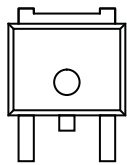


Automotive N-Channel 60 V (D-S) 175 °C MOSFET

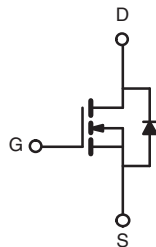
PRODUCT SUMMARY	
V_{DS} (V)	60
$R_{DS(on)}$ (Ω) at $V_{GS} = 10$ V	0.0076
$R_{DS(on)}$ (Ω) at $V_{GS} = 4.5$ V	0.009
I_D (A)	50
Configuration	Single

TO-252


G D S

Top View

Drain Connected to Tab



N-Channel MOSFET

FEATURES

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

 AUTOMOTIVE
GRADE

RoHS
COMPLIANT
HALOGEN
FREE

ORDERING INFORMATION	
Package	TO-252
Lead (Pb)-free and Halogen-free	SQD50N06-07L-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	I_D	$T_C = 25$ °C	50	A	
		$T_C = 125$ °C	50		
Continuous Source Current (Diode Conduction) ^a	I_S	50			
Pulsed Drain Current ^b	I_{DM}	200			
Single Pulse Avalanche Energy	E_{AS}	L = 0.1 mH	115	mJ	
Single Pulse Avalanche Current			I_{AS}	48	A
Maximum Power Dissipation ^b	P_D	$T_C = 25$ °C	136	W	
		$T_C = 125$ °C	45		
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to + 175	°C		

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

Notes

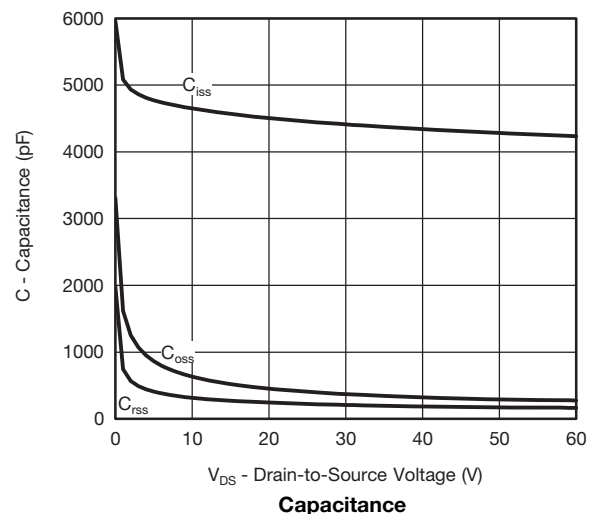
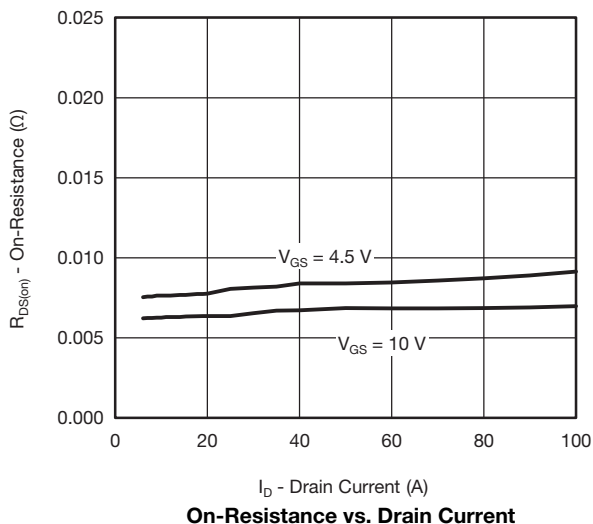
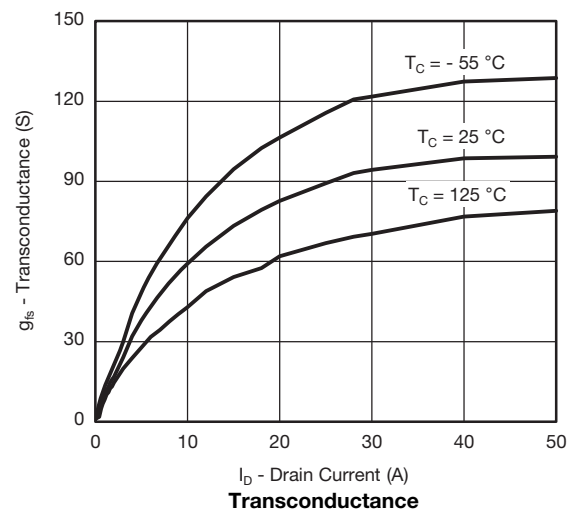
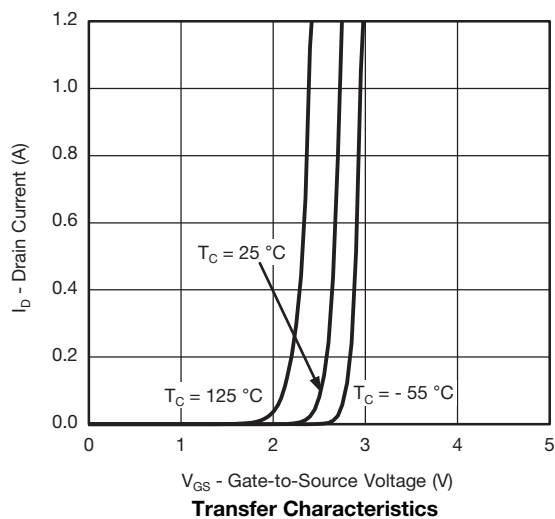
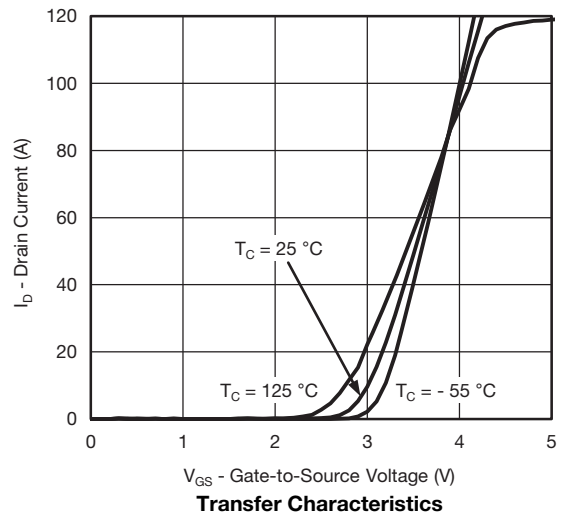
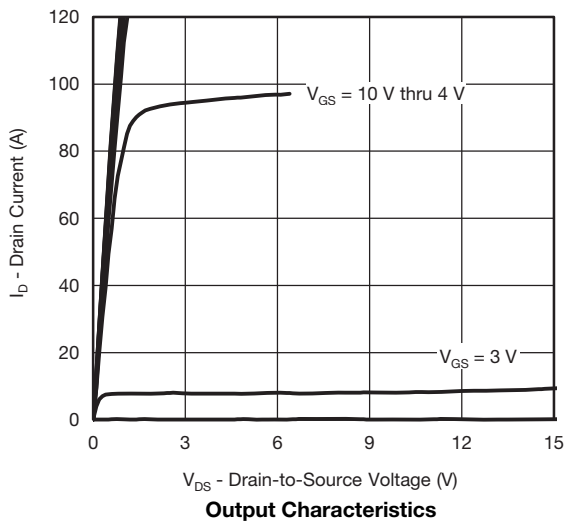
- Package limited.
- Pulse test; pulse width ≤ 300 μ s, duty cycle ≤ 2 %.
- When mounted on 1" square PCB (FR-4 material).
- Parametric verification ongoing.

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	2.0	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}	$V_{GS} = 0\text{ V}$	$V_{DS} = 60\text{ V}$	-	-	1.0	μA
		$V_{GS} = 0\text{ V}$	$V_{DS} = 60\text{ V}, T_J = 125\text{ }^\circ\text{C}$	-	-	50	
		$V_{GS} = 0\text{ V}$	$V_{DS} = 60\text{ V}, T_J = 175\text{ }^\circ\text{C}$	-	-	250	
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	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$	$I_D = 20\text{ A}$	-	0.0064	0.0076	Ω
		$V_{GS} = 10\text{ V}$	$I_D = 20\text{ A}, T_J = 125\text{ }^\circ\text{C}$	-	-	0.0130	
		$V_{GS} = 10\text{ V}$	$I_D = 20\text{ A}, T_J = 175\text{ }^\circ\text{C}$	-	-	0.0160	
		$V_{GS} = 4.5\text{ V}$	$I_D = 20\text{ A}$	-	0.0078	0.0090	
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 20\text{ A}$		-	82	-	S
Dynamic^b							
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}$	$V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	-	4455	5570	μF
Output Capacitance	C_{oss}			-	407	510	
Reverse Transfer Capacitance	C_{rss}			-	223	280	
Total Gate Charge ^c	Q_g	$V_{GS} = 10\text{ V}$	$V_{DS} = 30\text{ V}, I_D = 50\text{ A}$	-	80	120	nC
Gate-Source Charge ^c	Q_{gs}			-	11.1	-	
Gate-Drain Charge ^c	Q_{gd}			-	15.7	-	
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = 30\text{ V}, R_L = 0.6\text{ }\Omega$ $I_D \cong 50\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$		-	12	18	ns
Rise Time ^c	t_r			-	13	20	
Turn-Off Delay Time ^c	$t_{d(off)}$			-	42	63	
Fall Time ^c	t_f			-	7	11	
Source-Drain Diode Ratings and Characteristics^b							
Pulsed Current ^a	I_{SM}			-	-	200	A
Forward Voltage	V_{SD}	$I_F = 20\text{ A}, V_{GS} = 0\text{ V}$		-	0.85	1.5	V

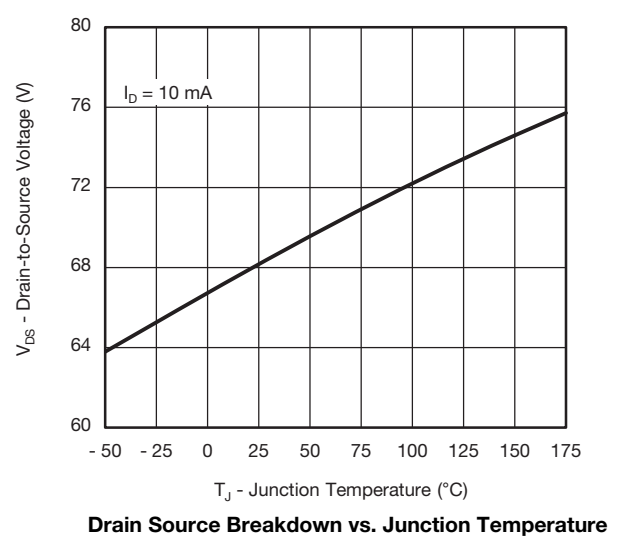
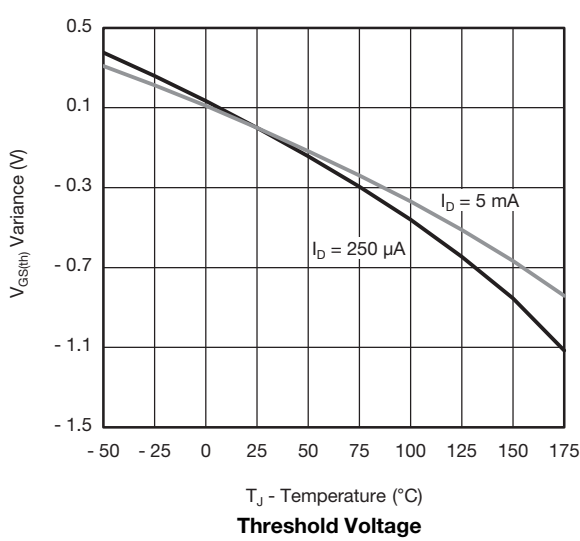
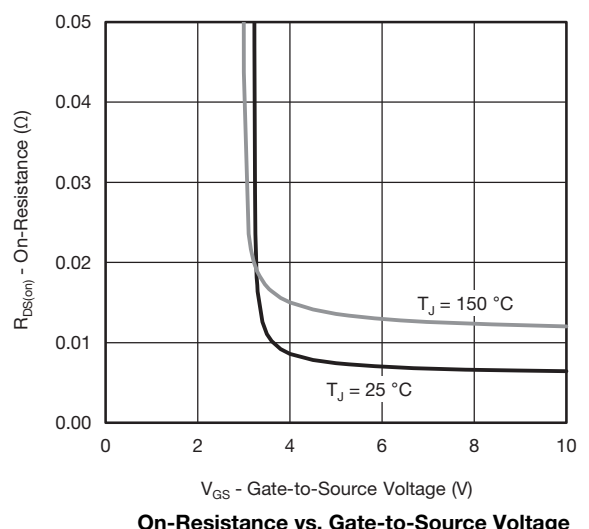
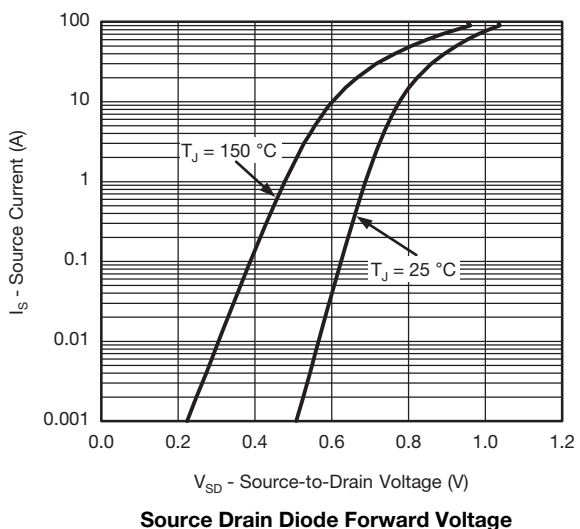
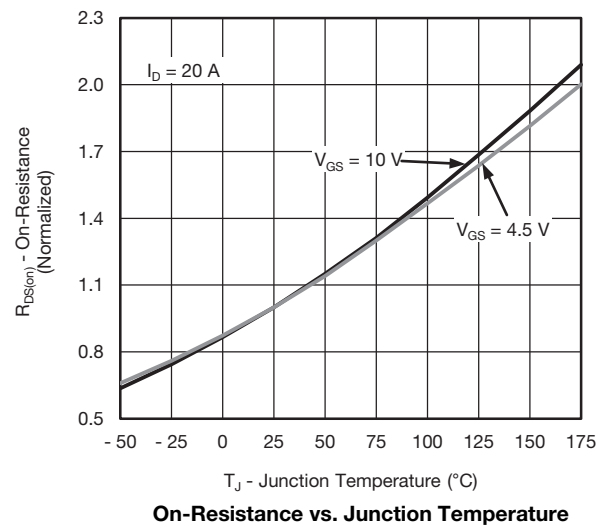
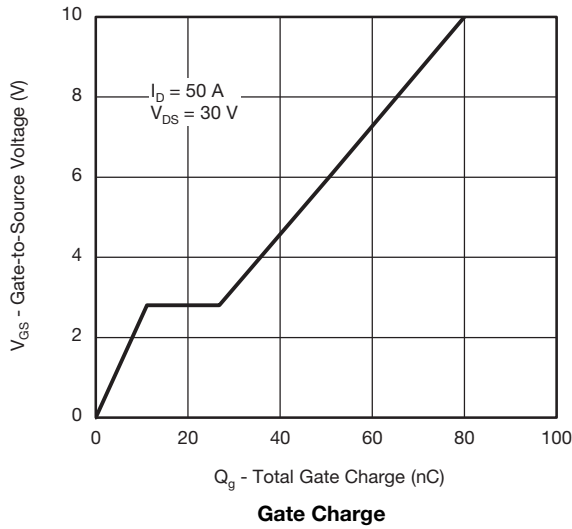
Notes

- 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.

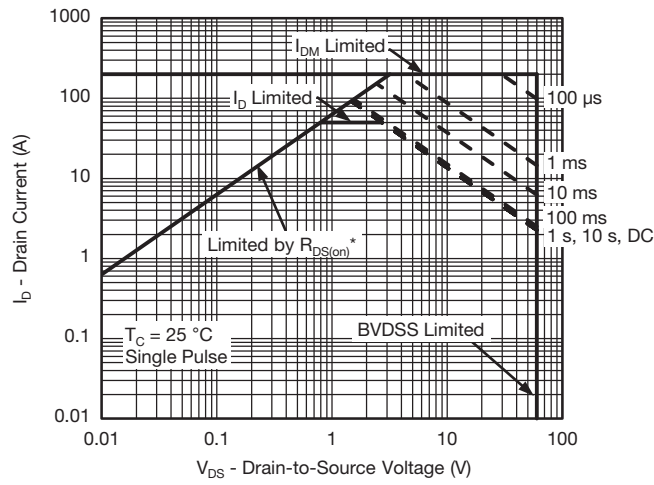
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

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


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

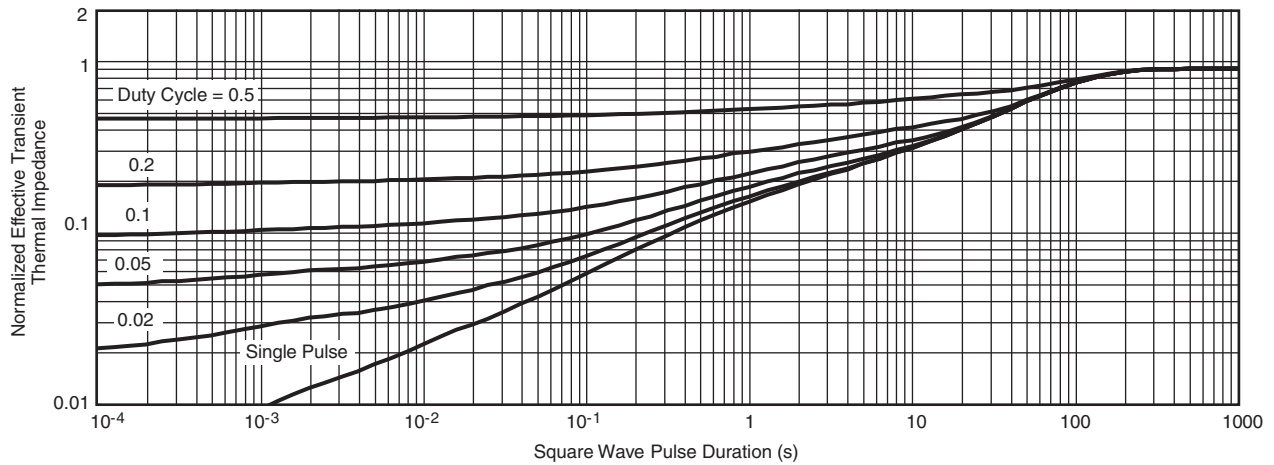


THERMAL RATINGS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



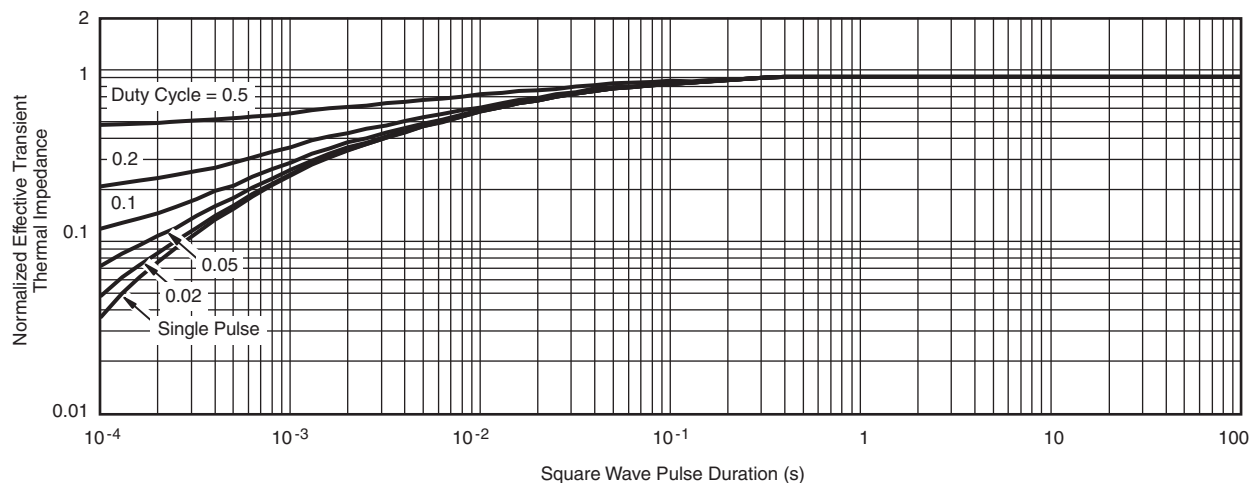
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient

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 two graphs
 - Normalized Transient Thermal Impedance Junction-to-Ambient ($25\text{ }^\circ\text{C}$)
 - Normalized Transient Thermal Impedance Junction-to-Case ($25\text{ }^\circ\text{C}$)
 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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