P-Channel 60 V (D-S), 175 °C MOSFET

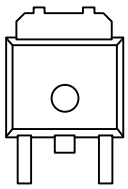
PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
- 60	0.015 at V_{GS} = - 10 V	- 50[d]
	0.020 at V_{GS} = - 4.5 V	- 50

FEATURES

- TrenchFET® Power MOSFET
- 175 °C Junction Temperature
- Compliant to RoHS Directive 2002/95/EC

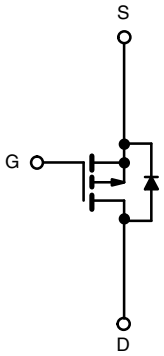
RoHS COMPLIANT

TO-252



Drain Connected to Tab

Top View



P-Channel MOSFET

Ordering Information: SUD50P06-15L-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	- 50[d]	A
	T_C = 125 °C		- 39	
Pulsed Drain Current		I_{DM}	- 80	
Avalanche Current		I_{AR}	- 50	
Repetitive Avalanche Energy[a]	L = 0.1 mH	E_{AR}	125	mJ
Power Dissipation	T_C = 25 °C	P_D	136[c]	W
	T_A = 25 °C		3[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}	15	18	°C/W
	Steady State		40	50	
Junction-to-Case		R_{thJC}	0.82	1.1	

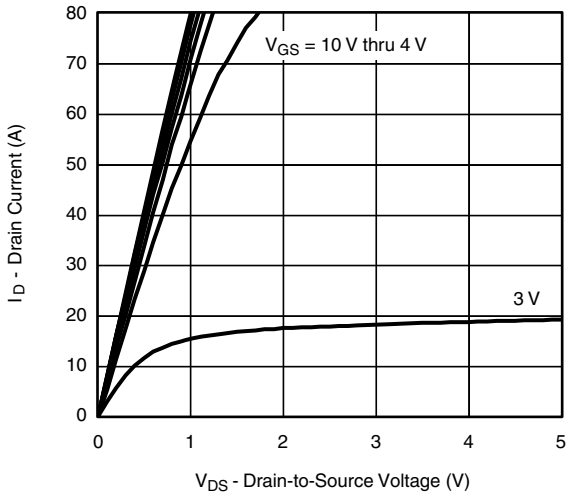
Notes:
a. Duty cycle ≤ 1 %.
b. When mounted on 1" square PCB (FR-4 material).
c. See SOA curve for voltage derating.
d. Package limited.

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static						
Drain-Source Breakdown Voltage	V_{DS}	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	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = - 48 V, V_{GS} = 0 V			- 1	µA
		V_{DS} = - 48 V, V_{GS} = 0 V, T_J = 125 °C			- 50	
		V_{DS} = - 48 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	- 50			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = - 10 V, I_D = - 17 A		0.012	0.015	Ω
		V_{GS} = - 10 V, I_D = - 50 A, T_J = 125 °C			0.025	
		V_{GS} = - 10 V, I_D = - 50 A, T_J = 175 °C			0.030	
		V_{GS} = - 4.5 V, I_D = - 14 A			0.020	
Forward Transconductance[a]	g_{fs}	V_{DS} = - 15 V, I_D = - 17 A		61		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = - 25 V, f = 1 MHz		4950		pF
Output Capacitance	C_{oss}			480		
Reverse Transfer Capacitance	C_{rss}			405		
Total Gate Charge[c]	Q_g	V_{DS} = - 30 V, V_{GS} = - 10 V, I_D = - 50 A		110	165	nC
Gate-Source Charge[c]	Q_{gs}			19		
Gate-Drain Charge[c]	Q_{gd}			28		
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = - 30 V, R_L = 0.6 Ω $I_D \cong$ - 50 A, V_{GEN} = - 10 V, R_G = 6 Ω		15	23	ns
Rise Time[c]	t_r			70	105	
Turn-Off Delay Time[c]	$t_{d(off)}$			175	260	
Fall Time[c]	t_f			175	260	
Source-Drain Diode Ratings and Characteristics (T_C = 25 °C)[b]						
Continuous Current	I_S				- 50	A
Pulsed Current	I_{SM}				- 80	
Forward Voltage[a]	V_{SD}	I_F = - 50 A, V_{GS} = 0 V		1.0	1.6	V
Reverse Recovery Time	t_{rr}	I_F = - 50 A, dI/dt = 100 A/µs		45	70	ns

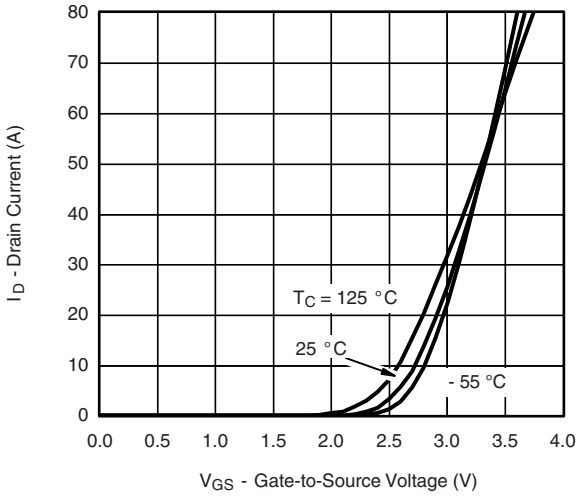
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

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.

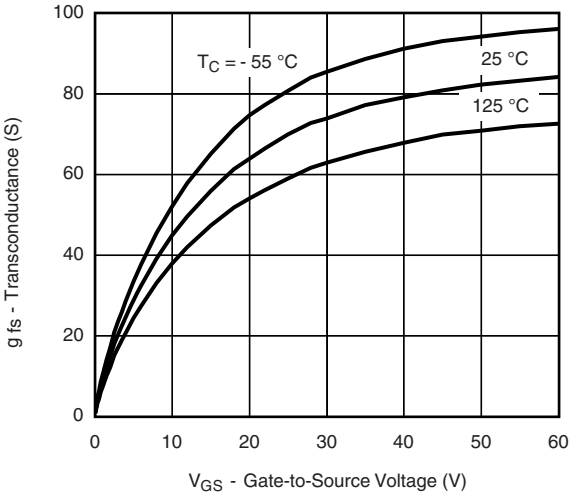
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



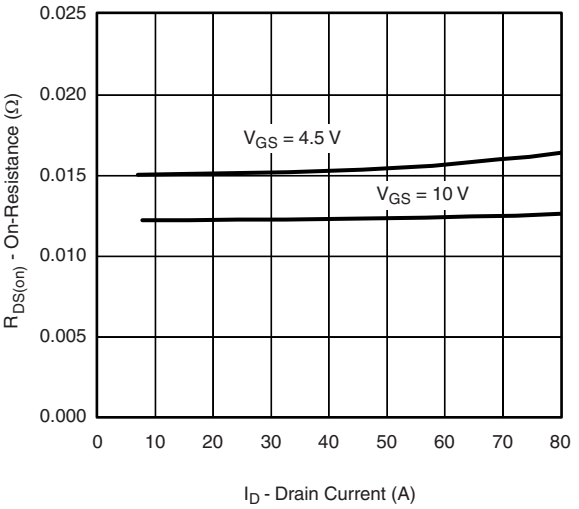
Output Characteristics



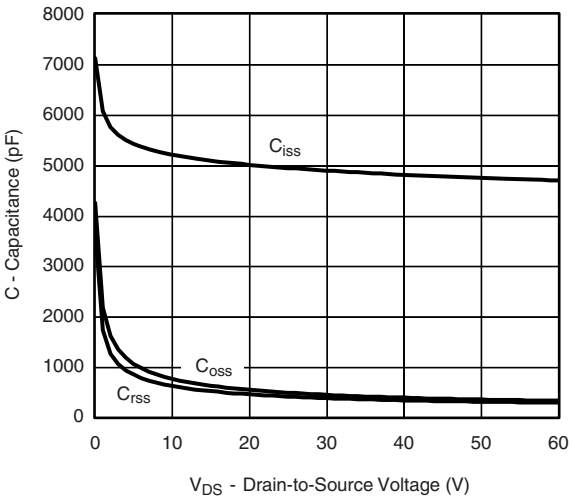
Transfer Characteristics



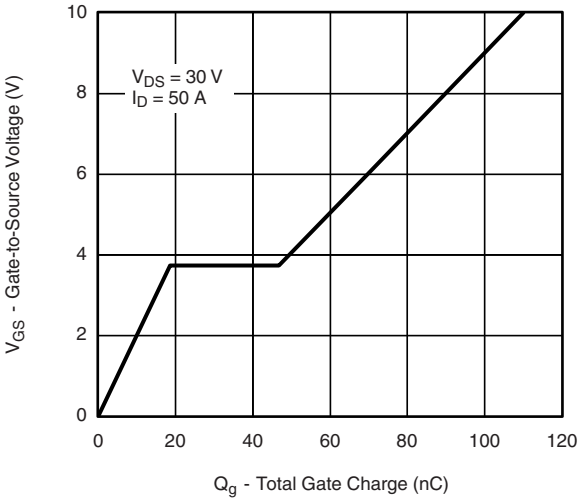
Transconductance



On-Resistance vs. Drain Current

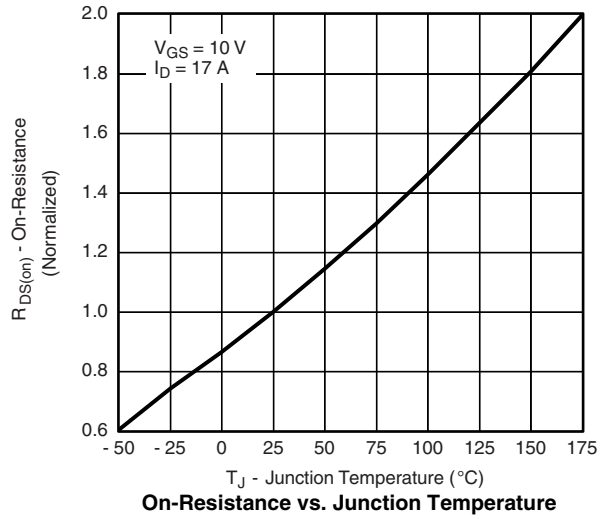


Capacitance

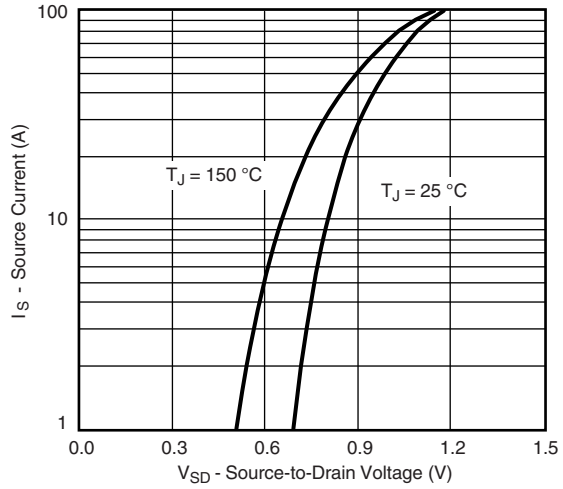


Gate Charge

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

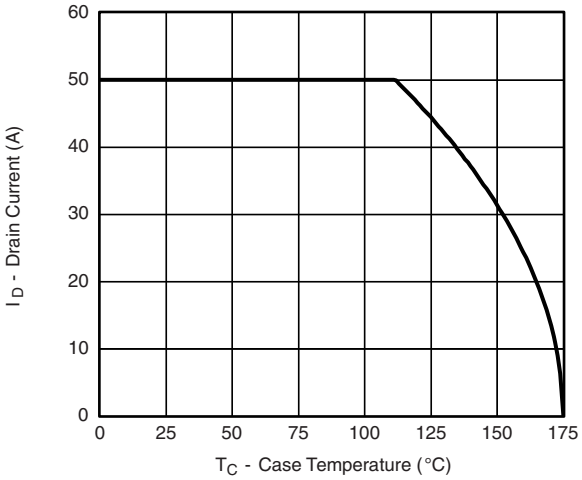


On-Resistance vs. Junction Temperature

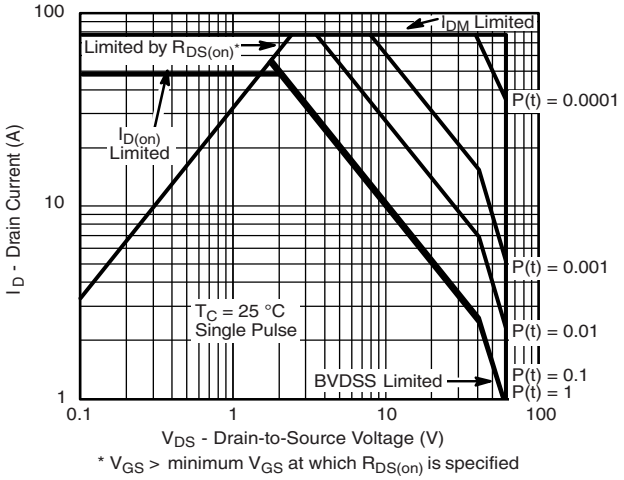


Source-Drain Diode Forward Voltage

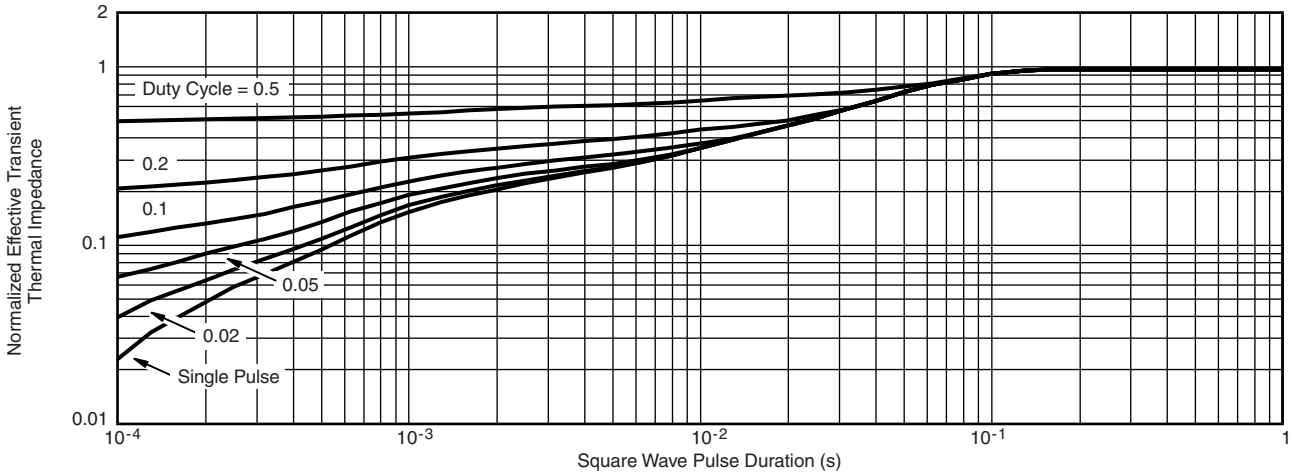
THERMAL RATINGS



Maximum Avalanche and Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

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