



N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY		
V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A) ^a
30	0.012 @ V _{GS} = 10 V	17.5
	0.0175 @ V _{GS} = 4.5 V	14.5

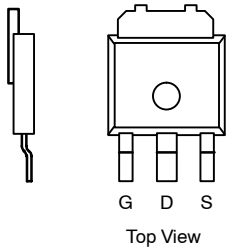
FEATURES

- TrenchFET® Power MOSFET
- PWM Optimized
- 100% R_g Tested

APPLICATIONS

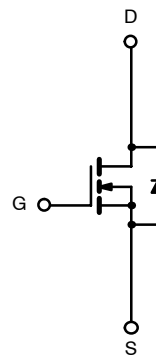
- DC/DC Converters
 - High-Side, Desktop CPU Core
- Synchronous Rectifiers

TO-252
Reverse Lead DPAK



Drain Connected to Tab

Ordering Information:
 SUR50N03-12P—E3
 SUR50N03-12P-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 ^a	T _C = 25 °C	I _D	47	A
	T _A = 25 °C		17.5	
	T _A = 100 °C		12.4	
Pulsed Drain Current		I _{DM}	40	
Continuous Source Current (Diode Conduction) ^a		I _S	5	
Single Pulse Avalanche Current		I _{AS}	30	mJ
Single Pulse Avalanche Energy		E _{AS}	45	
Maximum Power Dissipation	T _C = 25 °C	P _D	46.8	W
	T _A = 25 °C		6.5 ^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}	18	23	°C/W
	Steady State		40	50	
Maximum Junction-to-Case		R _{thJC}	2.6	3.2	

Notes

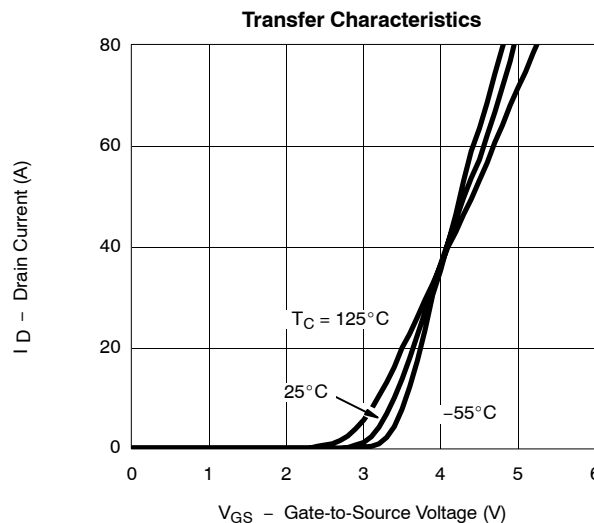
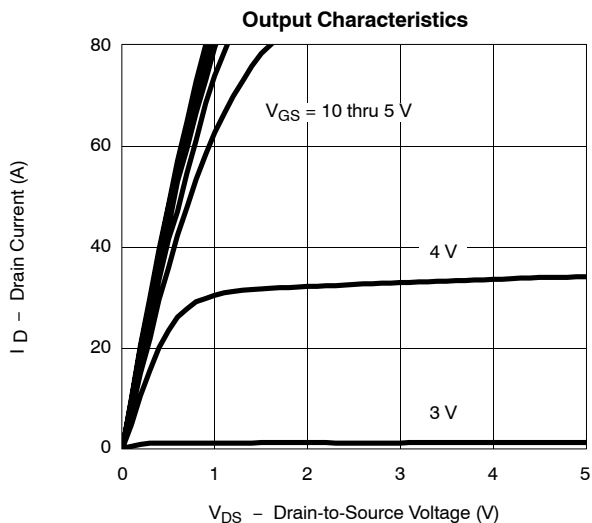
a. Surface Mounted on FR4 Board, t ≤ 10 sec.

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	40			A
Drain-Source On-State Resistance ^b	r _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		0.010	0.012	Ω
		V _{GS} = 10 V, I _D = 20 A, T _J = 125°C			0.017	
		V _{GS} = 4.5 V, I _D = 15 A		0.0138	0.0175	
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} = 25 V, f = 1 MHz		1600		pF
Output Capacitance	C _{oss}			285		
Reverse Transfer Capacitance	C _{rss}			140		
Total Gate Charge ^c	Q _g	V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 50 A		13	20	nC
Gate-Source Charge ^c	Q _{gs}			6.0		
Gate-Drain Charge ^c	Q _{gd}			5.0		
Gate Resistance	R _g			0.70	1.5	
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 15 V, R _L = 0.3 Ω I _D ≅ 50 A, V _{GEN} = 10 V, R _g = 2.5 Ω		9	15	ns
Rise Time ^c	t _r			15	25	
Turn-Off Delay Time ^c	t _{d(off)}			20	30	
Fall Time ^c	t _f			12	20	
Source-Drain Diode Ratings and Characteristic (T_C = 25°C)						
Pulsed Current	I _{SM}				100	A
Diode Forward Voltage ^b	V _{SD}	I _F = 40 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		25	70	ns

Notes

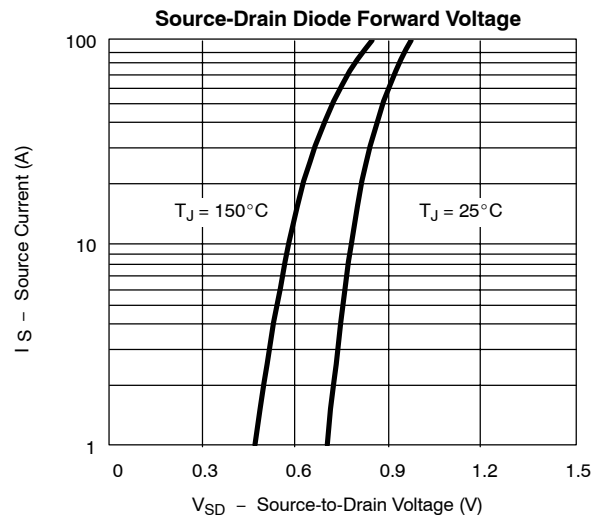
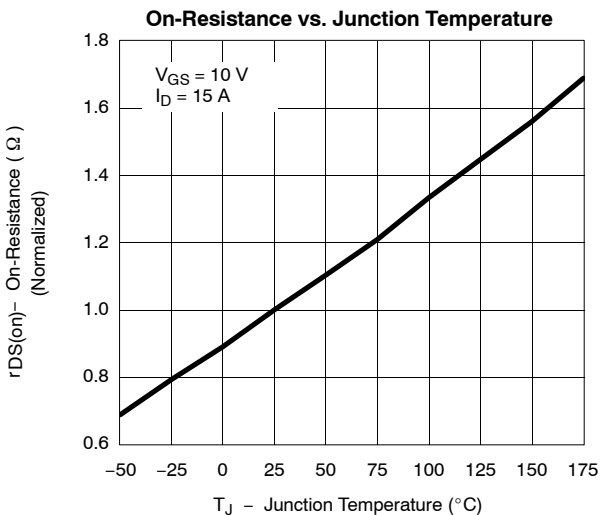
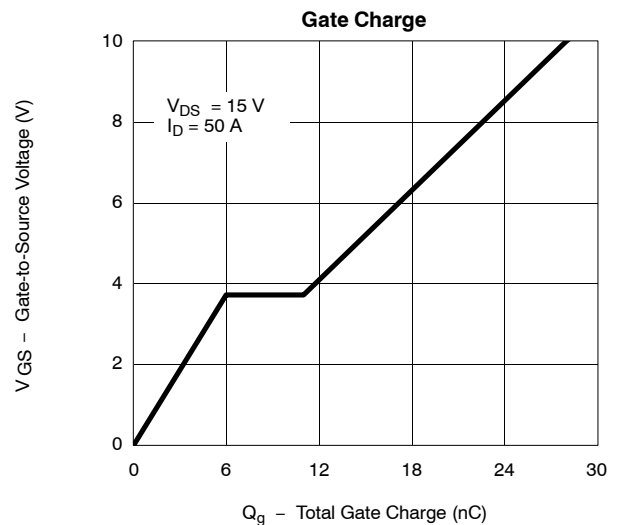
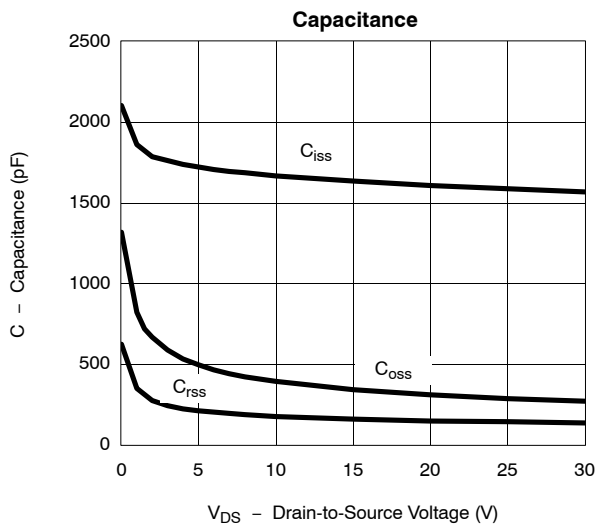
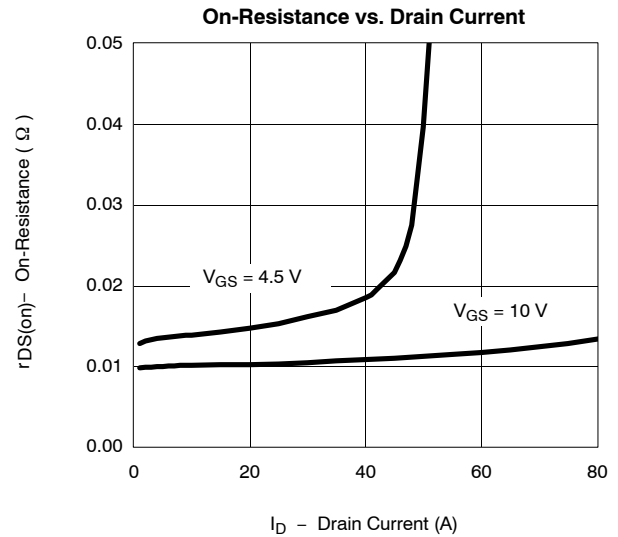
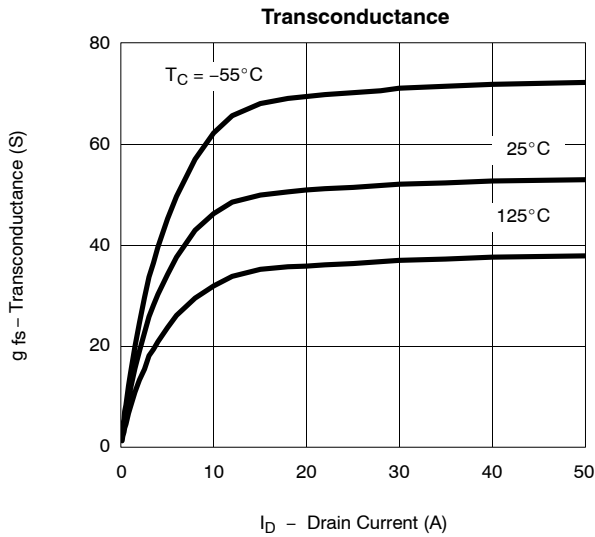
- a. Guaranteed by design, not subject to production testing.
- b. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- c. Independent of operating temperature.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



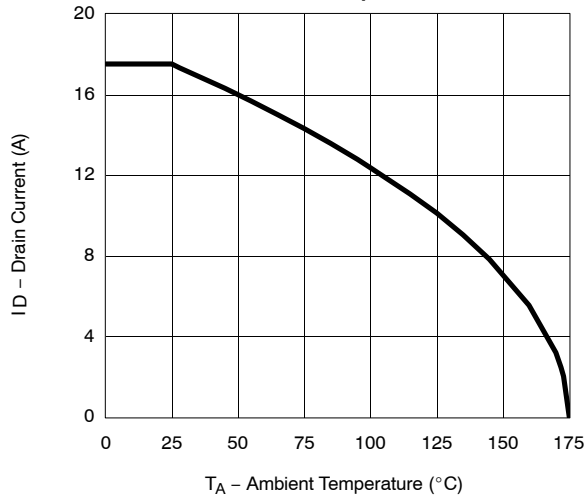


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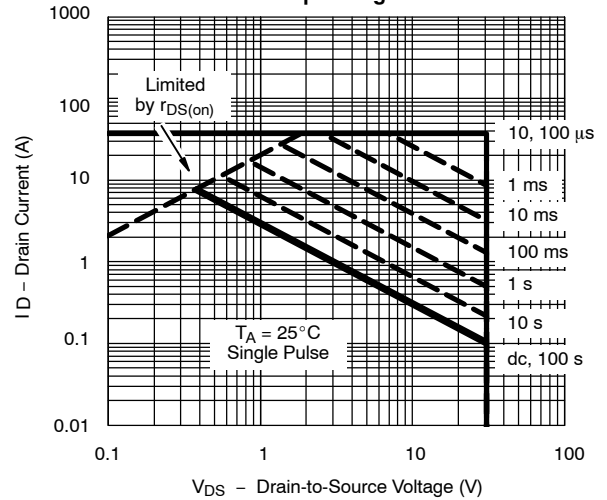


THERMAL RATINGS

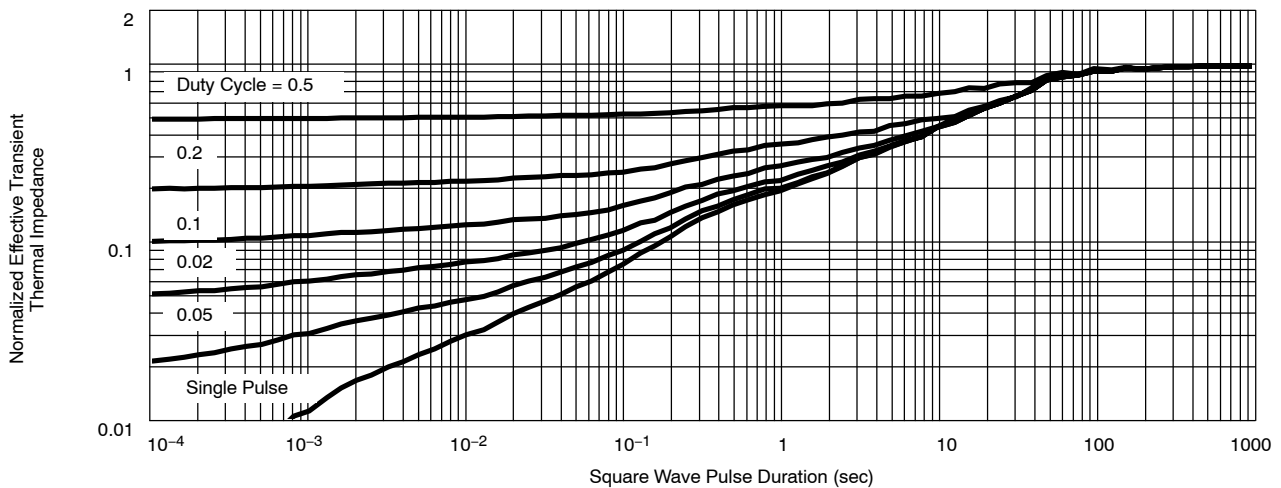
Maximum Drain Current vs. Ambient Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

