



N-Channel 20-V (D-S) 175°C MOSFET

PRODUCT SUMMARY

V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A) ^a
20	0.0037 @ V _{GS} = 10 V	37
	0.0061 @ V _{GS} = 4.5 V	29

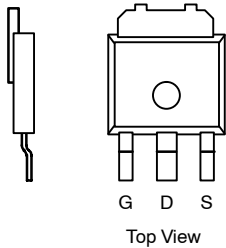
FEATURES

- TrenchFET® Power MOSFET
- 175°C Junction Temperature
- PWM Optimized for High Efficiency
- 100% R_g Tested

APPLICATIONS

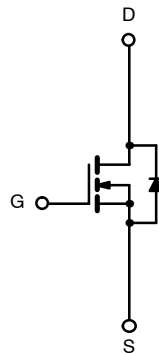
- Synchronous Buck Converter
 - Low Side
- Synchronous Rectifier
 - Secondary Rectifier

**TO-252
Reverse Lead DPAK**



Drain Connected to Tab

Ordering Information:
 SUR70N02-04P—E3
 SUR70N02-04P-T4—E3 (alternate tape orientation)



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	20	V
Gate-Source Voltage	V _{GS}	±20	
Continuous Drain Current ^a	I _D	T _A = 25°C	37 ^a
		T _C = 25°C	70 ^b
Pulsed Drain Current	I _{DM}	100	A
Continuous Source Current (Diode Conduction) ^a	I _S	37	
Single Pulse Avalanche Current	I _{AS}	30	mJ
Single Pulse Avalanche Energy			
Maximum Power Dissipation	P _D	T _A = 25°C	8.3 ^a
		T _C = 25°C	93
Operating Junction and Storage Temperature Range	T _J , T _{stg}	-55 to 175	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	R _{thJA}	t ≤ 10 sec	15	°C/W
		Steady State	40	
Maximum Junction-to-Case	R _{thJC}	1.3	1.6	

Notes

- Surface Mounted on FR4 Board, t ≤ 10 sec.
- Limited by package

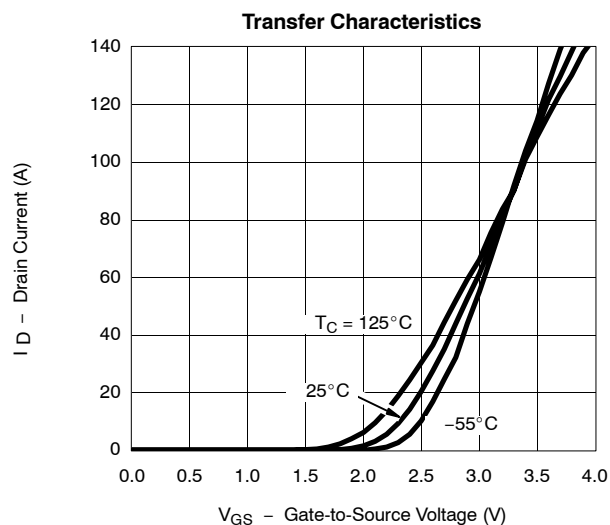
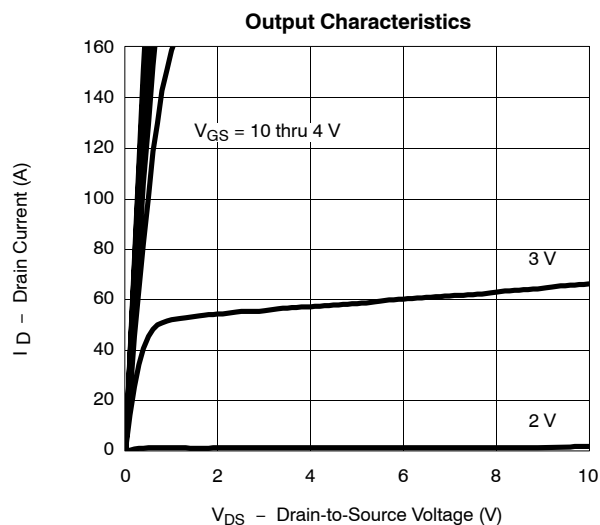
SPECIFICATIONS (T_J = 25 °C UNLESS OTHERWISE NOTED)

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	20			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	0.8		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} = 20 V, V _{GS} = 0 V			1	μA
		V _{DS} = 20 V, V _{GS} = 0 V, T _J = 125 °C			50	
On-State Drain Current ^b	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V	50			A
Drain-Source On-State Resistance ^b	r _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		0.0028	0.0037	Ω
		V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C			0.0052	
		V _{GS} = 4.5 V, I _D = 20 A		0.0047	0.0061	
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 20 A	15			S
Dynamic^a						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 10 V, f = 1 MHz		4500		pF
Output Capacitance	C _{oss}			1520		
Reverse Transfer Capacitance	C _{rss}			800		
Gate Resistance	R _g		0.5	1.1	1.8	Ω
Total Gate Charge ^c	Q _g	V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 50 A		34	153	nC
Gate-Source Charge ^c	Q _{gs}			11		
Gate-Drain Charge ^c	Q _{gd}			10		
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 10 V, R _L = 0.2 Ω I _D ≅ 50 A, V _{GEN} = 10 V, R _g = 2.5 Ω		15	25	ns
Rise Time ^c	t _r			11	20	
Turn-Off Delay Time ^c	t _{d(off)}			35	55	
Fall Time ^c	t _f			15	25	
Source-Drain Diode Ratings and Characteristic (T_C = 25 °C)						
Pulsed Current	I _{SM}				100	A
Diode Forward Voltage ^b	V _{SD}	I _F = 50 A, V _{GS} = 0 V		1.2	1.5	V
Source-Drain Reverse Recovery Time	t _{rr}	I _F = 50 A, di/dt = 100 A/μs		45	90	ns

Notes

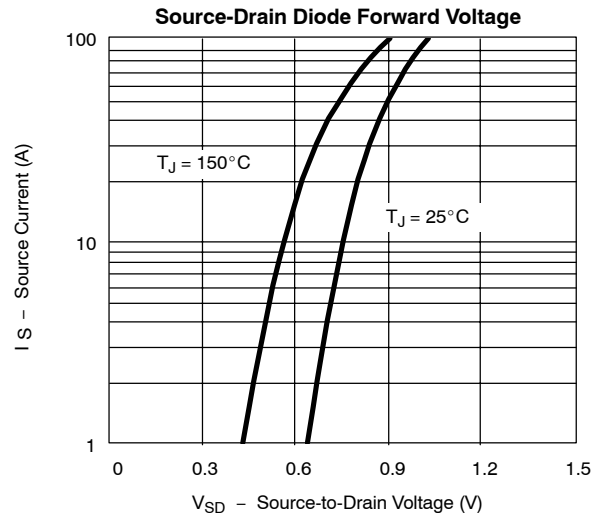
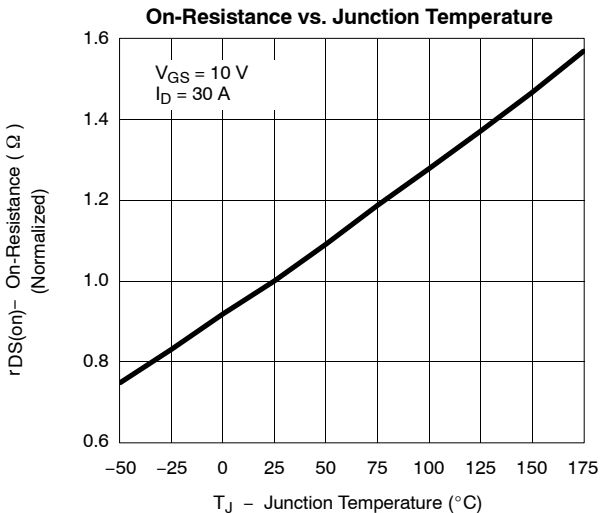
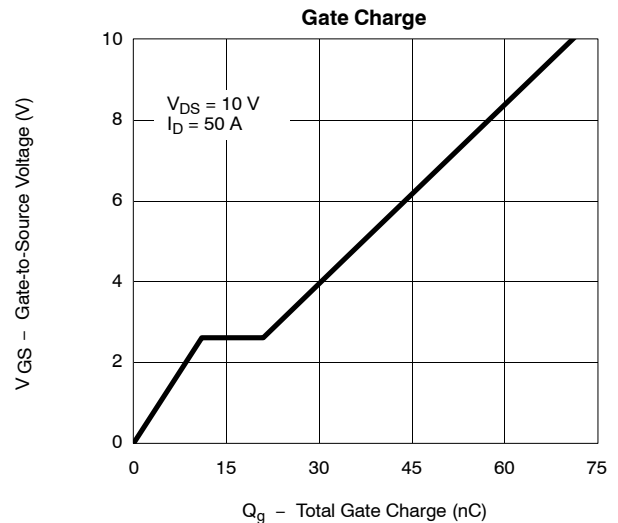
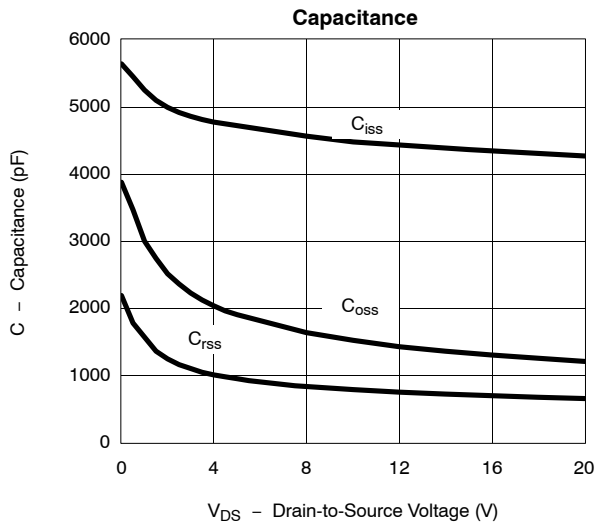
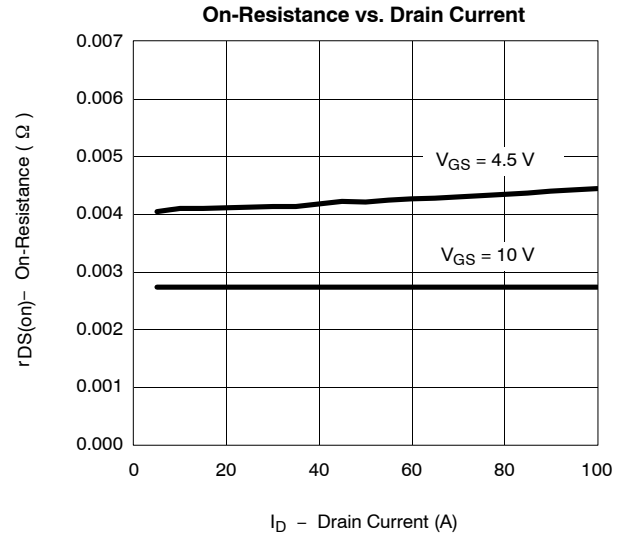
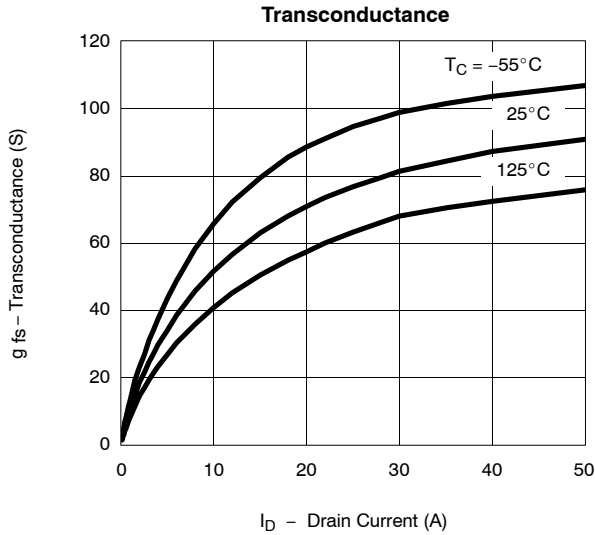
- a. Guaranteed by design, not subject to production testing.
- b. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- c. Independent of operating temperature.

TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



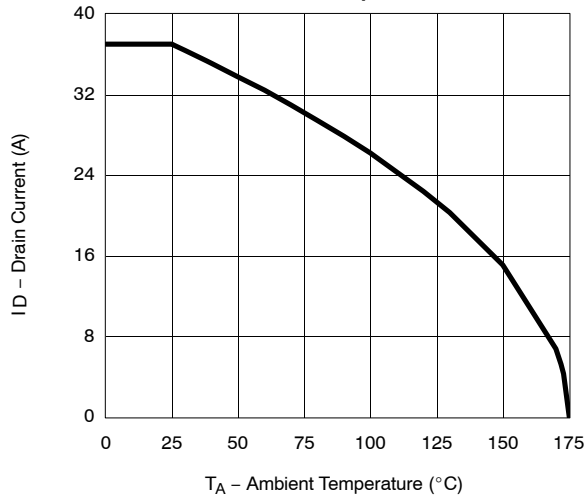


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

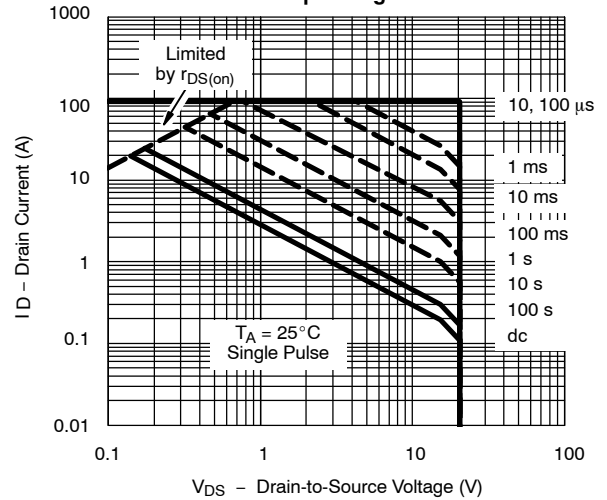


THERMAL RATINGS

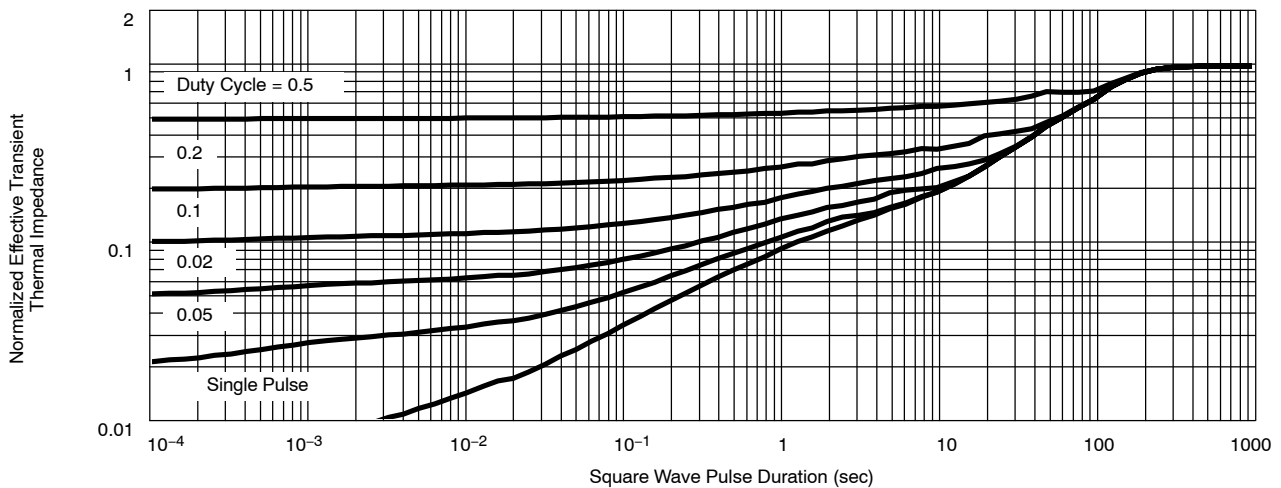
Maximum Drain Current vs. Ambient Temperature



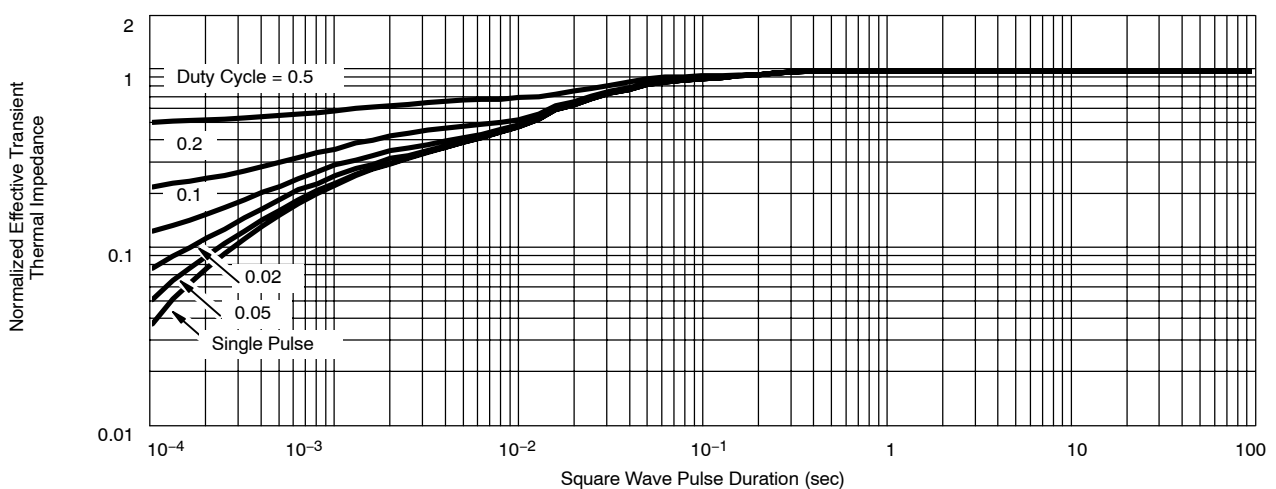
Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case





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