

P-Channel 60-V (D-S) 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 ^d

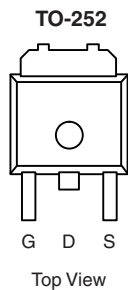
FEATURES

- Halogen-free
- TrenchFET[®] Power MOSFET

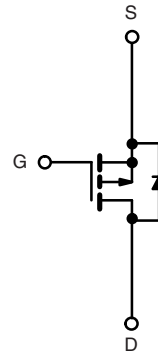

RoHS
COMPLIANT

APPLICATIONS

- Load Switch



Drain Connected to Tab


Ordering Information: SUD50P06-15-GE3 (Lead (Pb)-free and Halogen-free)

P-Channel MOSFET

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)	I_D	$T_C = 25$ °C	- 50 ^d	
		$T_C = 125$ °C	- 27.5	
Pulsed Drain Current	I_{DM}	- 80	A	
Avalanche Current	I_{AS}	- 50		
Single Pulse Avalanche Energy ^a	L = 0.1 mH	E_{AS}	125	mJ
Power Dissipation	P_D	$T_C = 25$ °C	113 ^c	W
		$T_A = 25$ °C	2.5 ^{b, c}	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient ^b	R_{thJA}	$t \leq 10$ s	15	18
		Steady State	40	50
Junction-to-Case	R_{thJC}	0.82	1.1	°C/W

Notes:

- Duty cycle ≤ 1 %.
- When Mounted on 1" square PCB (FR-4 material).
- See SOA curve for voltage derating.
- Package limited.

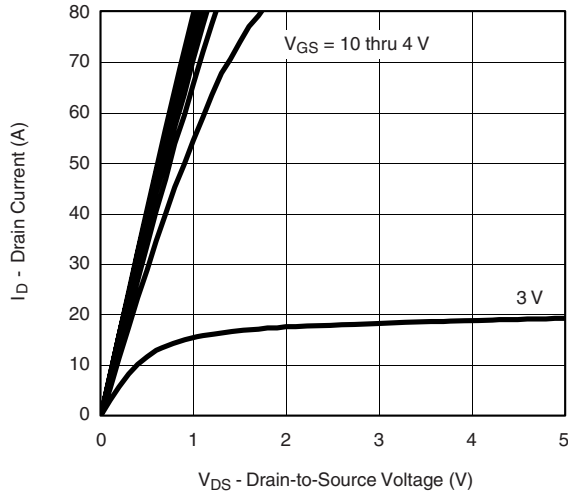
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-60			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-1		-3	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}$			-1	μA
		$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			-50	
		$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}, T_J = 150\text{ }^\circ\text{C}$			-100	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = -5\text{ V}, V_{GS} = -10\text{ V}$	-50			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -17\text{ A}$		0.012	0.015	Ω
		$V_{GS} = -10\text{ V}, I_D = -50\text{ A}, T_J = 125\text{ }^\circ\text{C}$			0.025	
		$V_{GS} = -10\text{ V}, I_D = -50\text{ A}, T_J = 150\text{ }^\circ\text{C}$			0.028	
		$V_{GS} = -4.5\text{ V}, I_D = -14\text{ A}$			0.020	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15\text{ V}, I_D = -17\text{ A}$		61		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = -25\text{ V}, f = 1\text{ MHz}$		4950		pF
Output Capacitance	C_{oss}			480		
Reverse Transfer Capacitance	C_{rss}			405		
Total Gate Charge ^c	Q_g	$V_{DS} = -30\text{ V}, V_{GS} = -10\text{ V}, I_D = -50\text{ A}$		110	165	nC
Gate-Source Charge ^c	Q_{gs}			19		
Gate-Drain Charge ^c	Q_{gd}			28		
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = -30\text{ V}, R_L = 0.6\text{ }\Omega$ $I_D \cong -50\text{ A}, V_{GEN} = -10\text{ V}, R_G = 6\text{ }\Omega$		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 $T_C = 25\text{ }^\circ\text{C}^b$						
Continuous Current	I_S				-50	A
Pulsed Current	I_{SM}				-80	
Forward Voltage ^a	V_{SD}	$I_F = -50\text{ A}, V_{GS} = 0\text{ V}$		-1.0	-1.6	V
Reverse Recovery Time	t_{rr}	$I_F = -50\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}$		45	70	ns

Notes:

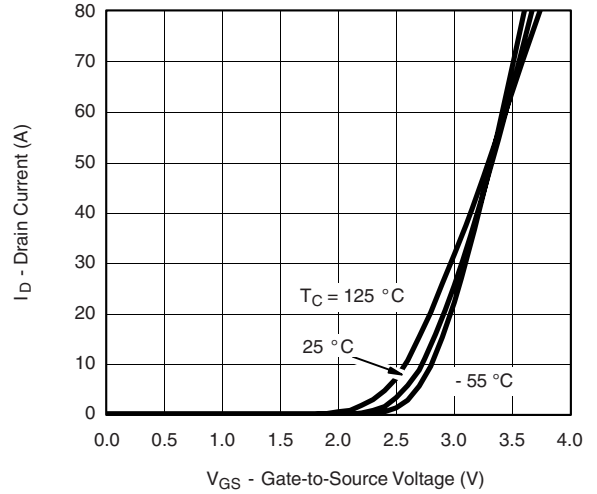
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

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.

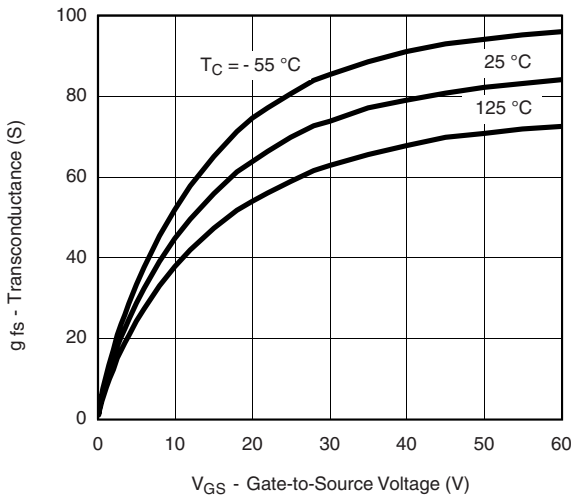
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



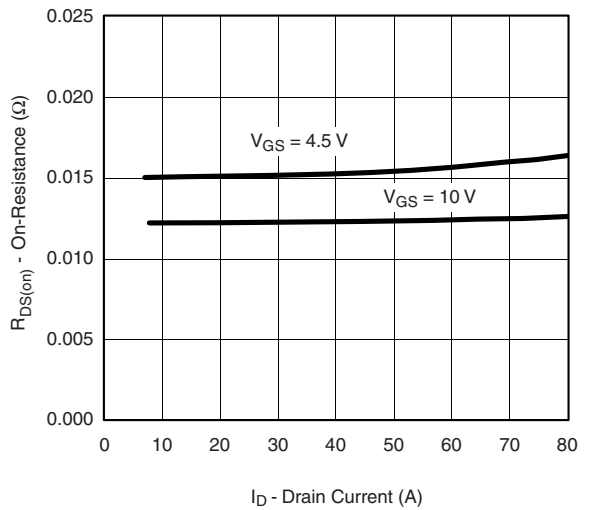
Output Characteristics



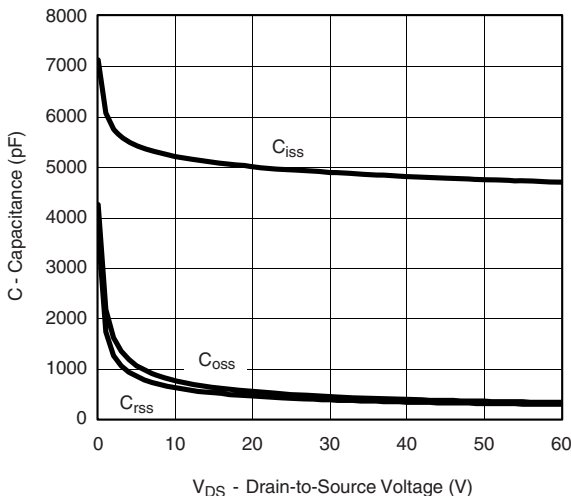
Transfer Characteristics



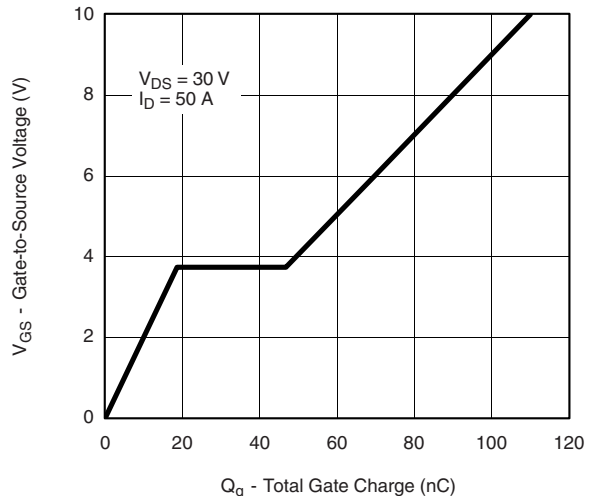
Transconductance



On-Resistance vs. Drain Current

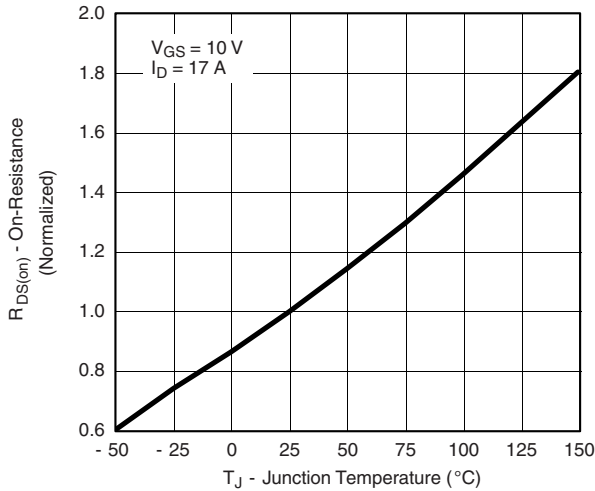


Capacitance

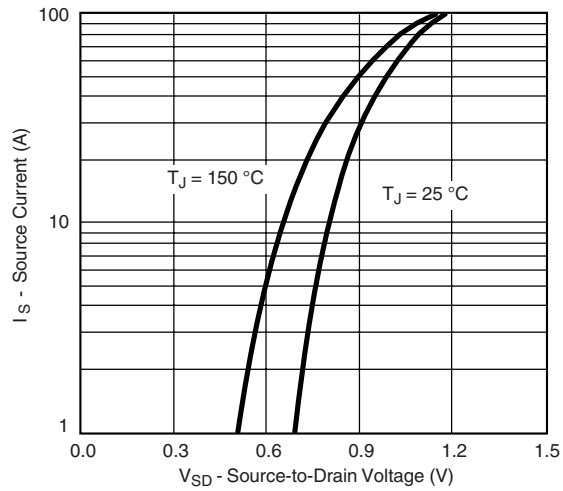


Gate Charge

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

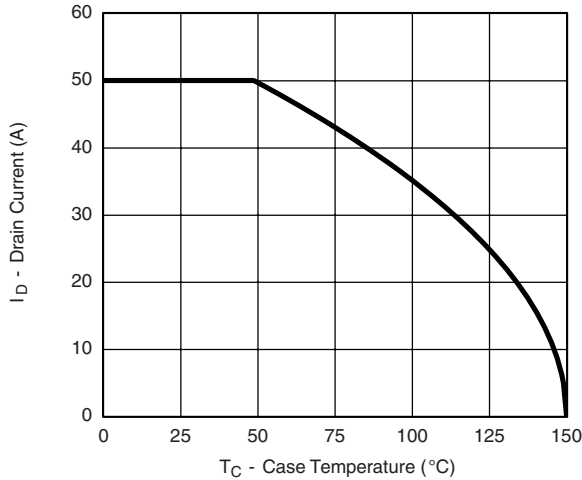


On-Resistance vs. Junction Temperature

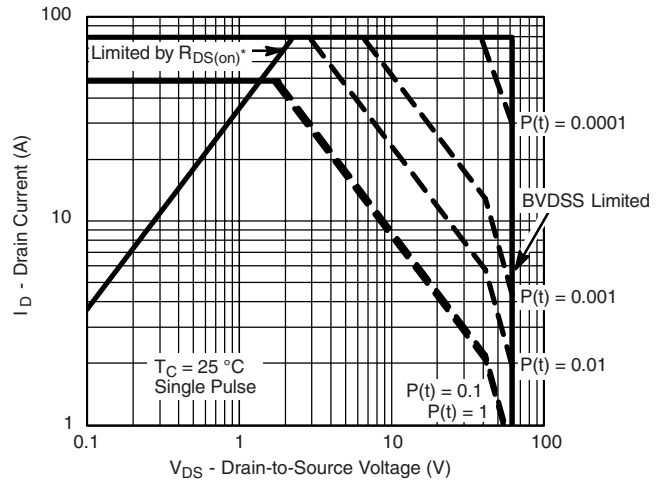


Source-Drain Diode Forward Voltage

THERMAL RATINGS

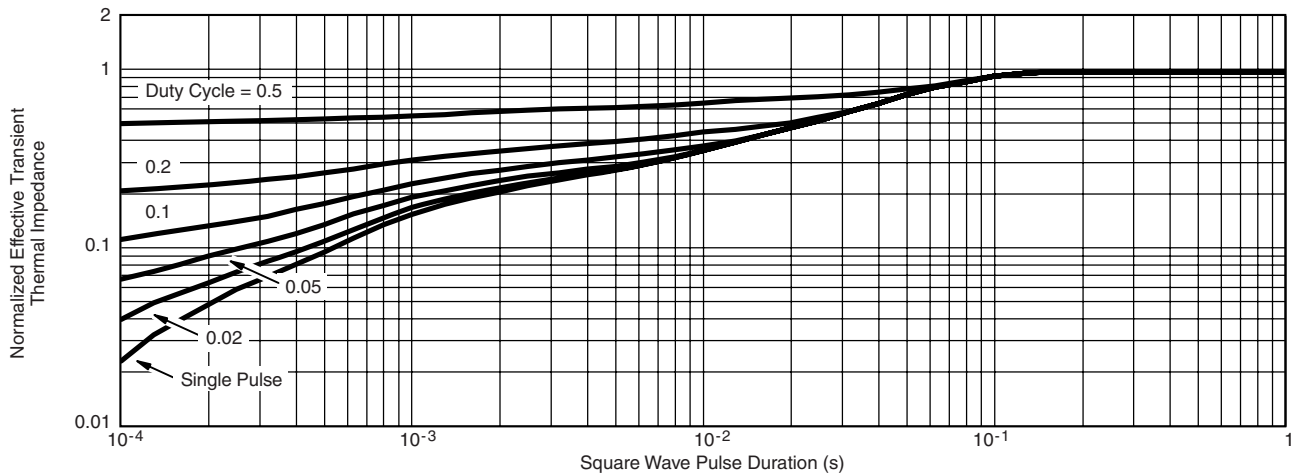


Drain Current vs. Case Temperature



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

Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

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