



N-Channel 30-V (D-S) 175°C MOSFET

PRODUCT SUMMARY

V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A) ^b
30	0.0065 @ V _{GS} = 10 V	84 ^b
	0.0095 @ V _{GS} = 4.5 V	59 ^b

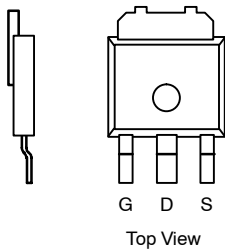
FEATURES

- TrenchFET® Power MOSFET
- 175°C Junction Temperature
- Optimized for Low-Side Synchronous Rectifier Operation
- 100% R_g Tested

APPLICATIONS

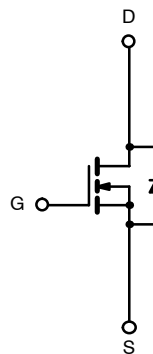
- DC/DC Converters
 - Desktop CPU Core
- Synchronous Rectifiers

**TO-252
Reverse Lead DPAK**



Drain Connected to Tab

Ordering Information:
 SUR50N03-06P—E3
 SUR50N03-06P-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}	30	V
Gate-Source Voltage		V _{GS}	±20	
Continuous Drain Current	T _A = 25°C	I _D	27	A
	T _C = 25°C		84 ^b	
	T _C = 100°C		59 ^b	
Pulsed Drain Current		I _{DM}	100	
Continuous Source Current (Diode Conduction) ^a		I _S	25	
Maximum Power Dissipation	T _C = 25°C	P _D	88	W
	T _A = 25°C		8.3 ^a	
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	t ≤ 10 sec	R _{thJA}	15	18	°C/W
	Steady State		40	50	
Maximum Junction-to-Case		R _{thJC}	1.4	1.7	

Notes

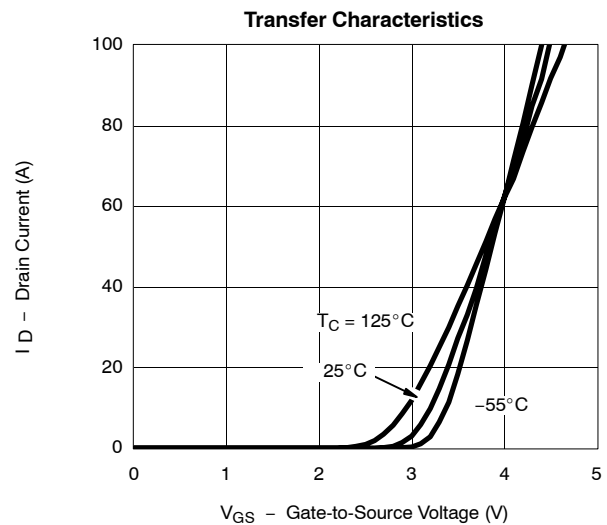
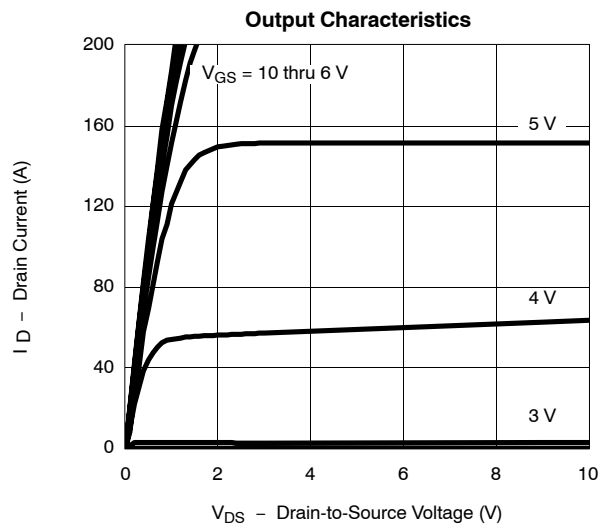
- Surface Mounted on FR4 Board, t ≤ 10 sec.
- Based on maximum allowable junction temperature, package limitation current is 50 A.

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	30			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} = 30 V, V _{GS} = 0 V			1	μA
		V _{DS} = 30 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		0.0053	0.0065	Ω
		V _{GS} = 10 V, I _D = 20 A, T _J = 125°C			0.0105	
		V _{GS} = 4.5 V, I _D = 20 A		0.0078	0.0095	
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 20 A	20			S
Dynamic^a						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		3100		pF
Output Capacitance	C _{oss}			565		
Reverse Transfer Capacitance	C _{rss}			255		
Gate Resistance	R _g		1	1.9	3.1	Ω
Total Gate Charge ^c	Q _g	V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 50 A		21	30	nC
Gate-Source Charge ^c	Q _{gs}			10		
Gate-Drain Charge ^c	Q _{gd}			7.5		
Turn-On Delay Time ^c	t _{d(on)}			12	20	
Rise Time ^c	t _r	V _{DD} = 15 V, R _L = 0.3 Ω I _D ≅ 50 A, V _{GEN} = 10 V, R _g = 2.5 Ω		12	20	ns
Turn-Off Delay Time ^c	t _{d(off)}			30	45	
Fall Time ^c	t _f			10	15	
Source-Drain Diode Ratings and Characteristic (T_C = 25°C)						
Pulsed Current	I _{SM}				100	A
Diode Forward Voltage ^b	V _{SD}	I _F = 100 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		35	70	ns

Notes

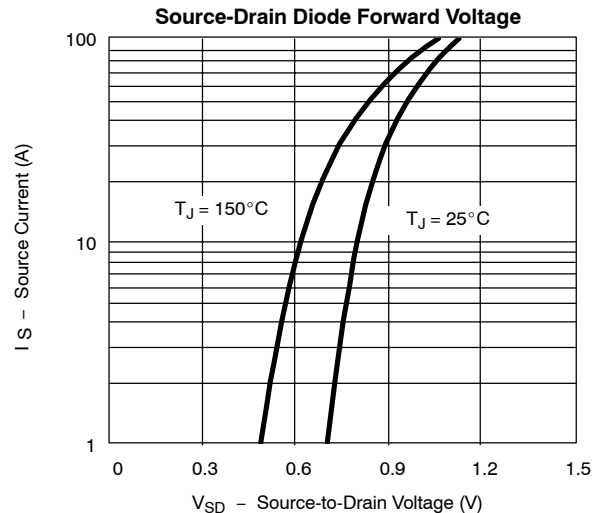
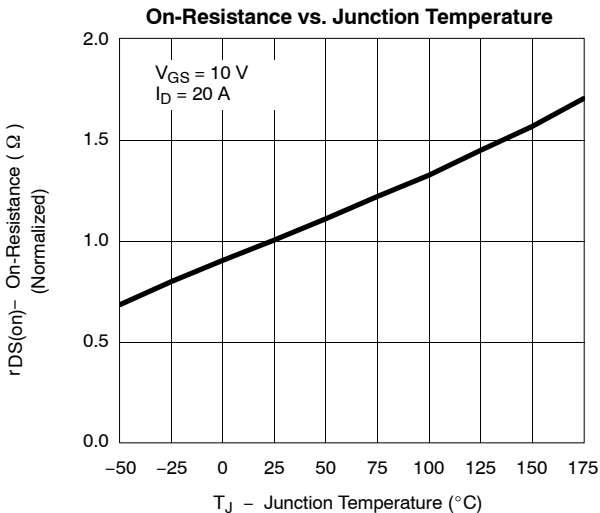
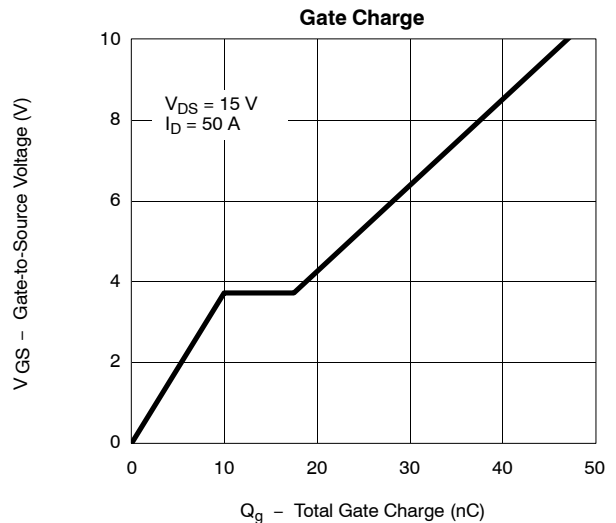
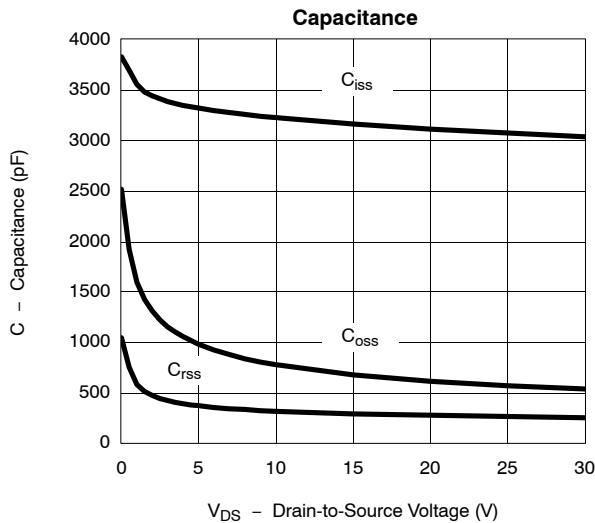
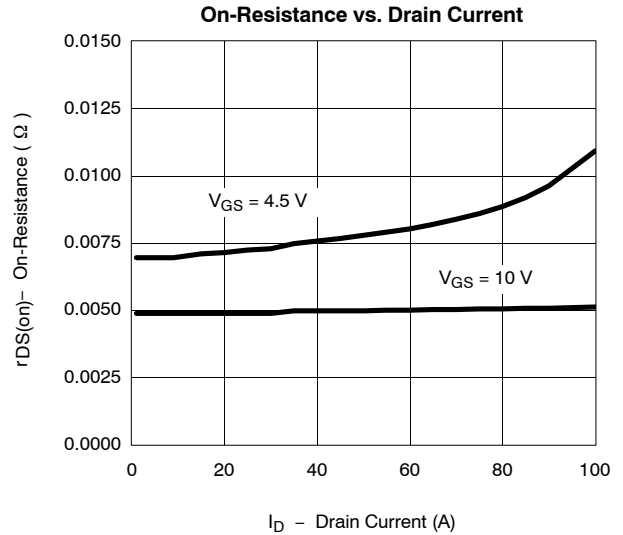
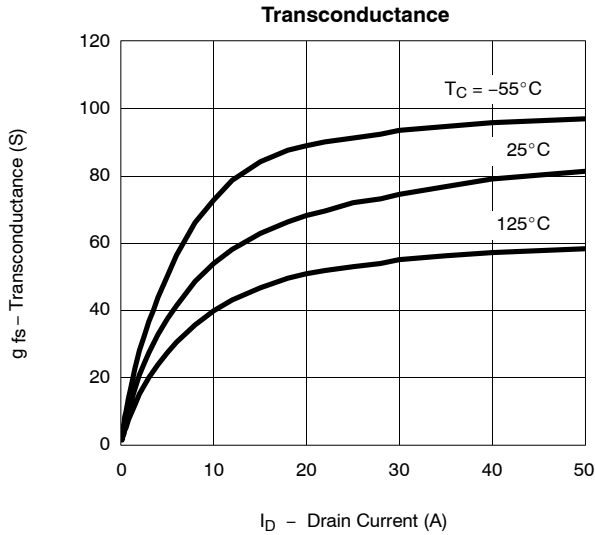
- a. Guaranteed by design, not subject to production testing.
- b. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- c. Independent of operating temperature.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



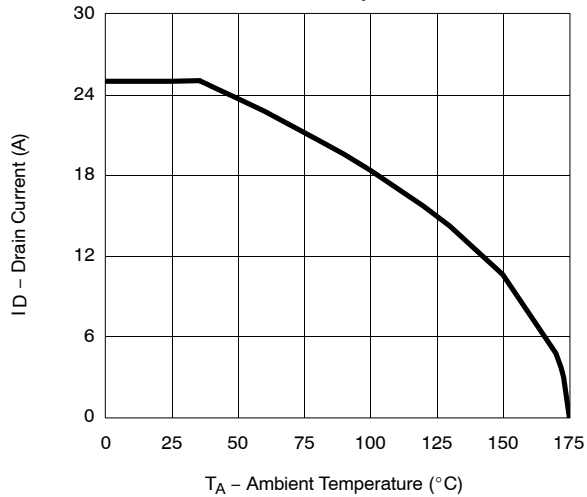


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

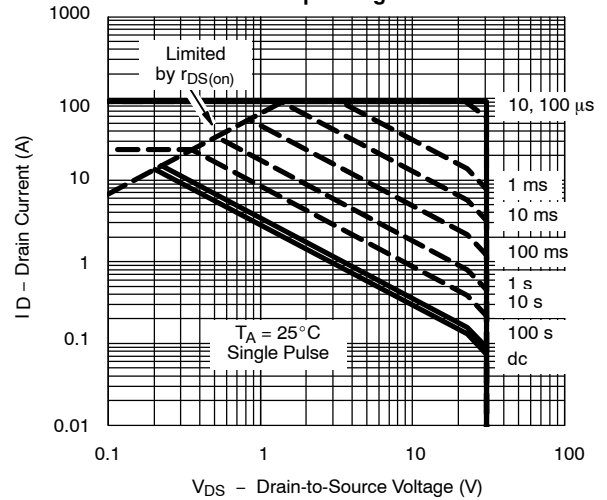


THERMAL RATINGS

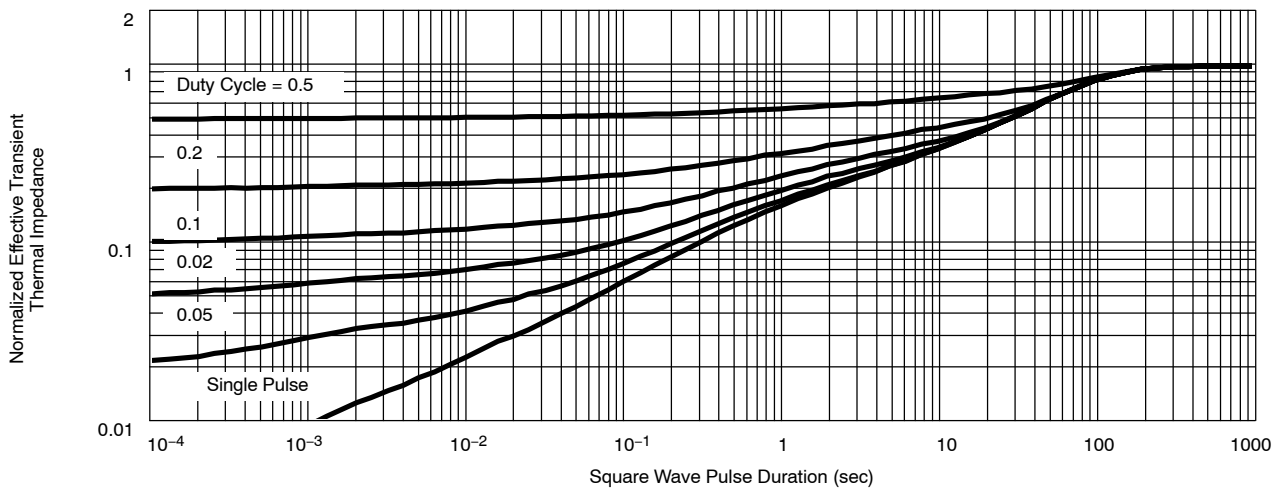
Maximum Drain Current vs. Ambient Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

