P-Channel 60-V (D-S) 175 °C MOSFET

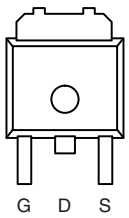
PRODUCT SUMMARY			
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ)
- 60	0.060 at V_{GS} = - 10 V	- 19	26
	0.077 at V_{GS} = - 4.5 V	- 16.8	

FEATURES

- TrenchFET® Power MOSFET
- 175 °C Junction Temperature

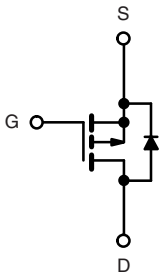
RoHS COMPLIANT

TO-252



Top View

Drain Connected to Tab



P-Channel MOSFET

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

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted				
Parameter		**Symbol**	**Limit**	**Unit**
Drain-Source Voltage		V_{DS}	- 60	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 175 °C)	T_C = 25 °C	I_D	- 19	A
	T_C = 125 °C		- 11	
Pulsed Drain Current		I_{DM}	- 30	
Avalanche Current, Single Pulse	L = 0.1 mH	I_{AS}	- 22	
Repetitive Avalanche Energy, Single Pulse[a]		E_{AS}	24.2	mJ
Power Dissipation	T_C = 25 °C	P_D	46[c]	W
	T_A = 25 °C		2.7[b, c]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS					
Parameter		**Symbol**	**Typical**	**Maximum**	**Unit**
Junction-to-Ambient[b]	t ≤ 10 s	R_{thJA}	17	21	°C/W
	Steady State		45	55	
Junction-to-Case		R_{thJC}	2.7	3.25	

Notes:

a. Duty cycle ≤ 1 %.

b. When monuted on 1" square PCB (FR-4 material).

c. See SOA curve for voltage derating.

SPECIFICATIONS T_J = 25 °C, unless otherwise noted						
Parameter	**Symbol**	**Test Conditions**	**Min**	**Typ**	**Max**	**Unit**
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = - 250 µA	- 60			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = - 250 µA	- 1		- 3	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = - 60 V, V_{GS} = 0 V			- 1	µA
		V_{DS} = - 60 V, V_{GS} = 0 V, T_J = 125 °C			- 50	
		V_{DS} = - 60 V, V_{GS} = 0 V, T_J = 175 ° C			- 150	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} = - 5 V, V_{GS} = - 10 V	- 30			A
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = - 10 V, I_D = - 10 A		0.048	0.060	Ω
		V_{GS} = - 10 V, I_D = - 16.8 A, T_J = 125 °C			0.102	
		V_{GS} = - 10 V, I_D = - 16.8 A, T_J = 175 °C			0.129	
		V_{GS} = - 4.5 V, I_D = - 5 A		0.061	0.077	
Forward Transconductance[a]	g_{fs}	V_{DS} = - 15 V, I_D = - 10 A		22		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = - 25 V, f = 1 MHz		1140	1710	pF
Output Capacitance	C_{oss}			130		
Reverse Transfer Capacitance	C_{rss}			90		
Total Gate Charge	Q_g	V_{DS} = - 30 V, V_{GS} = - 10 V, I_D = - 10 A		26	40	nC
Gate-Source Charge	Q_{gs}			4.5		
Gate-Drain Charge	Q_{gd}			7.0		
Gate Resistance	R_g	f = 1 MHz		7.0		Ω
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = - 30 V, R_L = 3 Ω $I_D \cong$ - 19 A, V_{GEN} = - 10 V, R_g = 2.5 Ω		8	15	ns
Rise Time[c]	t_r			9	15	
Turn-Off Delay Time[c]	$t_{d(off)}$			65	100	
Fall Time[c]	t_f			30	45	
Drain-Source Body Diode Characteristics (T_C = 25 °C)[b]						
Continuous Current	I_S				- 30	A
Pulsed Current	I_{SM}				- 30	
Forward Voltage[a]	V_{SD}	I_F = - 19 A, V_{GS} = 0 V		- 1.0	- 1.5	V
Reverse Recovery Time	t_{rr}	I_F = - 19 A, di/dt = 100 A/µs		41	61	ns

Notes:

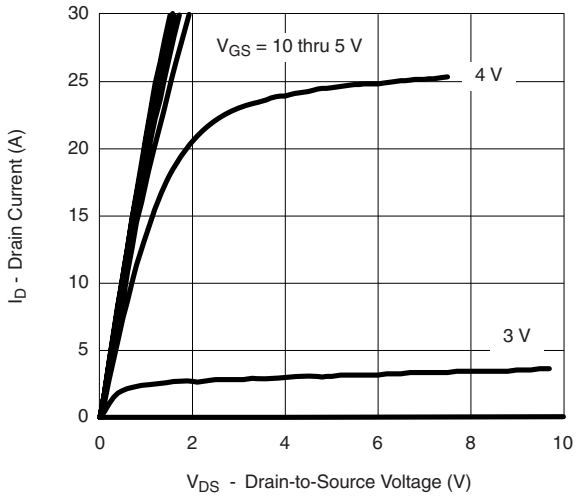
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.

b. Guaranteed by design, not subject to production testing.

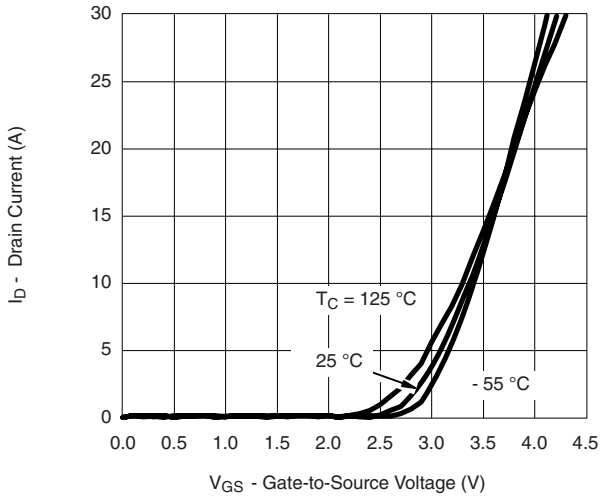
c. Independent of operating temperature.

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.

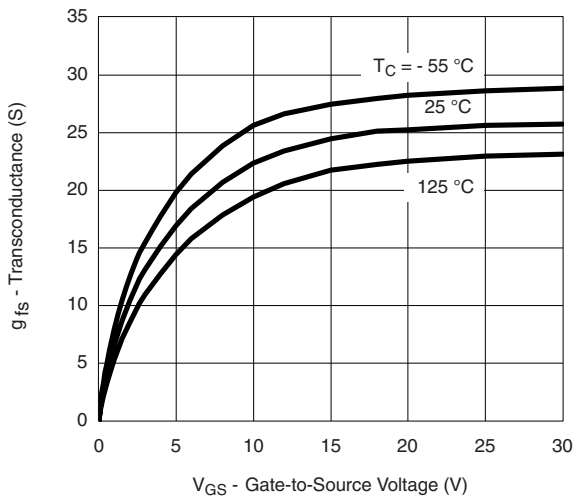
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



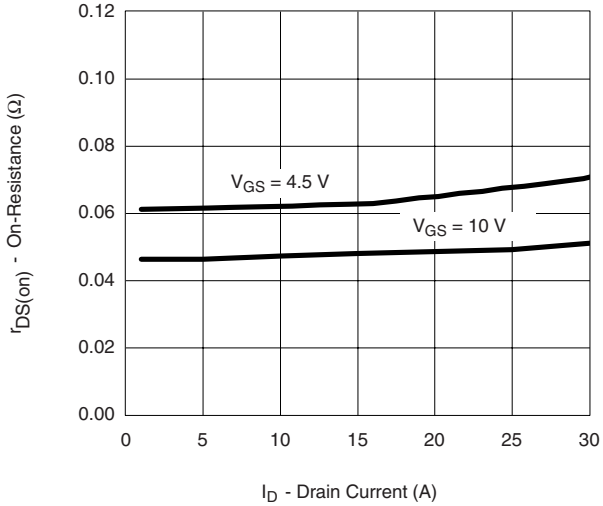
Output Characteristics



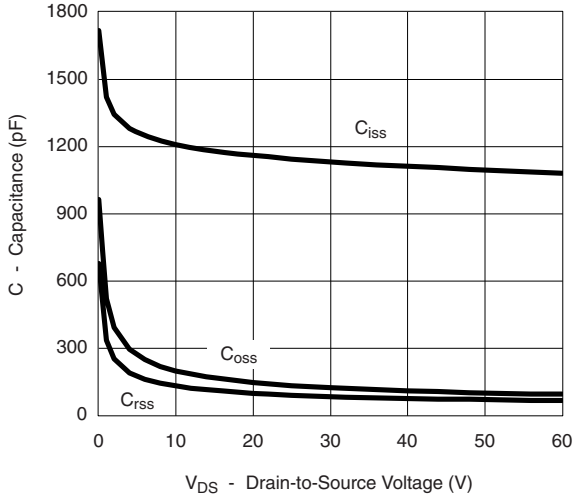
Transfer Characteristics



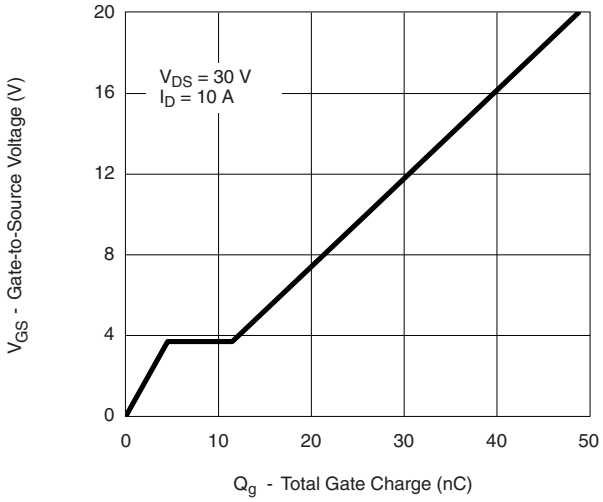
Transconductance



On-Resistance vs. Drain Current

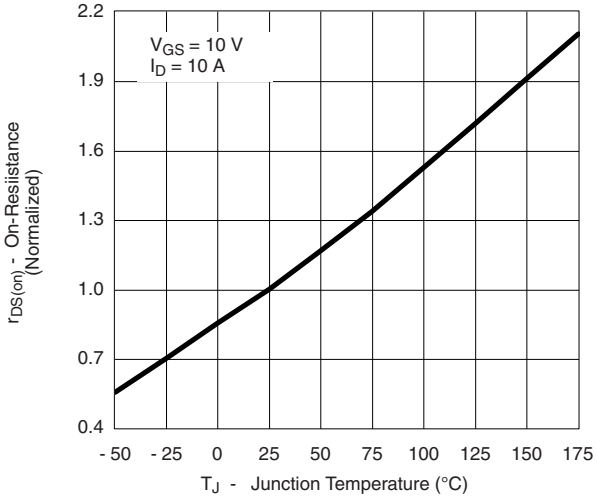


Capacitance

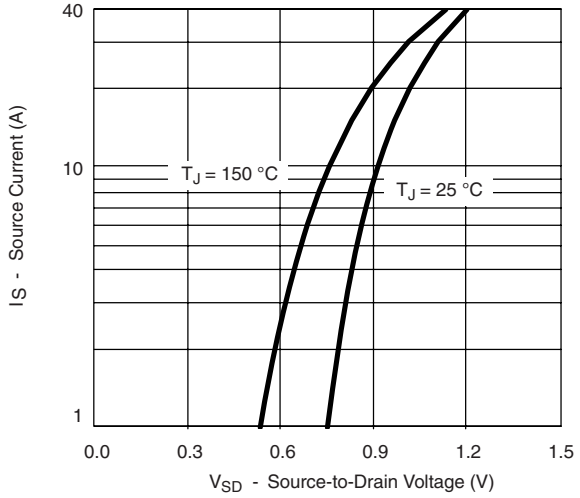


Gate Charge

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

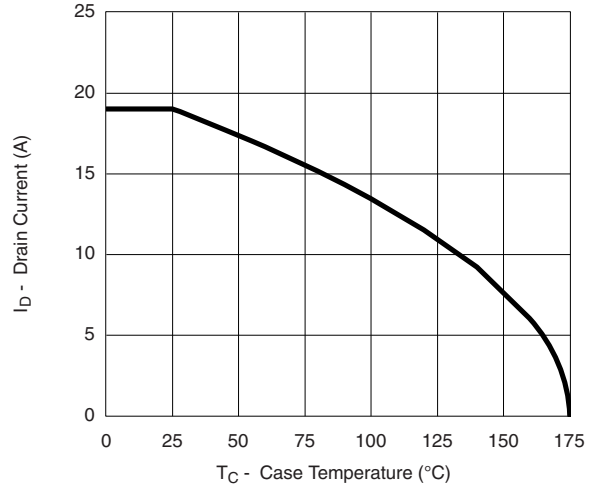


On-Resistance vs. Junction Temperature

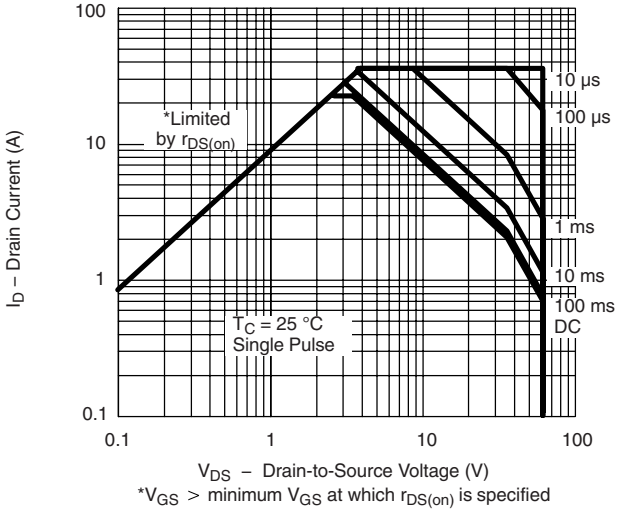


Source-Drain Diode Forward Voltage

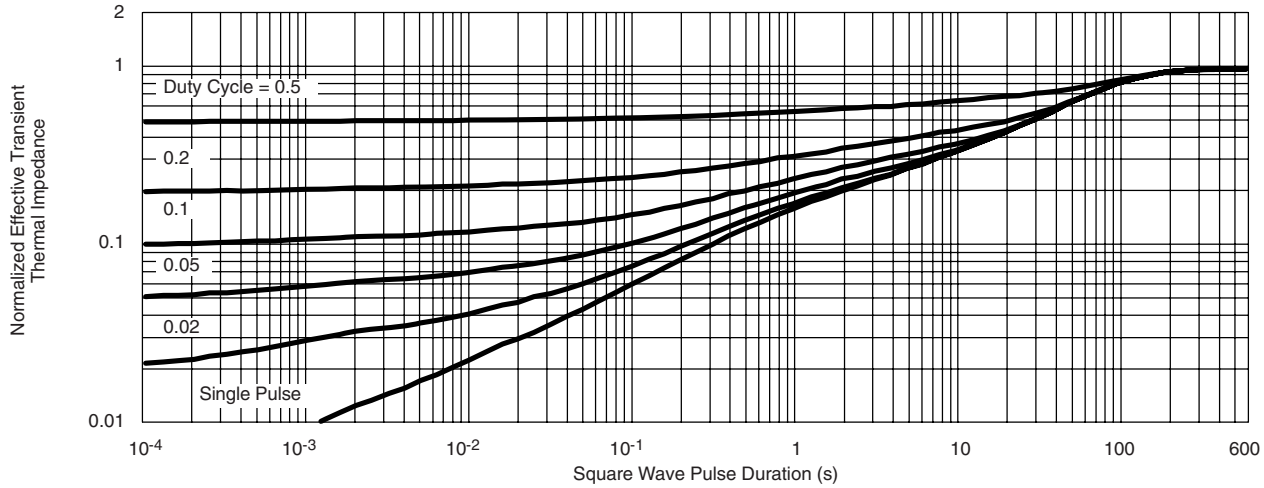
THERMAL RATINGS



Maximum Avalanche Drain Current vs. Case Temperature

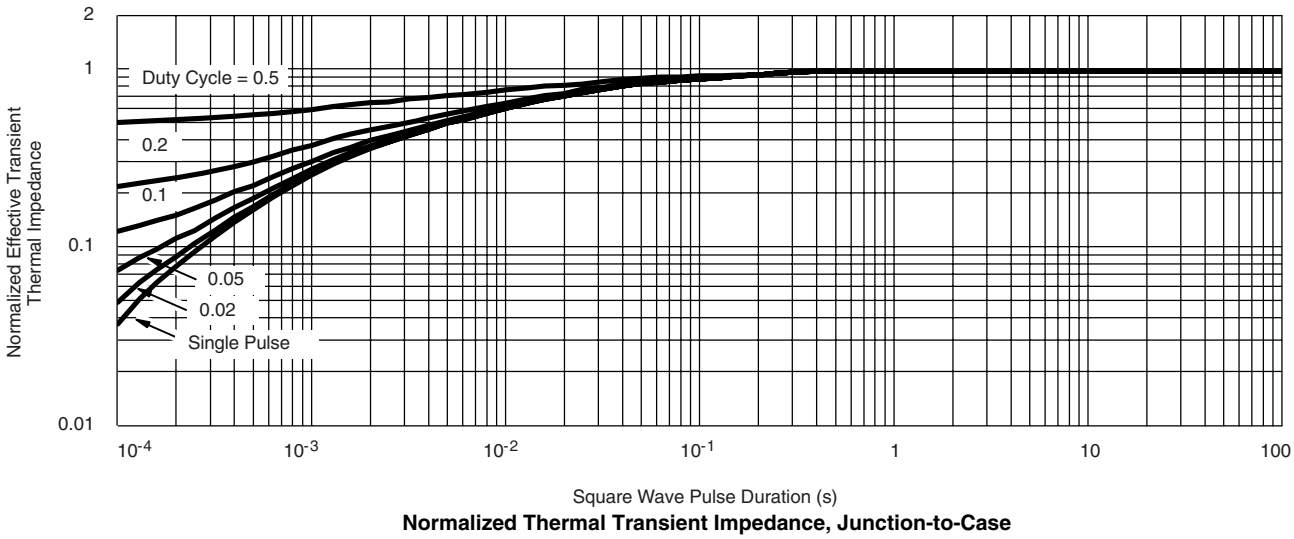


Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient

THERMAL RATINGS



Normalized Thermal Transient Impedance, Junction-to-Case

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