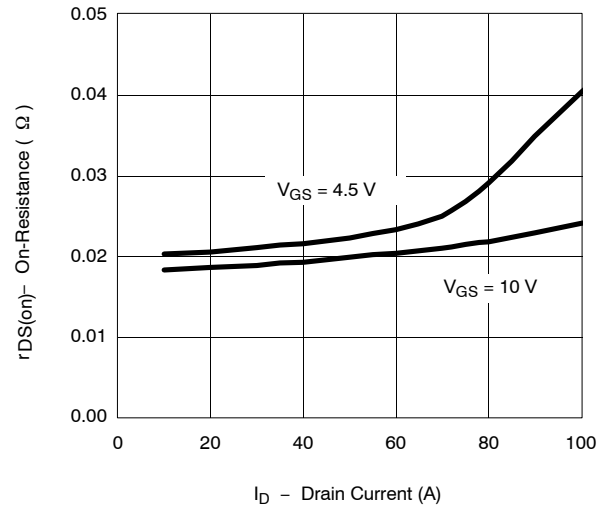
Transfer Characteristics



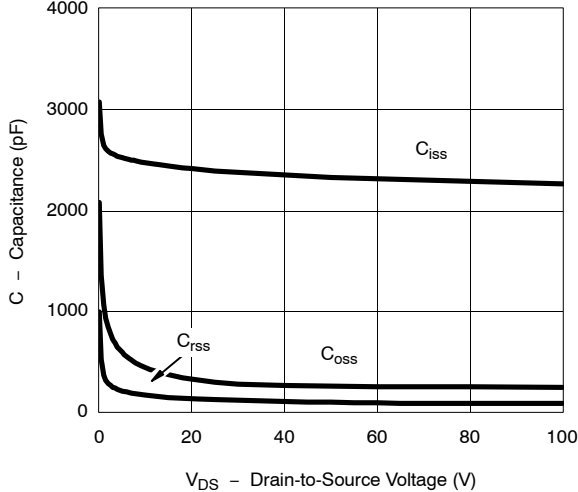
Transconductance



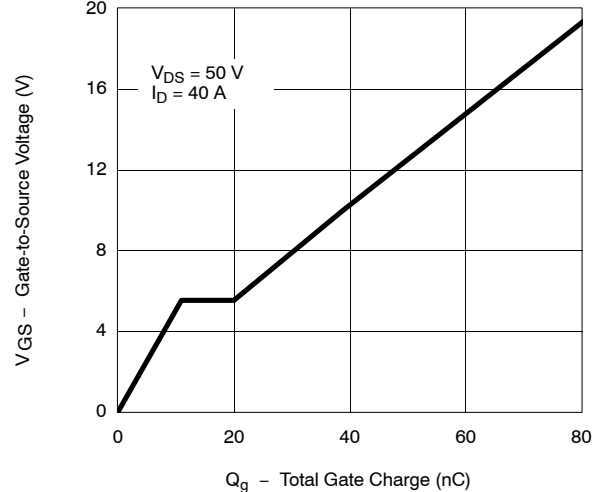
On-Resistance vs. Drain Current



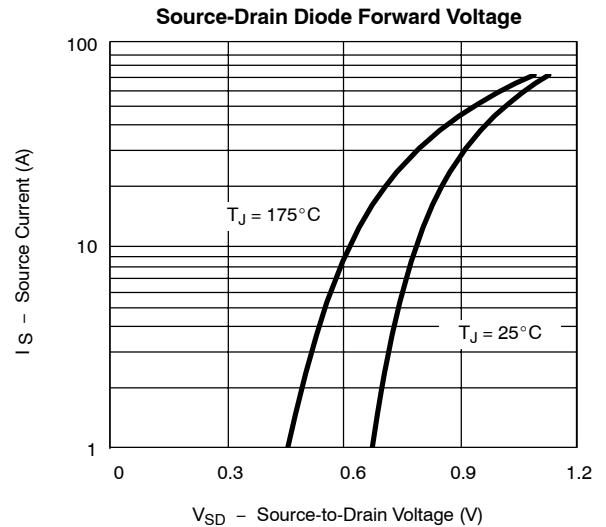
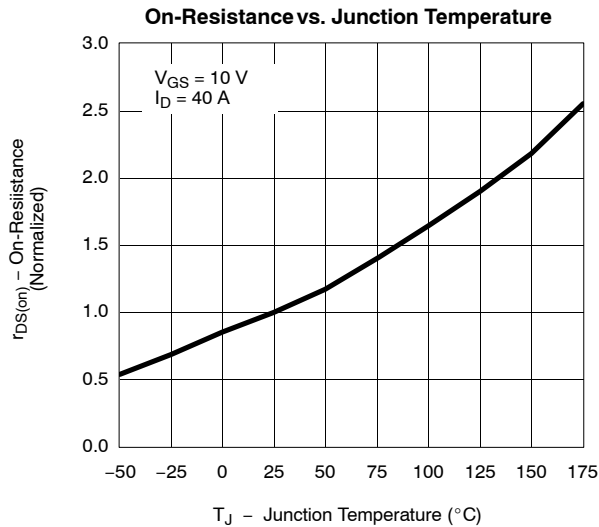
Capacitance



Gate Charge



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



THERMAL RATINGS

