N-Channel 22-V (D-S) 175°C MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)[d]
24[C]	0.006 @ V_{GS} = 10 V	80
	0.0095 @ V_{GS} = 4.5 V	64

FEATURES

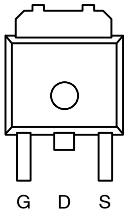
- TrenchFET® Power MOSFET
- 175°C Junction Temperature
- PWM Optimized for High Efficiency
- 100% R_g Tested
- Lead (Pb)-Free Version is RoHS Compliant

Pb-free
Available

APPLICATIONS

- Synchronous Buck DC/DC Conversion
  - Desktop
  - Server

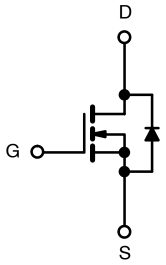
TO-252



Drain Connected to Tab

Top View

Ordering Information: SUD50N024-06P
SUD50N024-06P—E3 (Lead (Pb)-Free)



N-Channel MOSFET

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

Parameter		Symbol	Limit	Unit
Drain-Source Pulse Voltage		$V_{DS(pulse)}$	24[C]	V
Drain-Source Voltage		V_{DS}	22	
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current[a]	T_C = 25°C	I_D	80[d]	A
	T_C= 100°C		56[d]	
Pulsed Drain Current		I_{DM}	100	
Continuous Source Current (Diode Conduction)[a]		I_S	26	
Avalanche Current, Single Pulse	L = 0.1 mH	I_{AS}	45	
Avalanche Energy, Single Pulse		E_{AS}	101	mJ
Maximum Power Dissipation	T_A = 25°C	P_D	6.8[a]	W
	T_C = 25°C		65	
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	22	°C/W
	Steady State		40	50	
Maximum Junction-to-Case		R_{thJC}	1.9	2.3	

Notes
a. Surface Mounted on FR4 Board, t ≤ 10 sec.
b. Limited by package
c. Pulse condition: T_A = 105°C, 50 ns, 300 kHz operation
d. Calculation based on maximum allowable Junction Temperature. Package limitation current is 50 A.

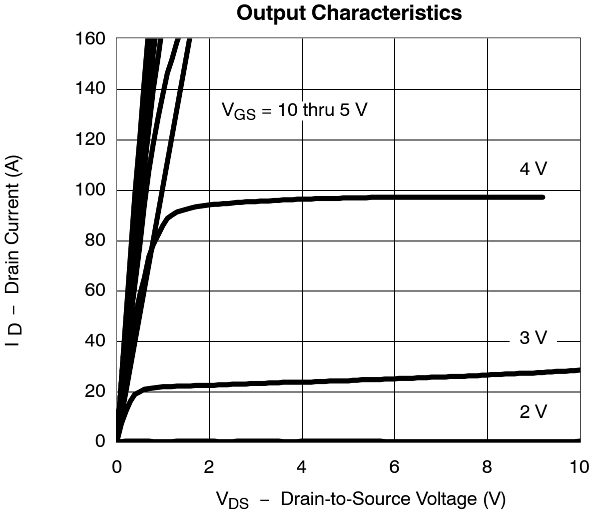
SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

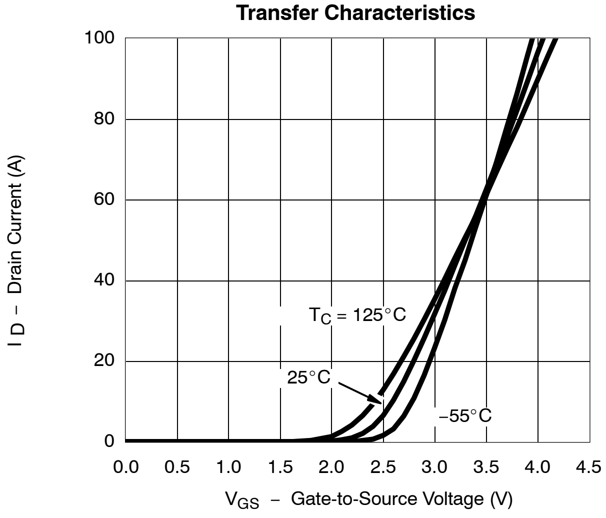
Parameter	Symbol	Test Condition	Min	Typ[a]	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 250 μA	22			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA	0.8		3.0	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage 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		0.0046	0.006	Ω
		V_{GS} = 10 V, I_D = 20 A, T_J = 125°C			0.0084	
		V_{GS} = 4.5 V, I_D = 20 A		0.0073	0.0095	
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		2550		pF
Output Capacitance	C_{oss}			900		
Reverse Transfer Capacitance	C_{rss}			415		
Gate Resistance	R_g		0.7	1.5	2.1	Ω
Total Gate Charge[c]	Q_g	V_{DS} = 10 V, V_{GS} = 4.5 V, I_D = 50 A		19	30	nC
Gate-Source Charge[c]	Q_{gs}			7.5		
Gate-Drain Charge[c]	Q_{gd}			6.0		
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		11	20	ns
Rise Time[c]	t_r			10	15	
Turn-Off Delay Time[c]	$t_{d(off)}$			24	35	
Fall Time[c]	t_f			9	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 = 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		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.

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.

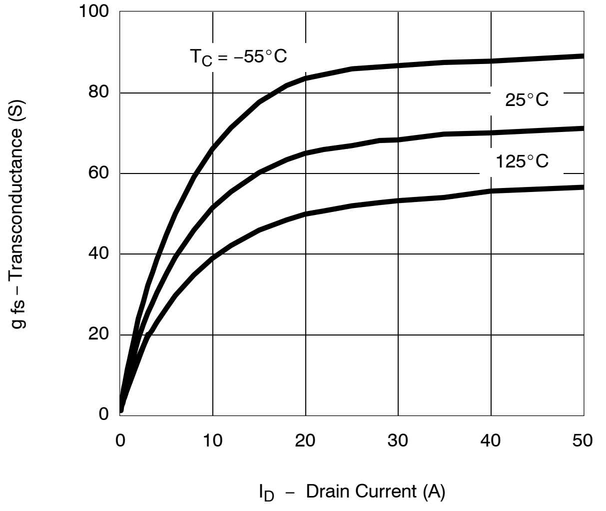
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)


Output Characteristics

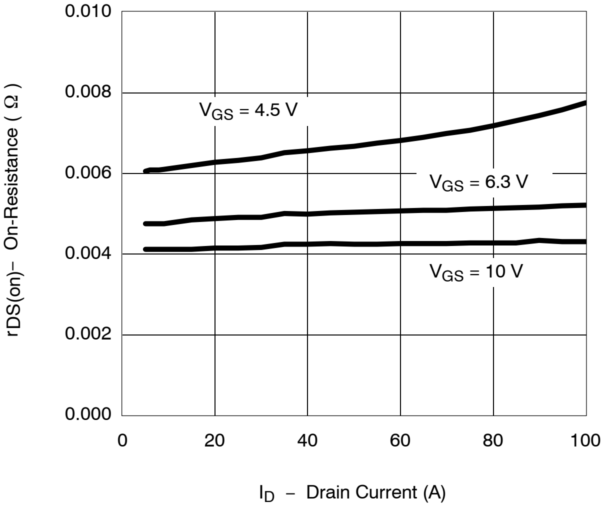

Transfer Characteristics

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

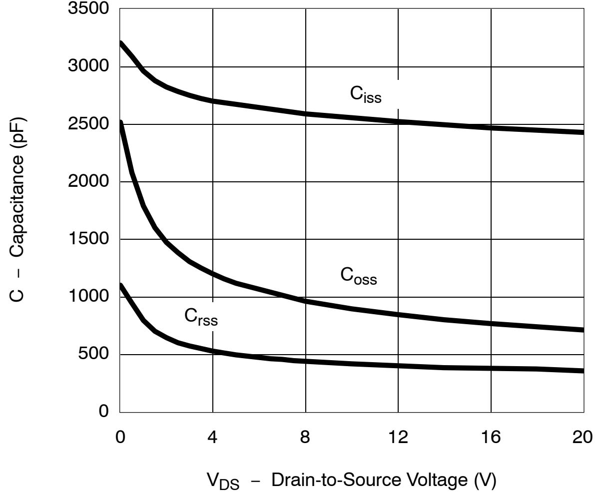
Transconductance



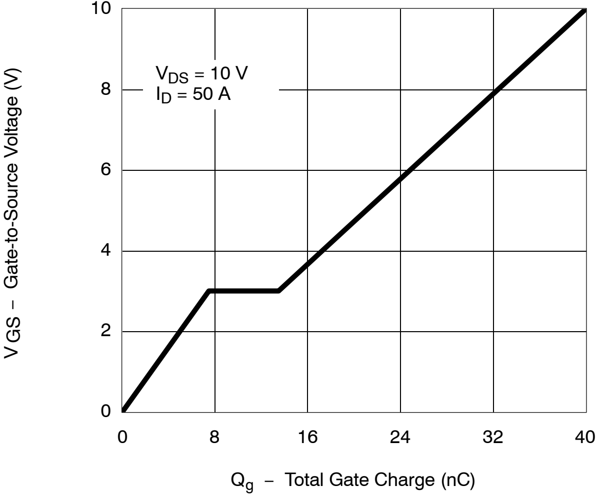
On-Resistance vs. Drain Current



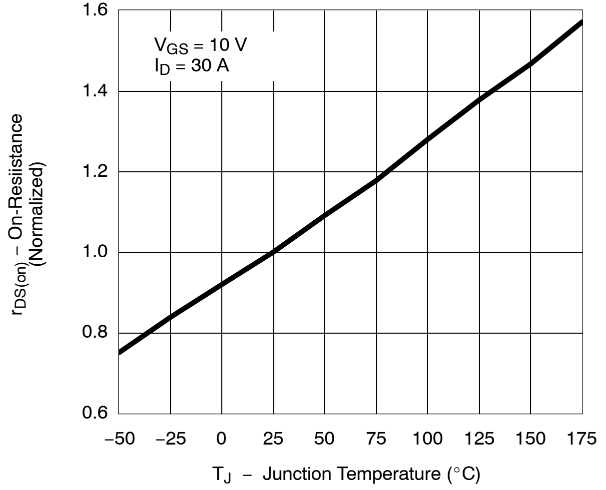
Capacitance



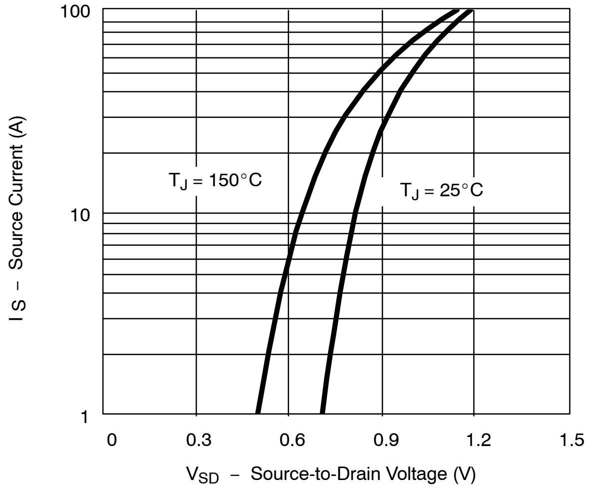
Gate Charge



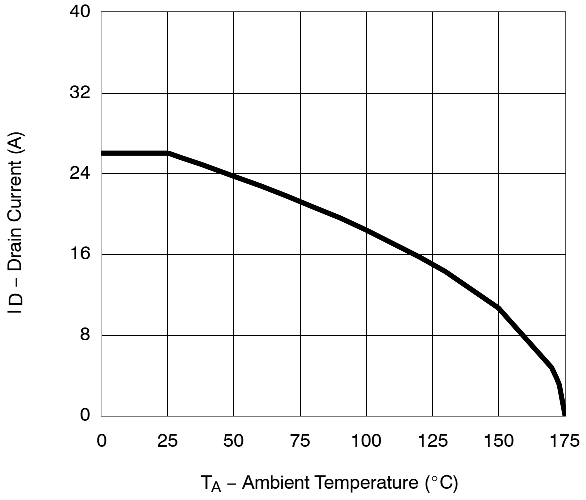
On-Resistance vs. Junction Temperature



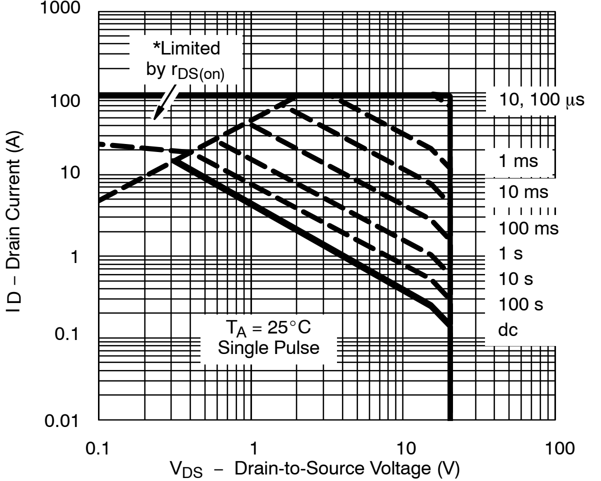
Source-Drain Diode Forward Voltage



THERMAL RATINGS

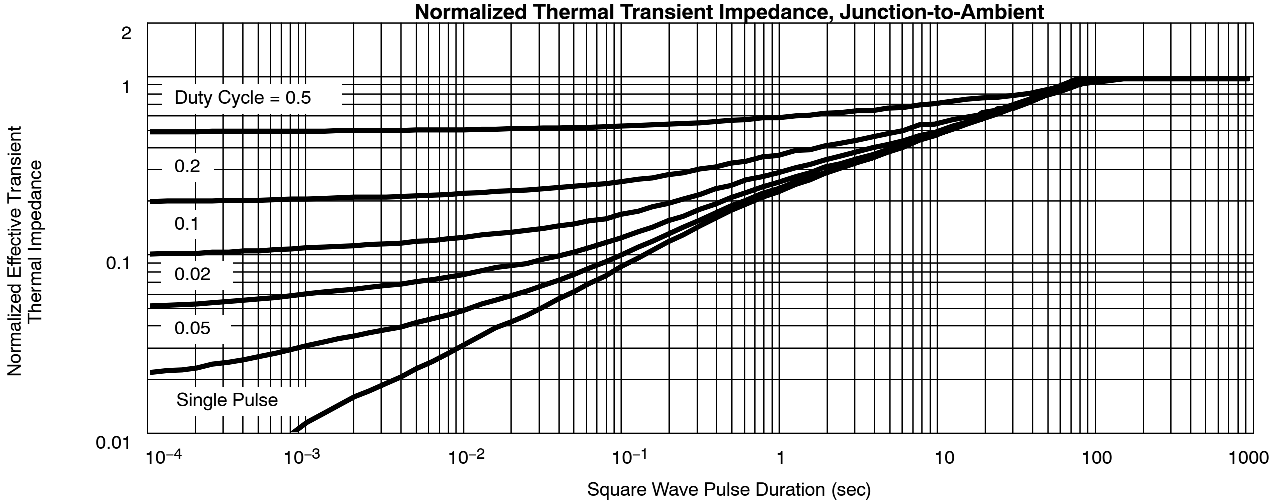


Maximum Drain Current vs. Ambiemt Temperature

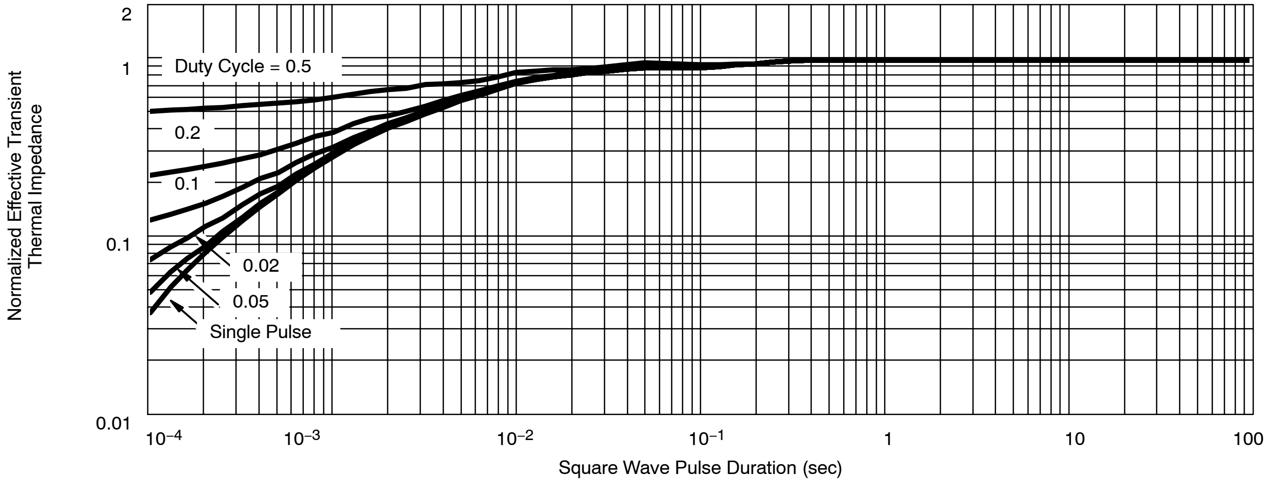


Safe Operating Area

*V_{GS} > minimum V_{GS} at which $r_{DS(on)}$ is specified



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.

Как с нами связаться

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