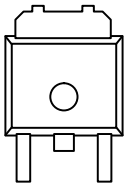
P-Channel 40-V (D-S), 175°C MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
–40	0.015 @ V_{GS} = –10 V	–50
	0.023 @ V_{GS} = –4.5 V	–45

175°C Rated Maximum Junction Temperature TrenchFET® Power MOSFETs

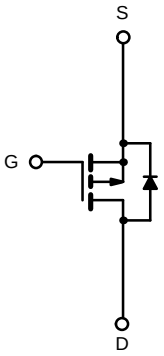
TO-252



Top View

Order Number:
SUD50P04-15

Drain Connected to Tab



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)				
Parameter		**Symbol**	**Limit**	**Unit**
Drain-Source Voltage		V_{DS}	–40	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current[b]	T_C = 25°C	I_D	–50	A
	T_C = 100°C		–40	
Pulsed Drain Current		I_{DM}	–150	
Continuous Source Current (Diode Conduction)		I_S	–50	
Maximum Power Dissipation[b]	T_C = 25°C	P_D	100[b]	W
	T_A = 25°C		3[a]	
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}	15	18	°C/W
	Steady State		40	50	
Maximum Junction-to-Case		R_{thJC}	1.2	1.5	

Notes
a. Surface Mounted on 1" x 1" FR4 Board.
b. See SOA curve for voltage derating.

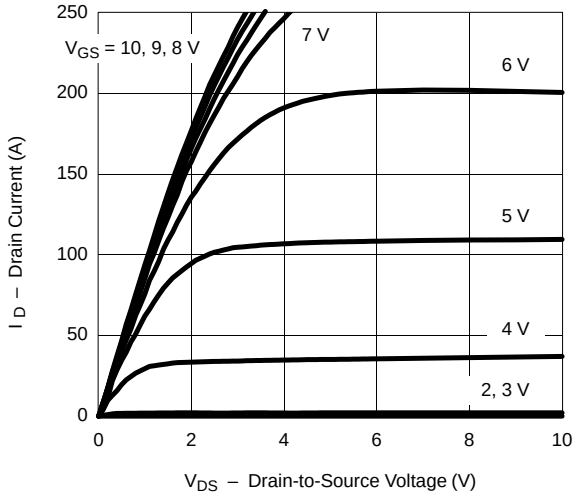
SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = –250 μA	–40			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = –250 μA	–1.0			
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = –40 V, V_{GS} = 0 V			–1	μA
		V_{DS} = –40 V, V_{GS} = 0 V, T_J = 125°C			–50	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} = –5 V, V_{GS} = –10 V	–120			A
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = –10 V, I_D = –30 A		0.012	0.015	Ω
		V_{GS} = –10 V, I_D = –30 A, T_J = 125°C			0.024	
		V_{GS} = –4.5 V, I_D = –20 A		0.018	0.023	
Forward Transconductance[a]	g_{fs}	V_{DS} = –15 V, I_D = –30 A	20			S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = –25 V, f = 1 MHz		5400		pF
Output Capacitance	C_{oss}			640		
Reverse Transfer Capacitance	C_{rss}			300		
Total Gate Charge[c]	Q_g	V_{DS} = –20 V, V_{GS} = –10 V, I_D = –50 A		85	130	nC
Gate-Source Charge[c]	Q_{gs}			25		
Gate-Drain Charge[c]	Q_{gd}			15		
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = –20 V, R_L = 0.4 Ω I_D ≅ –50 A, V_{GEN} = –10 V, R_G = 2.5 Ω		15	25	ns
Rise Time[c]	t_r			380	580	
Turn-Off Delay Time[c]	$t_{d(off)}$			75	115	
Fall Time[c]	t_f			140	210	
Source-Drain Diode Ratings and Characteristic (T_C = 25°C)						
Pulsed Current	I_{SM}				–150	A
Diode Forward Voltage[a]	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		40	80	ns

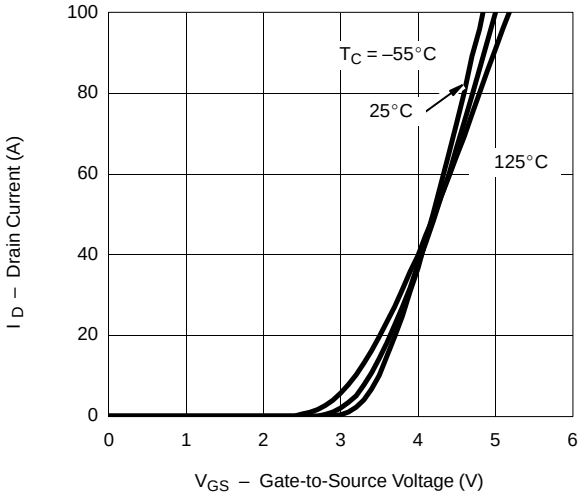
Notes
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

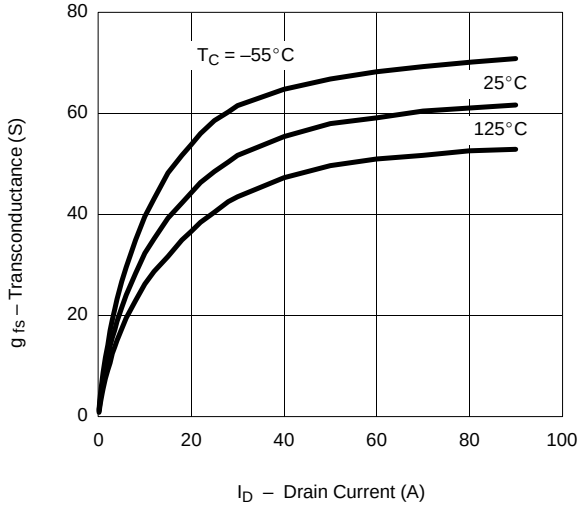
Output Characteristics



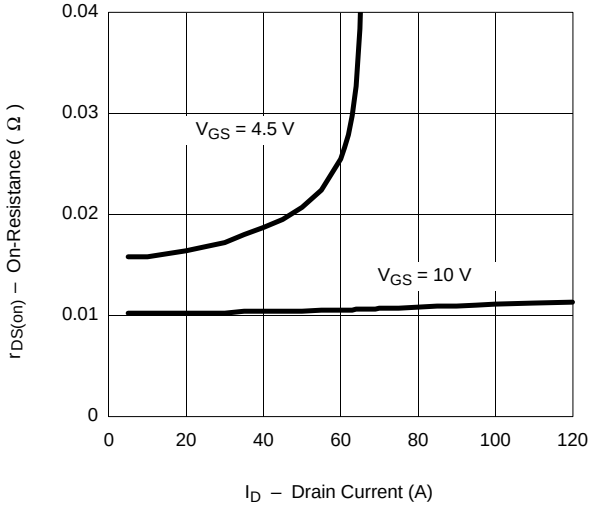
Transfer Characteristics



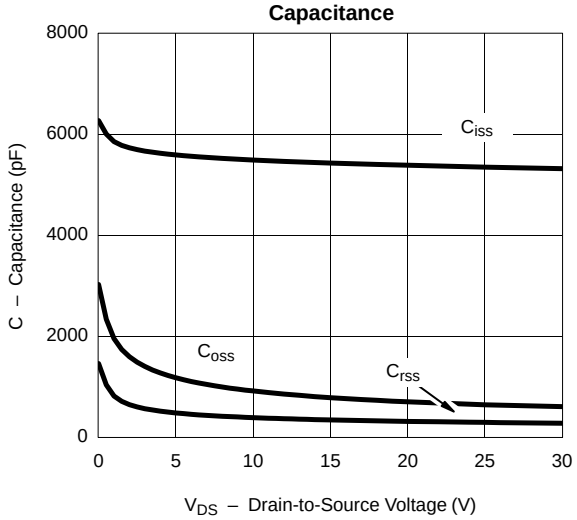
Transconductance



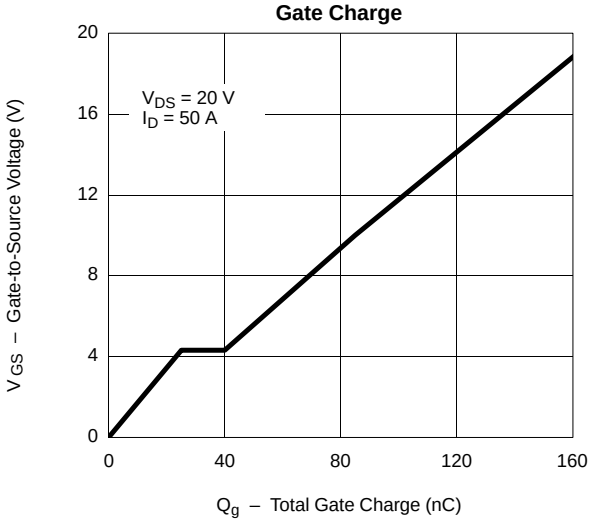
On-Resistance vs. Drain Current



Capacitance

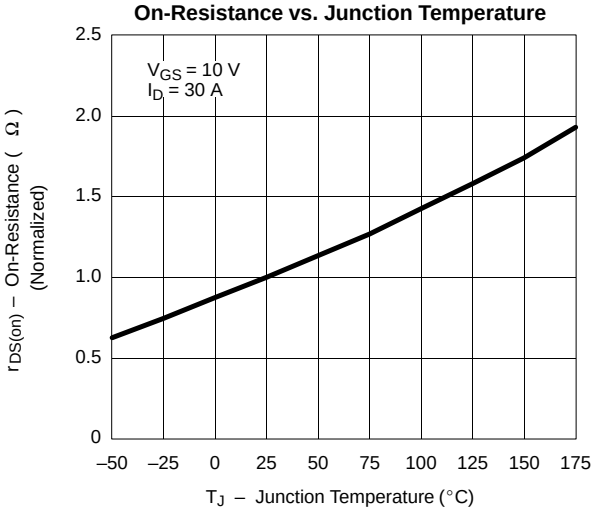


Gate Charge

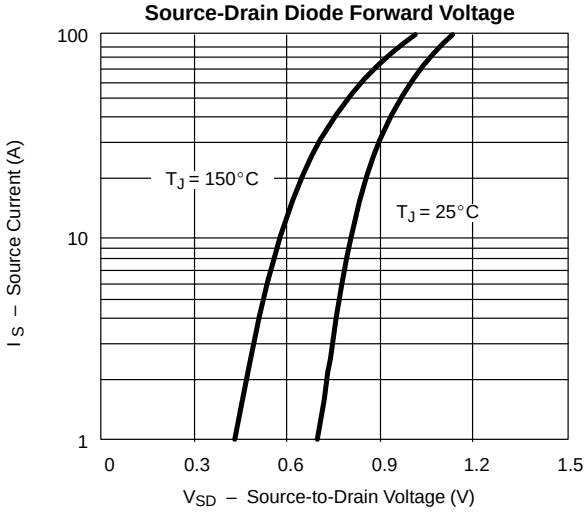


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

On-Resistance vs. Junction Temperature

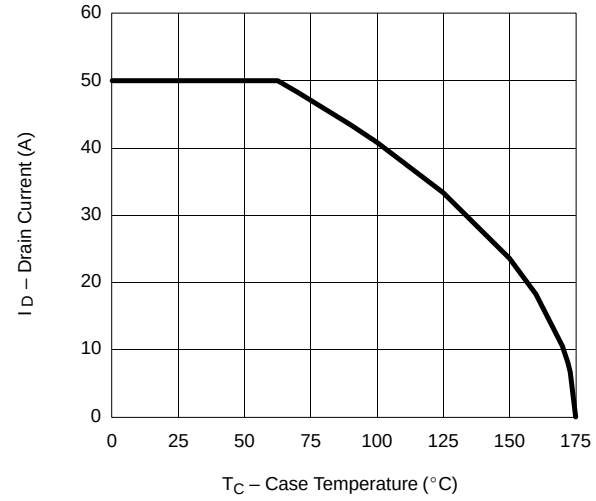


Source-Drain Diode Forward Voltage

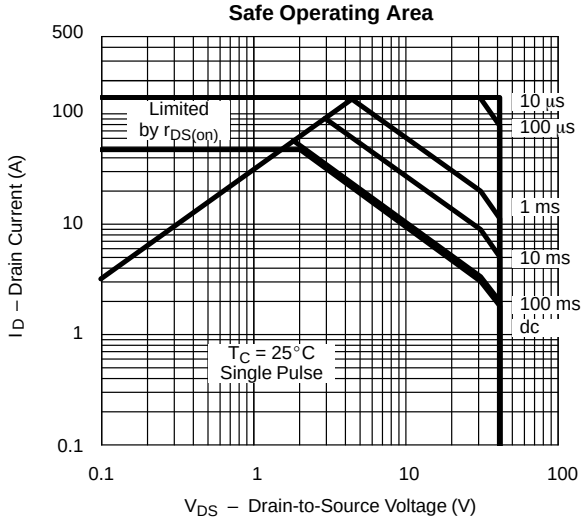


THERMAL RATINGS

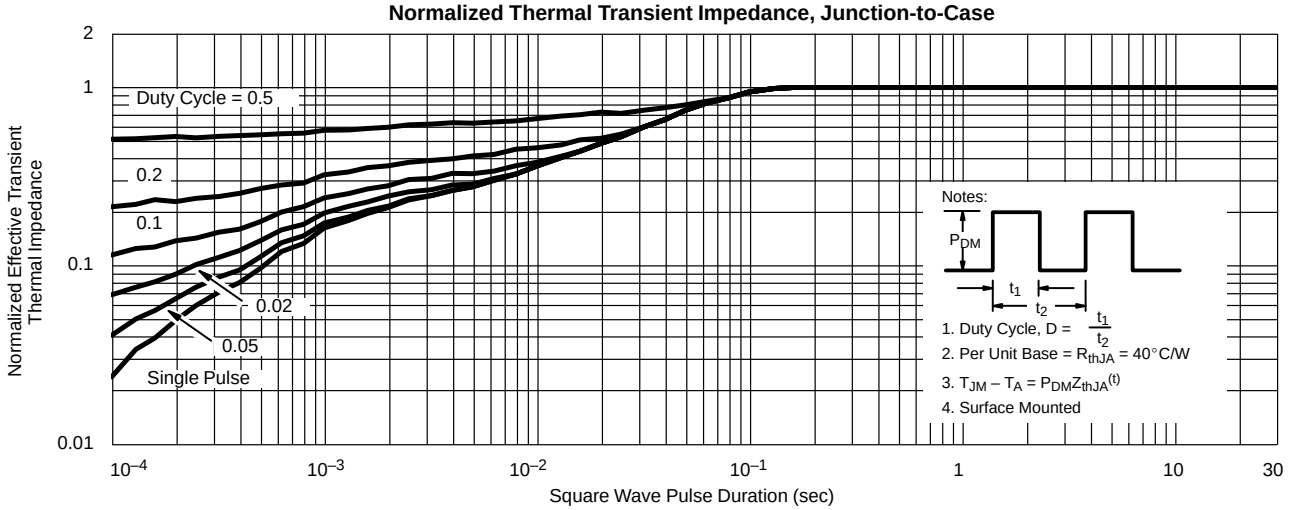
Maximum Drain Current vs. Case Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case



Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay’s terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.