

SQM50P03-07-GE3-VB Datasheet

P-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^d	Q_g (Typ.)
- 30	0.008 at $V_{GS} = -10$ V	- 75	56 nC
	0.011 at $V_{GS} = -4.5$ V	- 65	

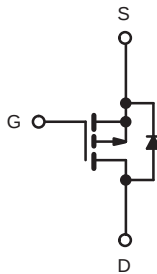
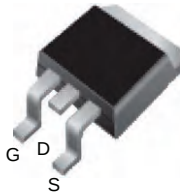
FEATURES

- Halogen-free
- TrenchFET[®] Power MOSFET
- 100 % R_g Tested
- 100 % UIS Tested


RoHS
 COMPLIANT

APPLICATIONS

- Load Switch
- Notebook Adaptor Switch

D²PAK (TO-263)

P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	- 30	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150$ °C)	$T_C = 25$ °C	- 75	A
	$T_C = 70$ °C	- 65	
	$T_A = 25$ °C	-55 ^{a, b}	
	$T_A = 70$ °C	-45 ^{a, b}	
Pulsed Drain Current	I_{DM}	- 200	mJ
Continuous Source-Drain Diode Current	$T_C = 25$ °C	- 4.1	
	$T_A = 25$ °C	- 2.2 ^{a, b}	
Avalanche Current	I_{AS}	- 75	mJ
Single-Pulse Avalanche Energy	E_{AS}	280	
Maximum Power Dissipation	$T_C = 25$ °C	250	W
	$T_C = 70$ °C	205	
	$T_A = 25$ °C	3.7 ^{a, b}	
	$T_A = 70$ °C	2.7 ^{a, b}	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{a, c}	R_{thJA}	38	46	°C/W
Maximum Junction-to-Foot	R_{thJF}	20	25	

Notes:

a. Surface mounted on 1" x 1" FR4 board.

 b. $t = 10$ s.

c. Maximum under Steady State conditions is 85 °C/W.

 d. Based on $T_C = 25$ °C.

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	- 30			V	
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = - 250 μA		- 34		mV/ °C	
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J			5.3			
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = - 250 μA	- 1.0		- 2.5	V	
Gate-Source Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 25 V			± 100	nA	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = - 30 V, V _{GS} = 0 V			- 1	μA	
		V _{DS} = - 30 V, V _{GS} = 0 V, T _J = 55 °C			- 5		
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ - 10 V, V _{GS} = - 10 V	- 30			A	
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = - 10 V, I _D = - 10 A		0.008		Ω	
		V _{GS} = - 4.5 V, I _D = - 8 A		0.011			
Forward Transconductance ^a	g _{fs}	V _{DS} = - 10 V, I _D = - 10 A		28		S	
Dynamic ^b							
Input Capacitance	C _{iss}	V _{DS} = - 15 V, V _{GS} = 0 V, f = 1 MHz		4550		pF	
Output Capacitance	C _{oss}			1455			
Reverse Transfer Capacitance	C _{rss}			570			
Total Gate Charge	Q _g	V _{DS} = - 15 V, V _{GS} = - 10 V, I _D = - 10 A		115		nC	
Gate-Source Charge	Q _{gs}	V _{DS} = - 15 V, V _{GS} = - 4.5 V, I _D = - 10 A		56			
Gate-Drain Charge	Q _{gd}			8			
Gate Resistance	R _g			22			
Turn-On Delay Time	t _{d(on)}	f = 1 MHz	0.5	2.2	4.4	Ω	
Rise Time	t _r		V _{DD} = - 15 V, R _L = 1.5 Ω I _D ≅ - 10 A, V _{GEN} = - 10 V, R _g = 1 Ω		13	25	ns
Turn-Off DelayTime	t _{d(off)}				12	24	
Fall Time	t _f				40	70	
Turn-On Delay Time	t _{d(on)}			9	18		
Rise Time	t _r	V _{DD} = - 15 V, R _L = 1.5 Ω I _D ≅ - 10 A, V _{GEN} = - 4.5 V, R _g = 1 Ω		48	80		
Turn-Off DelayTime	t _{d(off)}			92	160		
Fall Time	t _f			34	60		
				19	35		
Drain-Source Body Diode Characteristics							
Continous Source-Drain Diode Current	I _S	T _C = 25 °C			- 4.1	A	
Pulse Diode Forward Current	I _{SM}				- 60		
Body Diode Voltage	V _{SD}	I _S = - 3 A, V _{GS} = 0 V		- 0.75	- 1.2	V	
Body Diode Reverse Recovery Time	t _{rr}	I _F = - 10 A, dI/dt = 100 A/μs, T _J = 25 °C		27	45	ns	
Body Diode Reverse Recovery Charge	Q _{rr}			16	27	nC	
Reverse Recovery Fall Time	t _a			12		ns	
Reverse Recovery Rise Time	t _b			15			

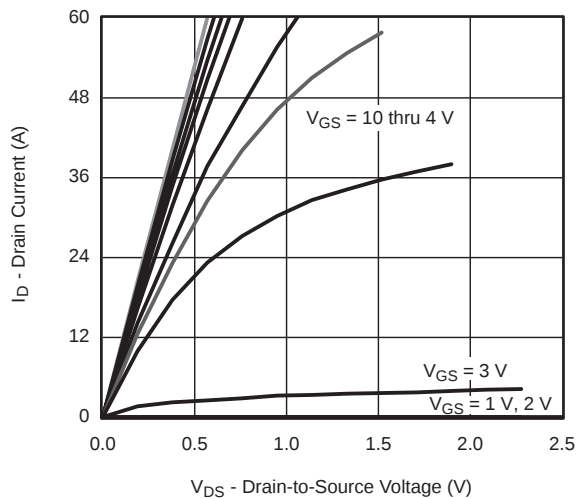
Notes:

a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

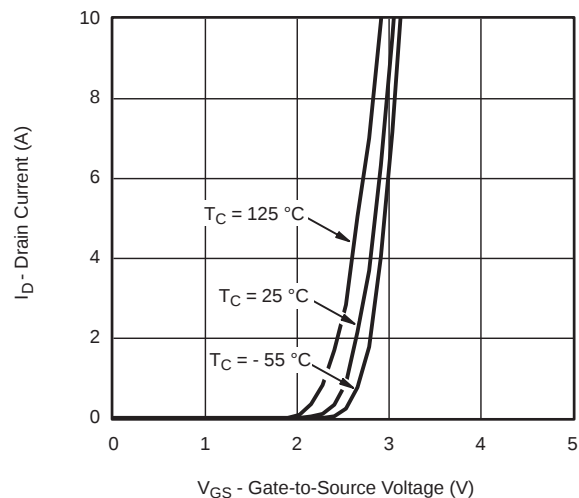
b. Guaranteed by design, not subject to production testing.

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.

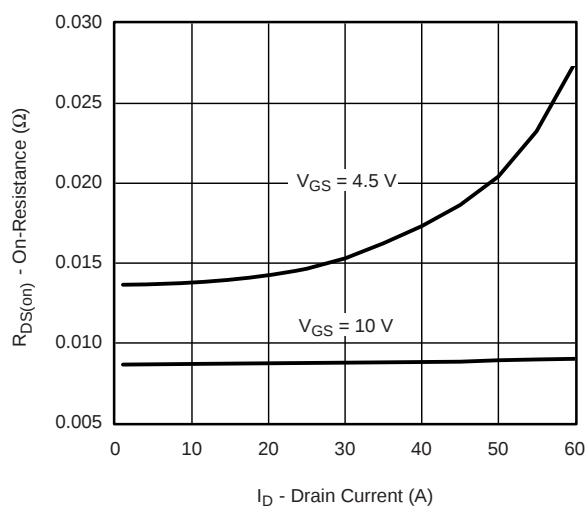
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



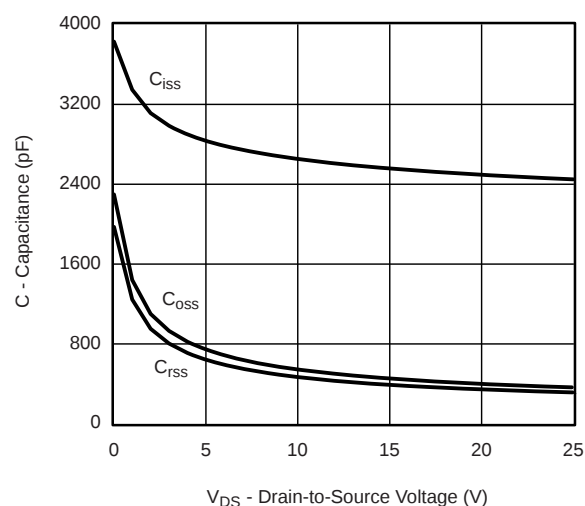
Output Characteristics



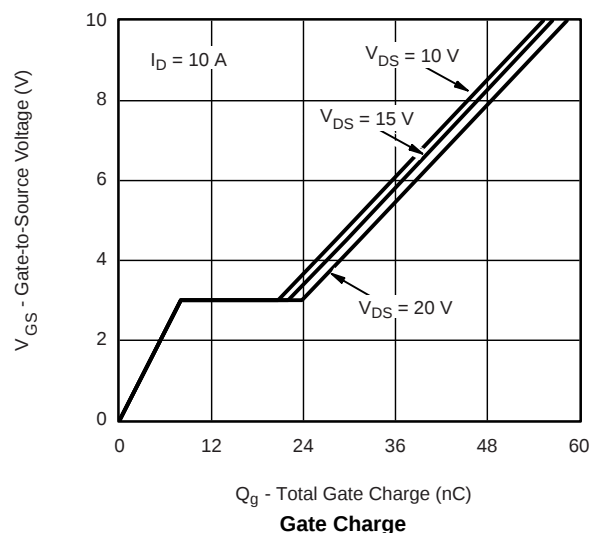
Transfer Characteristics



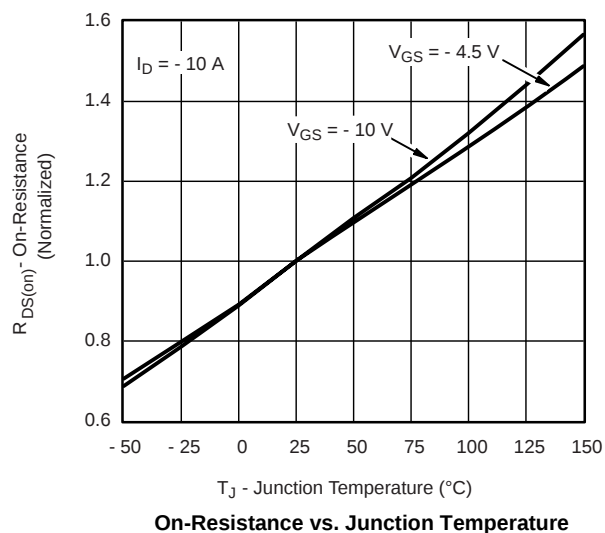
On-Resistance vs. Drain Current



Capacitance



Gate Charge



On-Resistance vs. Junction Temperature

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



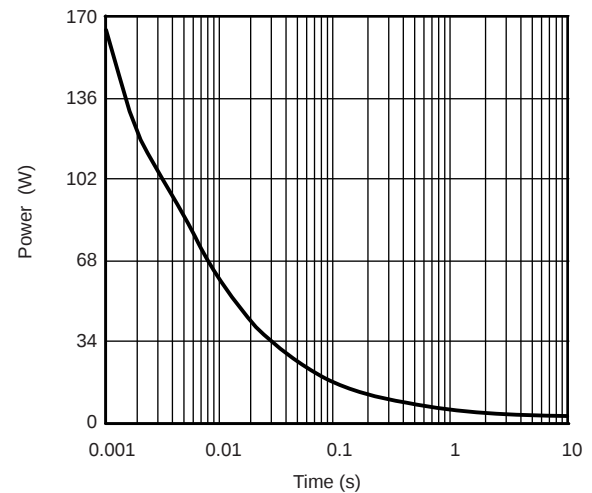
Source-Drain Diode Forward Voltage



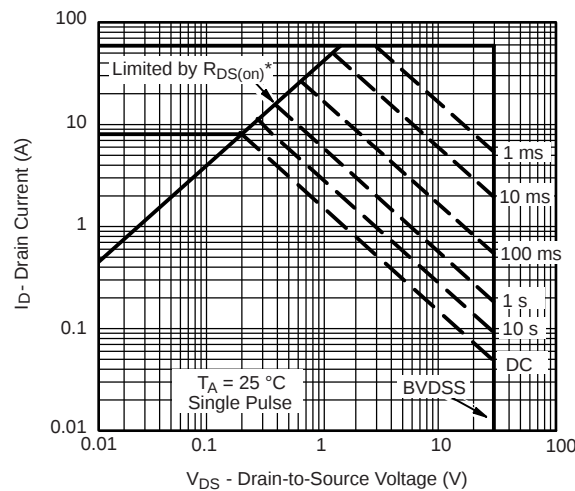
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power, Junction-to-Ambient



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

Safe Operating Area

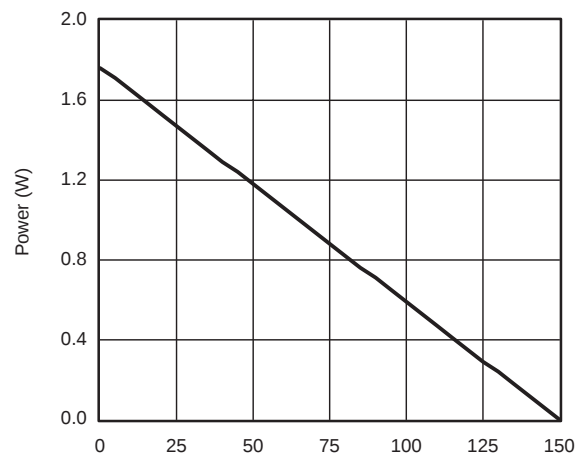
MOSFET TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Current Derating*



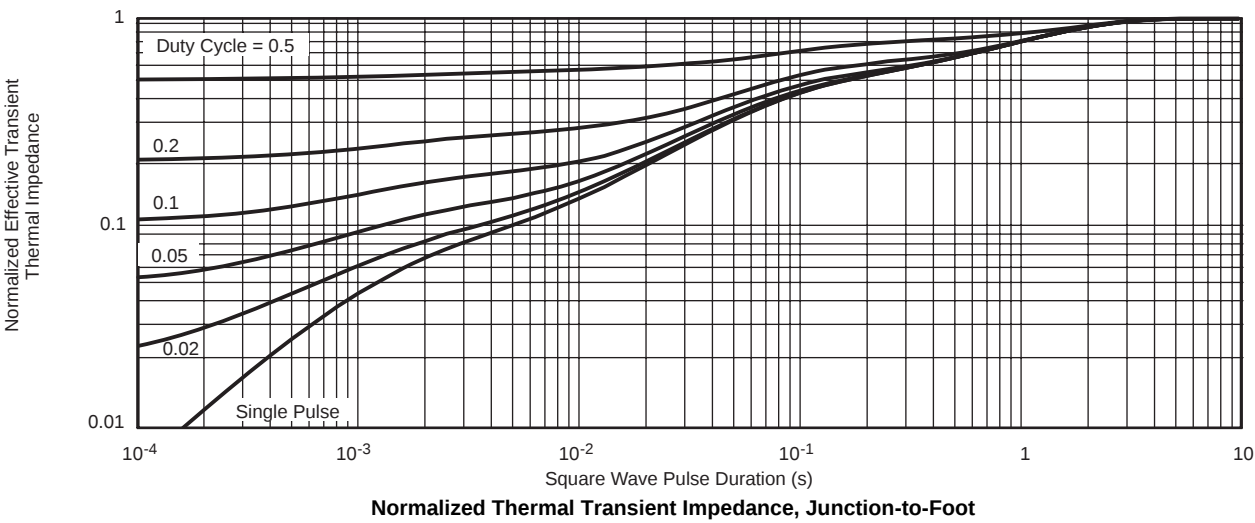
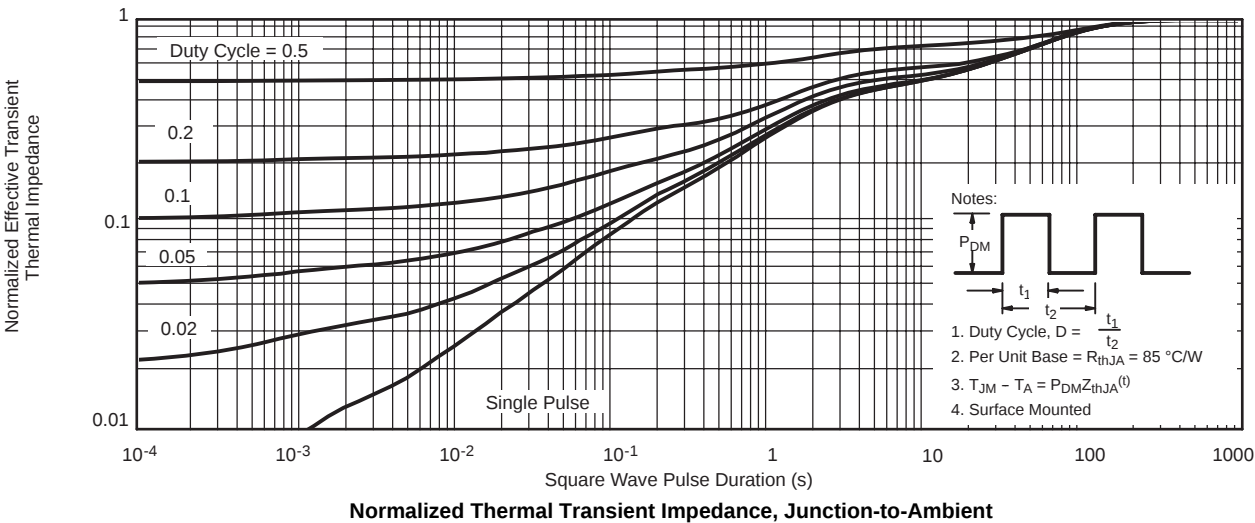
Power, Junction-to-Foot

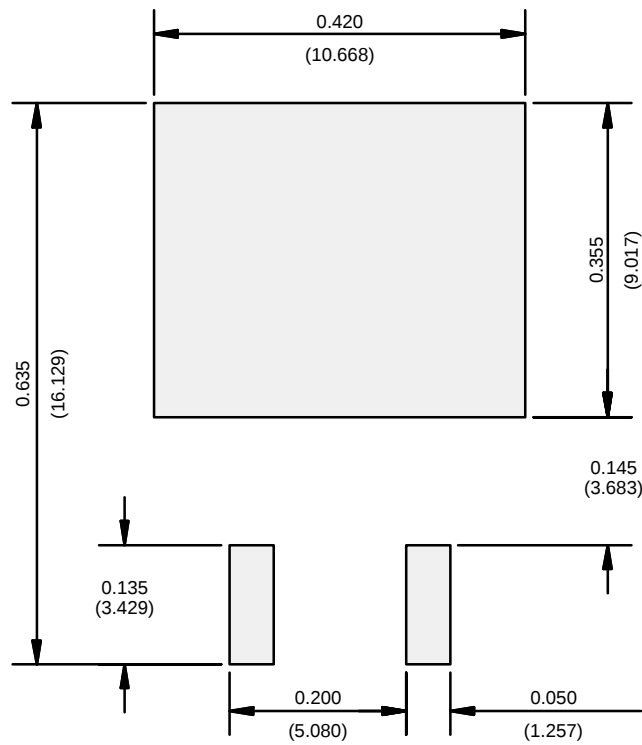


Power Derating, Junction-to-Ambient

* The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



RECOMMENDED MINIMUM PADS FOR D²PAK: 3-Lead

Recommended Minimum Pads
Dimensions in Inches/(mm)

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