



## P-Channel 60-V (D-S) MOSFET

## PRODUCT SUMMARY

V <sub>DS</sub> (V)	r <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A) <sup>d</sup>	Q <sub>g</sub> (Typ)
- 60	0.060 at V <sub>GS</sub> = - 10 V	- 19	26
	0.077 at V <sub>GS</sub> = - 4.5 V	- 16.8	

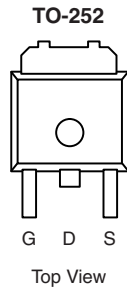
## FEATURES

- TrenchFET<sup>®</sup> Power MOSFET
- 100 % UIS Tested

RoHS  
COMPLIANT

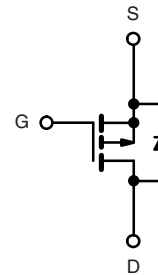
## APPLICATIONS

- High Side Switch for Full Bridge Converter
- DC/DC Converter for LCD Display



Drain Connected to Tab

Ordering Information: SUD19P06-60-E3 (Lead (Pb)-free)

ABSOLUTE MAXIMUM RATINGS T<sub>A</sub> = 25 °C, unless otherwise noted

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	- 60	V
Gate-Source Voltage	V <sub>GS</sub>	± 20	
Continuous Drain Current (T <sub>J</sub> = 150 °C)	I <sub>D</sub>	T <sub>C</sub> = 25 °C	- 18.3
		T <sub>C</sub> = 125 °C	- 8.19
Pulsed Drain Current	I <sub>DM</sub>	- 30	A
Avalanche Current, Single Pulse	I <sub>AS</sub>	- 22	
Repetitive Avalanche Energy, Single Pulse <sup>a</sup>	E <sub>AS</sub>	24.2	mJ
Power Dissipation	P <sub>D</sub>	T <sub>C</sub> = 25 °C	38.5 <sup>c</sup>
		T <sub>A</sub> = 25 °C	2.3 <sup>b, c</sup>
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150	°C

## THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>b</sup>	R <sub>thJA</sub>	t ≤ 10 s	17	21
		Steady State	45	55
Maximum Junction-to-Case	R <sub>thJC</sub>	2.7	3.25	°C/W

Notes:

- Duty cycle ≤ 1 %.
- When mounted on 1" square PCB (FR-4 material).
- See SOA curve for voltage derating.
- Based up on T<sub>C</sub> = 25 °C.

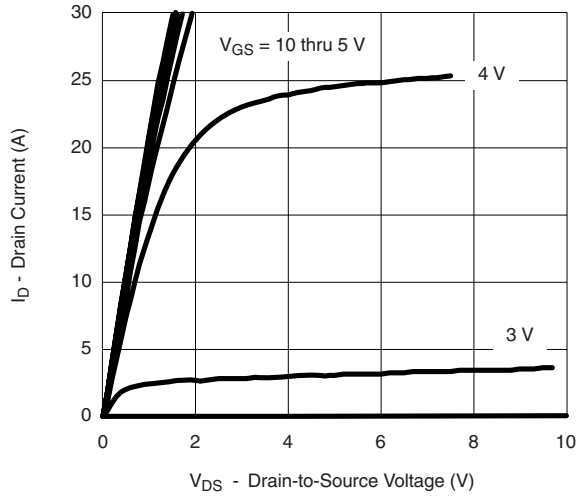
<b>SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-60			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-1		-3	V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}$			-1	$\mu\text{A}$
		$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			-50	
		$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}, T_J = 150\text{ }^\circ\text{C}$			-125	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} = -5\text{ V}, V_{GS} = -10\text{ V}$	-30			A
Drain-Source On-State Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -10\text{ A}$		0.048	0.060	$\Omega$
		$V_{GS} = -10\text{ V}, I_D = -10\text{ A}, T_J = 125\text{ }^\circ\text{C}$			0.102	
		$V_{GS} = -10\text{ V}, I_D = -10\text{ A}, T_J = 150\text{ }^\circ\text{C}$			0.120	
		$V_{GS} = -4.5\text{ V}, I_D = -5\text{ A}$		0.061	0.077	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -15\text{ V}, I_D = -10\text{ A}$		22		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = -25\text{ V}, f = 1\text{ MHz}$		1140	1710	$\text{pF}$
Output Capacitance	$C_{oss}$			130		
Reverse Transfer Capacitance	$C_{rss}$			90		
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{DS} = -30\text{ V}, V_{GS} = -10\text{ V}, I_D = -10\text{ A}$		26	40	$\text{nC}$
Gate-Source Charge <sup>c</sup>	$Q_{gs}$			4.5		
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$			7.0		
Gate Resistance	$R_g$	$f = 1\text{ MHz}$		7.0		$\Omega$
Turn-On Delay Time <sup>c</sup>	$t_{d(on)}$	$V_{DD} = -30\text{ V}, R_L = 3\text{ }\Omega$ $I_D \cong -19\text{ A}, V_{GEN} = -10\text{ V}, R_g = 2.5\text{ }\Omega$		8	15	ns
Rise Time <sup>c</sup>	$t_r$			9	15	
Turn-Off Delay Time <sup>c</sup>	$t_{d(off)}$			65	100	
Fall Time <sup>c</sup>	$t_f$			30	45	
<b>Drain-Source Body Diode and Characteristics (<math>T_C = 25\text{ }^\circ\text{C}</math>)<sup>b</sup></b>						
Continuous Current	$I_S$				-30	A
Pulsed Current	$I_{SM}$				-30	
Forward Voltage <sup>a</sup>	$V_{SD}$	$I_F = -19\text{ A}, V_{GS} = 0\text{ V}$		-1.0	-1.5	V
Reverse Recovery Time	$t_{rr}$	$I_F = -19\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		41	61	ns

## Notes:

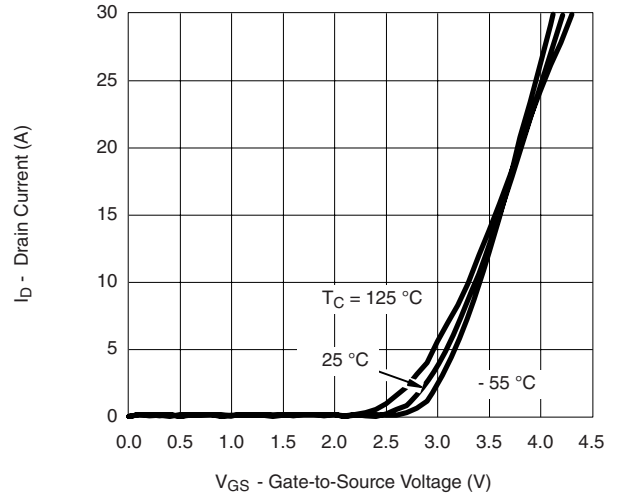
- Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

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.

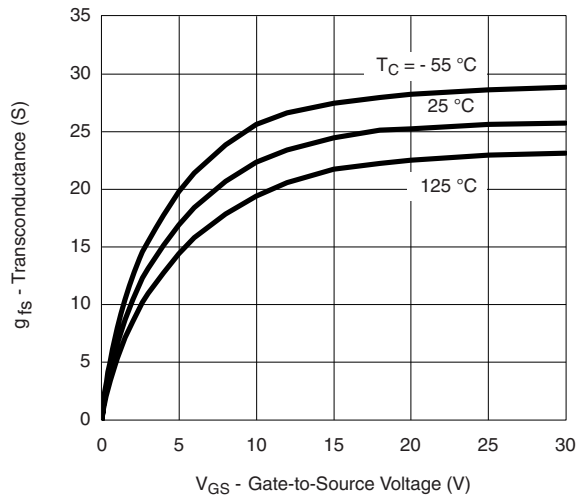
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



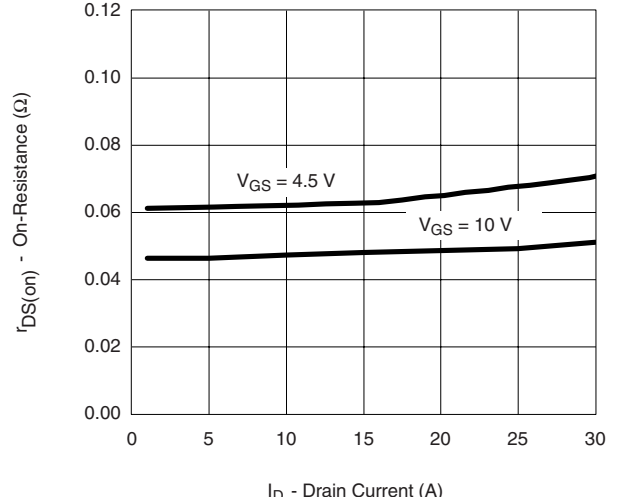
**Output Characteristics**



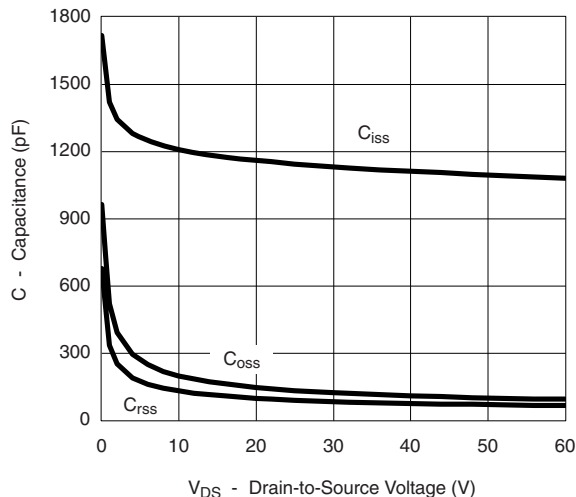
**Transfer Characteristics**



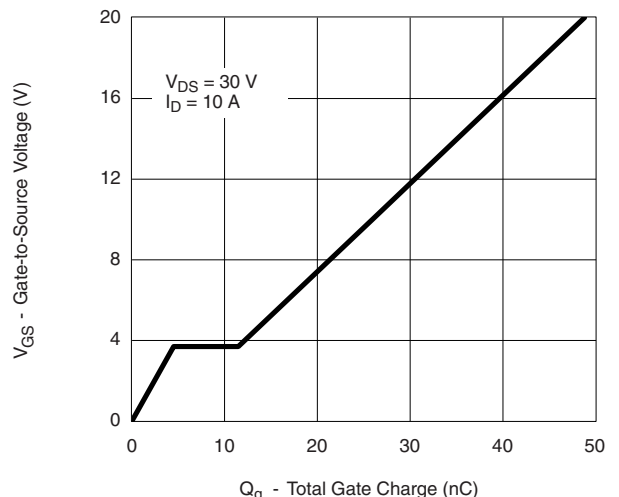
**Transconductance**



**On-Resistance vs. Drain Current**



**Capacitance**



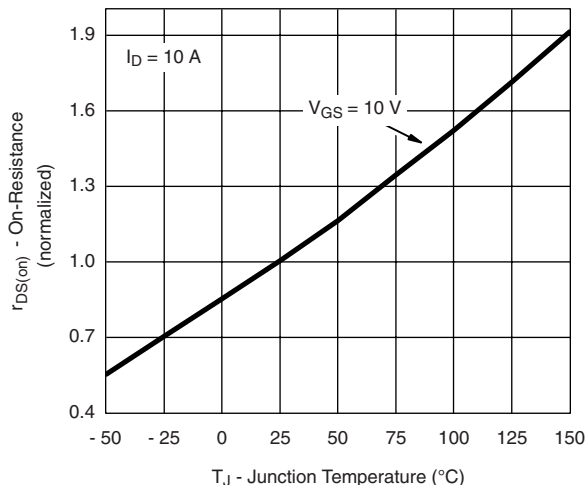
**Gate Charge**

# SUD19P06-60

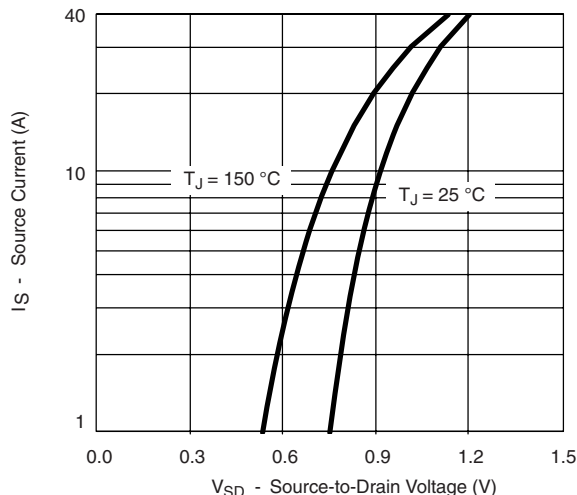
Vishay Siliconix



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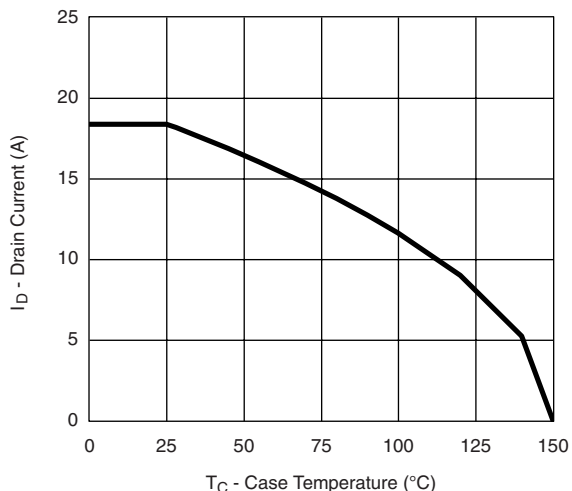


On-Resistance vs. Junction Temperature

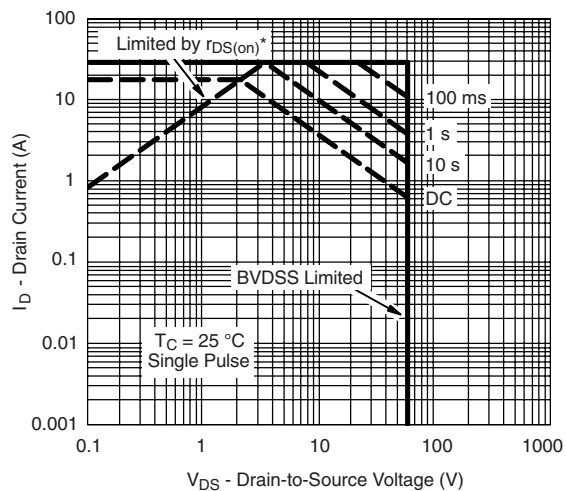


Source-Drain Diode Forward Voltage

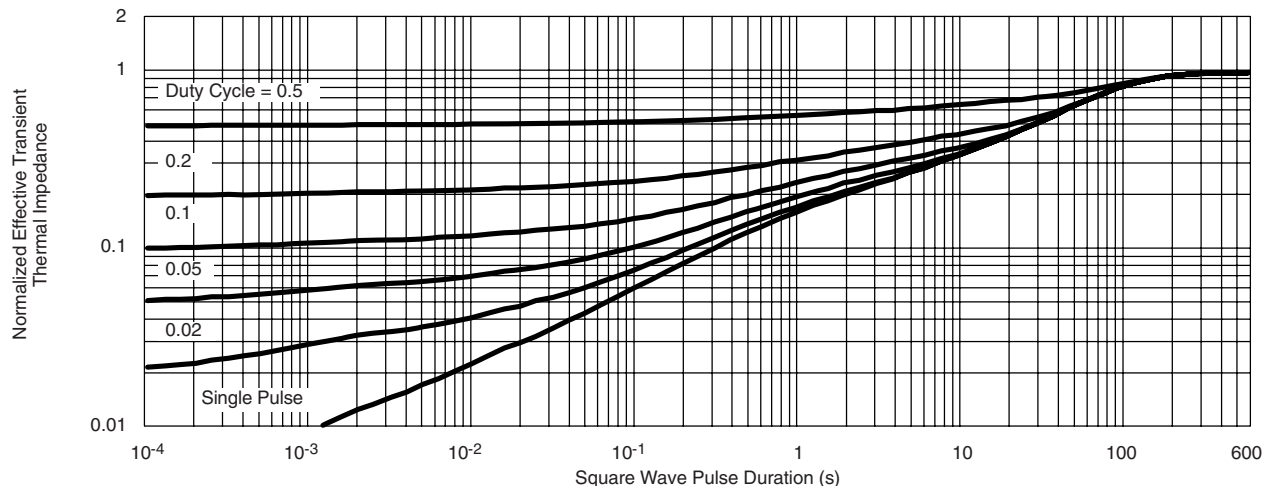
## THERMAL RATINGS



Maximum Drain Current vs. Case Temperature

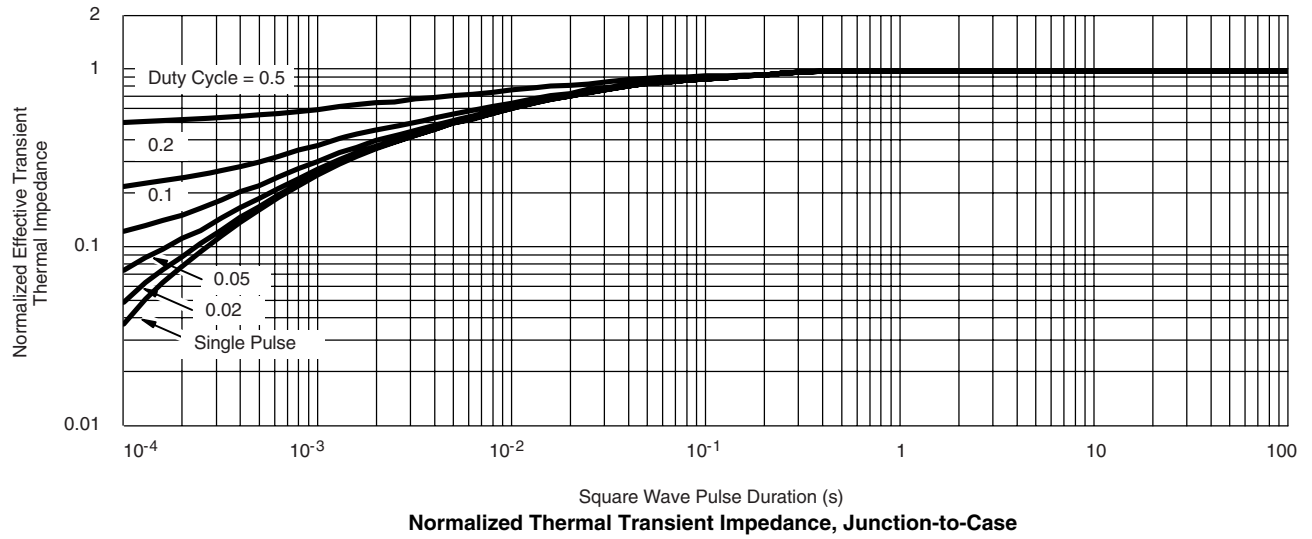


Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient

**THERMAL RATINGS**



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