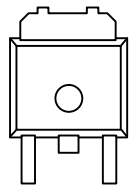


Automotive P-Channel 60 V (D-S) 175 °C MOSFET

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

FEATURES

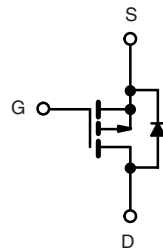
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET
- Package with Low Thermal Resistance
- Compliant to RoHS Directive 2002/95/EC
- AEC-Q101 Qualified^d
- Find out more about Vishay's Automotive Grade Product Requirements at: www.vishay.com/applications


TO-252


G D S

Top View

Drain Connected to Tab



P-Channel MOSFET

ORDERING INFORMATION	
Package	TO-252
Lead (Pb)-free and Halogen-free	SQD50P06-15L-GE3

ABSOLUTE MAXIMUM RATINGS $T_C = 25$ °C, unless otherwise noted				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V_{DS}	- 60	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ^a	$T_C = 25$ °C	I_D	- 50	A
	$T_C = 125$ °C		- 39	
Continuous Source Current (Diode Conduction) ^a		I_S	- 50	
Pulsed Drain Current ^b		I_{DM}	- 80	
Single Pulse Avalanche Current	L = 0.1 mH	I_{AS}	52	
Single Pulse Avalanche Energy		E_{AS}	135	mJ
Maximum Power Dissipation ^b	$T_C = 25$ °C	P_D	130	W
	$T_A = 25$ °C		3	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to + 175	°C

THERMAL RESISTANCE RATINGS				
PARAMETER		SYMBOL	LIMIT	UNIT
Junction-to-Ambient	PCB Mount ^c	R_{thJA}	50	°C/W
Junction-to-Case (Drain)		R_{thJC}	1.1	

Notes

- Package limited.
- Pulse test; pulse width ≤ 300 μ s, duty cycle ≤ 2 %.
- When mounted on 1" square PCB (FR-4 material).
- Parametric verification ongoing.

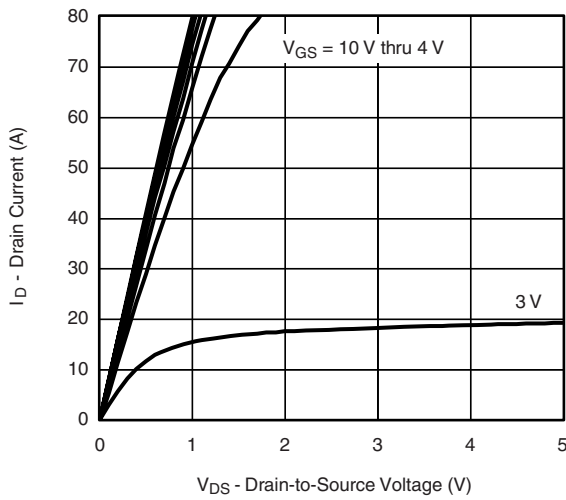
SPECIFICATIONS $T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$		-60	-	-	V
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$		-1.5	-	-2.5	
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$		-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}$	$V_{DS} = -48\text{ V}$	-	-	-1	μA
		$V_{GS} = 0\text{ V}$	$V_{DS} = -48\text{ V}, T_J = 125\text{ }^\circ\text{C}$	-	-	-50	
		$V_{GS} = 0\text{ V}$	$V_{DS} = -48\text{ V}, T_J = 175\text{ }^\circ\text{C}$	-	-	-150	
On-State Drain Current ^a	$I_{D(on)}$	$V_{GS} = -10\text{ V}$	$V_{DS} \geq -5\text{ V}$	-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	
		$V_{GS} = -10\text{ V}$	$I_D = -50\text{ A}, T_J = 175\text{ }^\circ\text{C}$	-	-	0.030	
		$V_{GS} = -4.5\text{ V}$	$I_D = -14\text{ A}$	-	-	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	-	μF
Output Capacitance	C_{oss}			-	480	-	
Reverse Transfer Capacitance	C_{rss}			-	405	-	
Total Gate Charge ^c	Q_g	$V_{GS} = -10\text{ V}$	$V_{DS} = -30\text{ V}, I_D = -50\text{ A}$	-	110	-	nC
Gate-Source Charge ^c	Q_{gs}			-	19	-	
Gate-Drain Charge ^c	Q_{gd}			-	28	-	
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = -30\text{ V}, R_L = 0.6\text{ }\Omega$ $I_D \cong -50\text{ A}, V_{GEN} = -10\text{ V}, R_g = 6.0\text{ }\Omega$		-	15	-	ns
Rise Time ^c	t_r			-	70	-	
Turn-Off Delay Time ^c	$t_{d(off)}$			-	175	-	
Fall Time ^c	t_f			-	175	-	
Source-Drain Diode Ratings and Characteristics $T_C = 25\text{ }^\circ\text{C}$^b							
Pulsed Current ^a	I_{SM}			-	-	-80	A
Forward Voltage	V_{SD}	$I_F = -50\text{ A}, V_{GS} = 0\text{ V}$		-	1.0	1.6	V

Notes

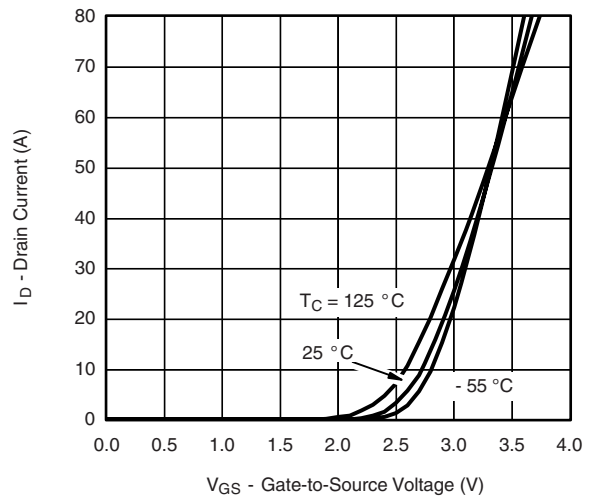
- Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

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.

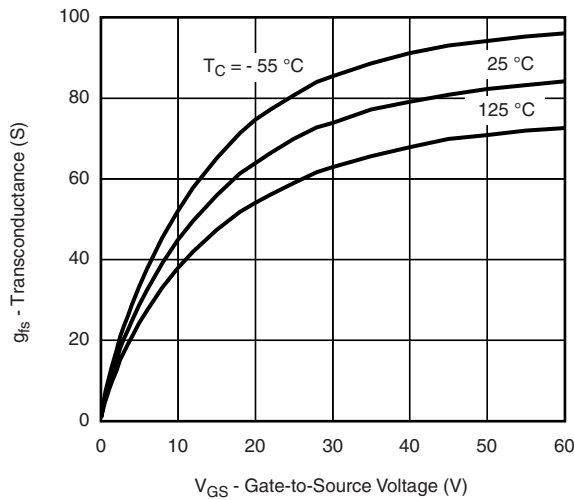
TYPICAL CHARACTERISTICS $T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted



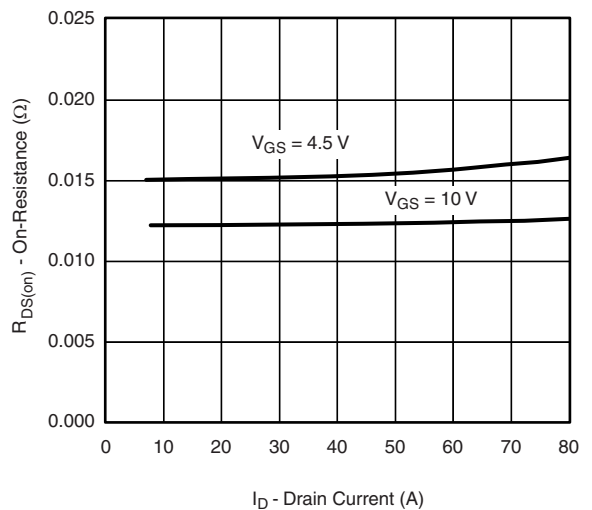
Output Characteristics



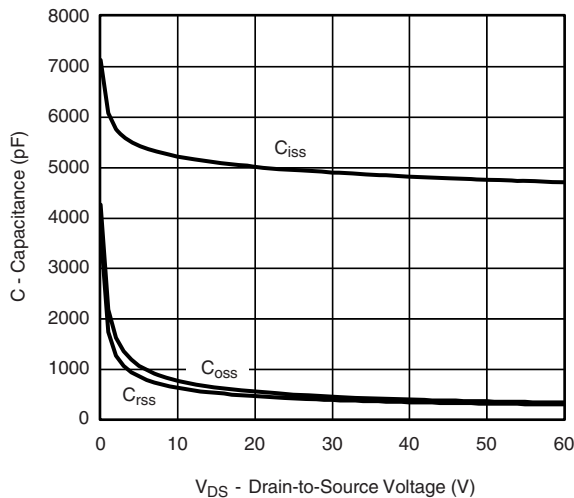
Transfer Characteristics



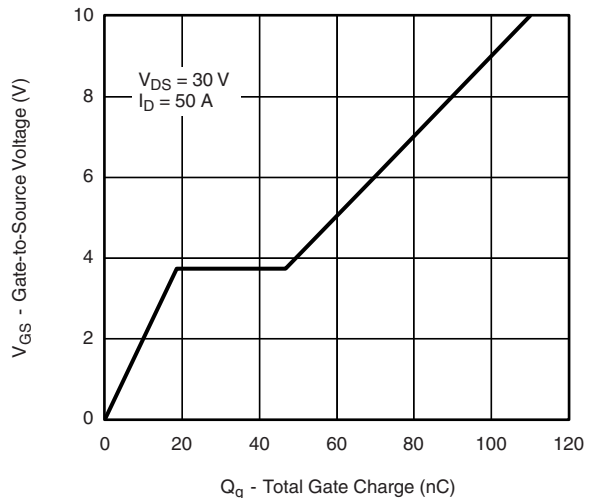
Transconductance



On-Resistance vs. Drain Current

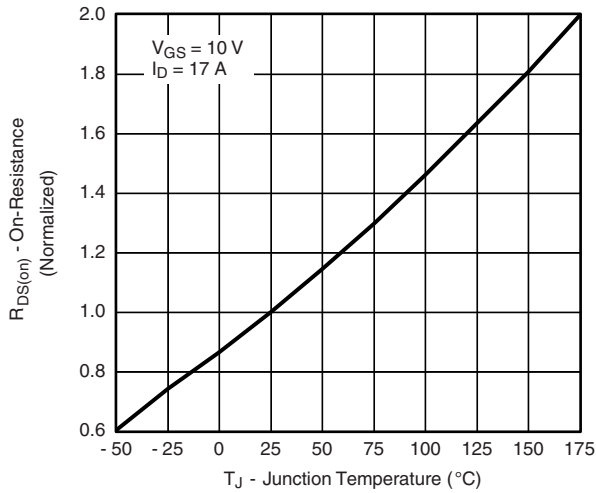


Capacitance

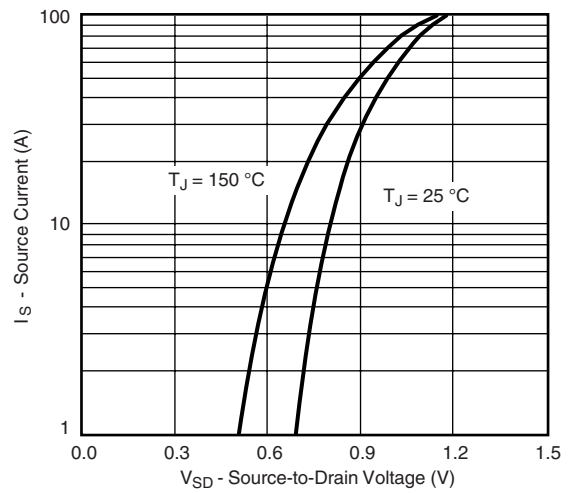


Gate Charge

TYPICAL CHARACTERISTICS $T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted

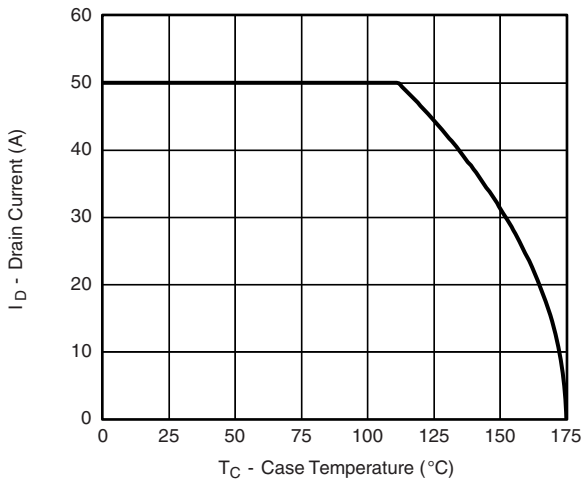


On-Resistance vs. Junction Temperature

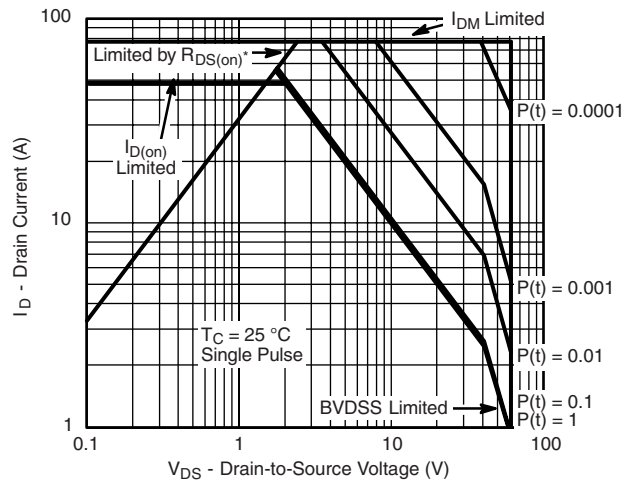


Source Drain Diode Forward Voltage

THERMAL RATINGS $T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted

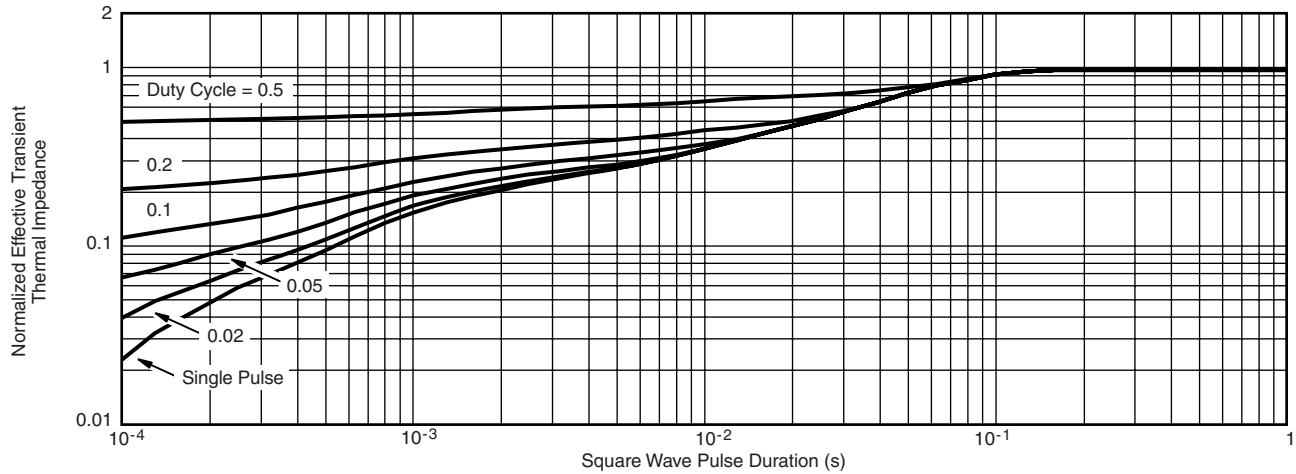


Maximum Drain Current vs. Ambient Temperature



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

Safe Operating Area

THERMAL RATINGS $T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted

Normalized Thermal Transient Impedance, Junction-to-Case
Note

The characteristics shown in the graph

- Normalized Transient Thermal Impedance Junction to Ambient (25 °C)

are given for general guidelines only to enable the user to get a "ball park" indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

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