

20-V N-Channel NexFET™ Power MOSFETs

Check for Samples: [CSD15571Q2](#)

FEATURES

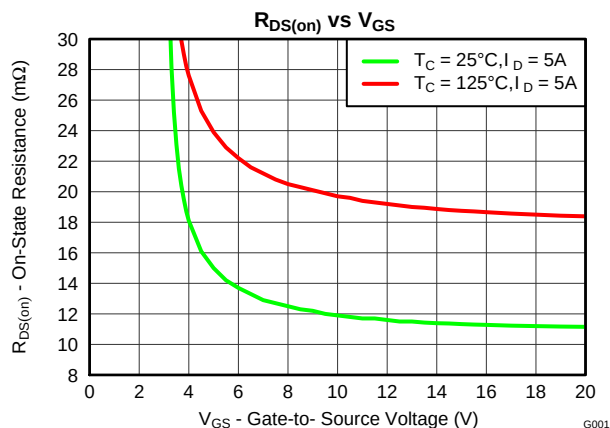
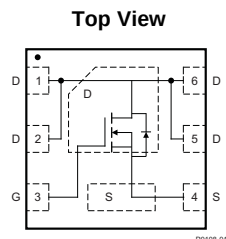
- Ultralow Q_g and Q_{gd}
- Low Thermal Resistance
- Avalanche Rated
- Pb Free Terminal Plating
- RoHS Compliant
- Halogen Free
- SON 2-mm × 2-mm Plastic Package

APPLICATIONS

- Optimized for Load Switch Applications
- Storage, Tablets, and Handheld Devices
- Optimized for Control FET Applications
- Point of Load Synchronous Buck Converters

DESCRIPTION

The NexFET™ power MOSFET has been designed to minimize losses in power conversion and load management applications. The SON 2x2 offers excellent thermal performance for the size of the package.



PRODUCT SUMMARY

V_{DS}	Drain to Source Voltage	20	V
Q_g	Gate Charge Total (4.5V)	2.5	nC
Q_{gd}	Gate Charge Gate to Drain	0.66	nC
$R_{DS(on)}$	Drain to Source On Resistance	$V_{GS} = 4.5\text{V}$	16 mΩ
		$V_{GS} = 10\text{V}$	12 mΩ
$V_{GS(th)}$	Threshold Voltage	1.45	V

ORDERING INFORMATION

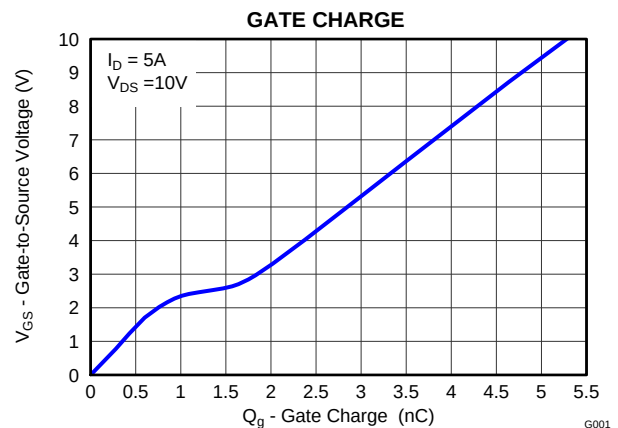
Device	Package	Media	Qty	Ship
CSD15571Q2	SON 2-mm × 2-mm Plastic Package	7-Inch Reel	3000	Tape and Reel

ABSOLUTE MAXIMUM RATINGS

$T_A = 25^\circ\text{C}$ unless otherwise stated		VALUE	UNIT
V_{DS}	Drain to Source Voltage	20	V
V_{GS}	Gate to Source Voltage	±20	V
I_D	Continuous Drain Current (Package Limit)	22	A
	Continuous Drain Current ⁽¹⁾	10	A
I_{DM}	Pulsed Drain Current, $T_A = 25^\circ\text{C}$ ⁽²⁾	52	A
P_D	Power Dissipation ⁽¹⁾	2.5	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	–55 to 150	°C
E_{AS}	Avalanche Energy, single pulse $I_D = 19\text{A}, L = 0.1\text{mH}, R_G = 25\Omega$	18	mJ

(1) $R_{\theta JA} = 50$ on 1in² Cu (2 oz.) on .060" thick FR4 PCB.

(2) Pulse duration 10μs, duty cycle ≤2%



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

NexFET is a trademark of Texas Instruments.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of the Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

Copyright © 2013, Texas Instruments Incorporated



These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

ELECTRICAL CHARACTERISTICS

$T_A = 25^\circ\text{C}$, unless otherwise specified

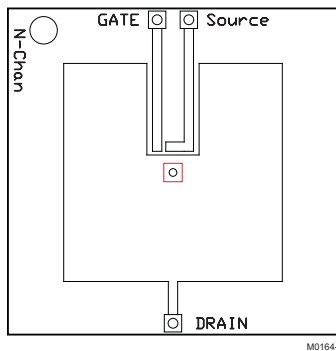
PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
Static Characteristics						
BV _{DSS}	Drain to Source Voltage	V _{GS} = 0V, I _D = 250μA	20			V
I _{DSS}	Drain to Source Leakage Current	V _{GS} = 0V, V _{DS} = 20V			1	μA
I _{GSS}	Gate to Source Leakage Current	V _{DS} = 0V, V _{GS} = 20V			100	nA
V _{GS(th)}	Gate to Source Threshold Voltage	V _{DS} = V _{GS} , I _{DS} = 250μA	1.10	1.45	1.90	V
R _{DS(on)}	Drain to Source On Resistance	V _{GS} = 4.5V, I _{DS} = 5A		16.0	19.2	mΩ
		V _{GS} = 10V, I _{DS} = 5A		12.0	15.0	mΩ
g _{fs}	Transconductance	V _{DS} = 16V, I _{DS} = 5A		25		S
Dynamic Characteristics						
C _{ISS}	Input Capacitance	V _{GS} = 0V, V _{DS} = 10V, f = 1MHz		320	419	pF
C _{OSS}	Output Capacitance			184	239	pF
C _{RSS}	Reverse Transfer Capacitance			32	42	pF
R _g	Series Gate Resistance			3.8	7.6	Ω
Q _g	Gate Charge Total (4.5V)	V _{DS} = 10V, I _{DS} = 5A		2.5	3.3	nC
Q _g	Gate Charge Total (10V)			5.1	6.7	nC
Q _{gd}	Gate Charge – Gate to Drain			0.66		nC
Q _{gs}	Gate Charge Gate to Source			0.93		nC
Q _{g(th)}	Gate Charge at V _{th}			0.52		nC
Q _{OSS}	Output Charge	V _{DS} = 10V, V _{GS} = 0V		4.1		nC
t _{d(on)}	Turn On Delay Time	V _{DS} = 10V, V _{GS} = 4.5V, I _{DS} = 5A R _G = 2Ω		4.7		ns
t _r	Rise Time			17.2		ns
t _{d(off)}	Turn Off Delay Time			9.9		ns
t _f	Fall Time			4.1		ns
Diode Characteristics						
V _{SD}	Diode Forward Voltage	I _{DS} = 5A, V _{GS} = 0V		0.82	1	V
Q _{rr}	Reverse Recovery Charge	V _{DD} = 10V, I _F = 5A, di/dt = 300A/μs		10.7		nC
t _{rr}	Reverse Recovery Time			19		ns

THERMAL CHARACTERISTICS

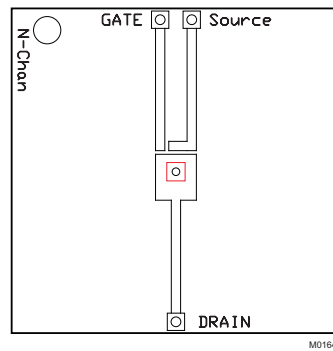
($T_A = 25^\circ\text{C}$ unless otherwise stated)

PARAMETER		MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Thermal Resistance Junction to Case ⁽¹⁾			4.5	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance Junction to Ambient ⁽¹⁾⁽²⁾			65	$^\circ\text{C/W}$

- $R_{\theta JC}$ is determined with the device mounted on a 1-inch² (6.45-cm²), 2-oz. (0.071-mm thick) Cu pad on a 1.5-inch $\times$ 1.5-inch (3.81-cm $\times$ 3.81-cm), 0.06-inch (1.52-mm) thick FR4 PCB. $R_{\theta JC}$ is specified by design, whereas $R_{\theta JA}$ is determined by the user's board design.
- Device mounted on FR4 material with 1-inch² (6.45-cm²), 2-oz. (0.071-mm thick) Cu.



Max $R_{\theta JA} = 65$ when
mounted on 1 inch²
(6.45 cm²) of 2-oz.
(0.071-mm thick) Cu.



Max $R_{\theta JA} = 235$ when
mounted on minimum
pad area of 2-oz.
(0.071-mm thick) Cu.

TYPICAL MOSFET CHARACTERISTICS

($T_A = 25^\circ\text{C}$ unless otherwise stated)

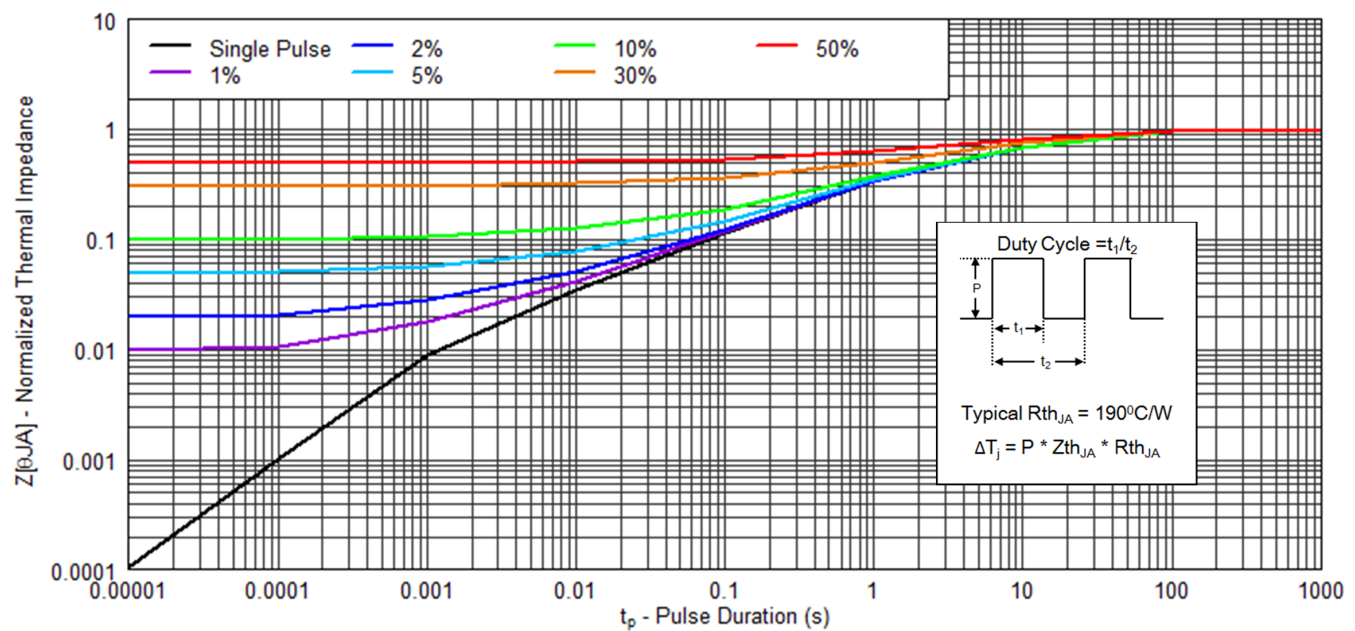


Figure 1. Transient Thermal Impedance

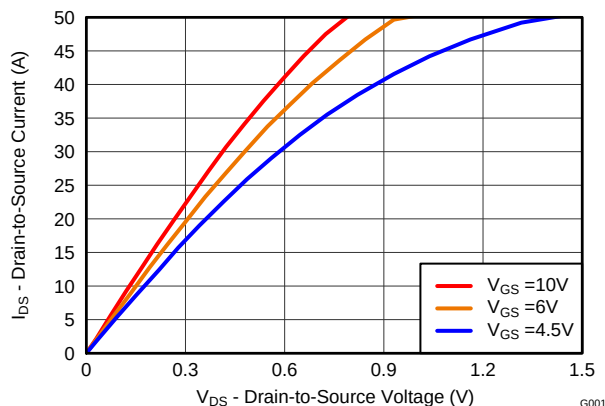


Figure 2. Saturation Characteristics

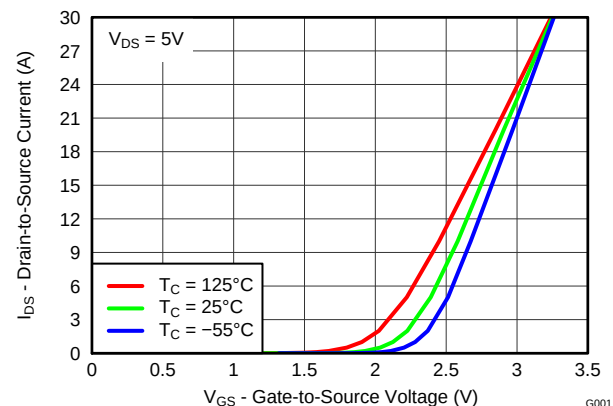


Figure 3. Transfer Characteristics

TYPICAL MOSFET CHARACTERISTICS (continued)

($T_A = 25^\circ\text{C}$ unless otherwise stated)

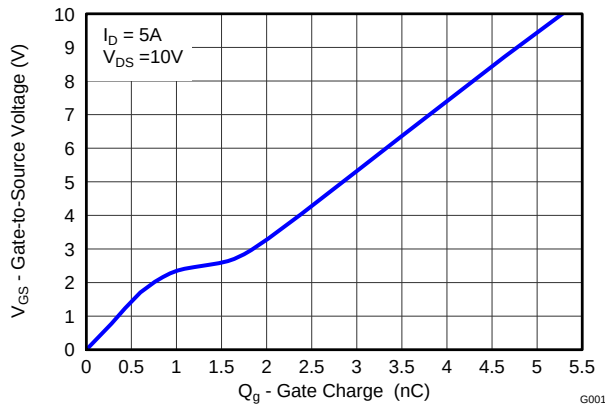


Figure 4. Gate Charge

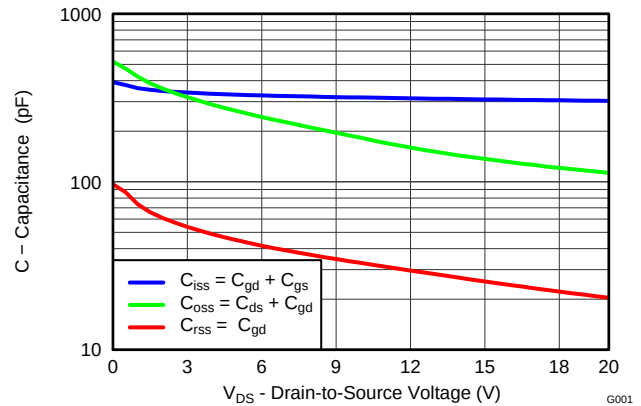


Figure 5. Capacitance

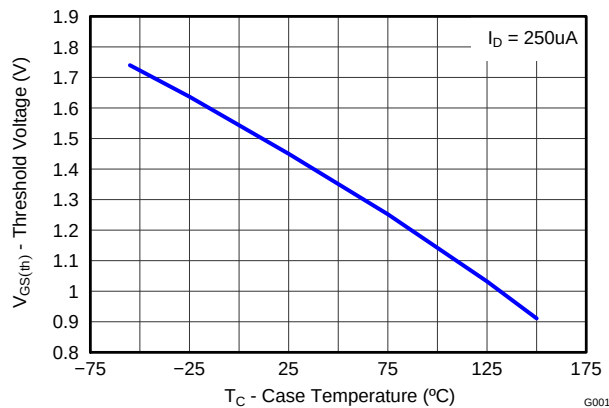


Figure 6. Threshold Voltage vs. Temperature

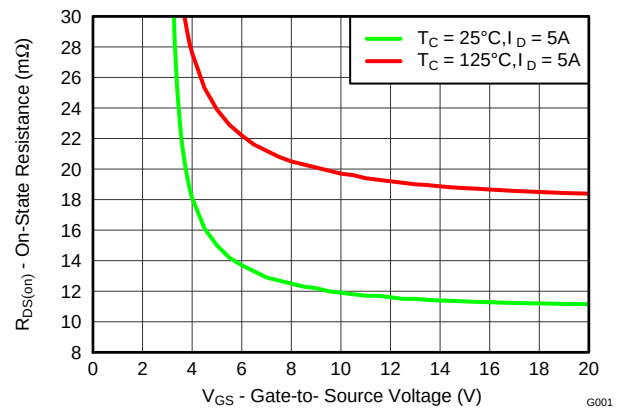


Figure 7. On-State Resistance vs. Gate-to-Source Voltage

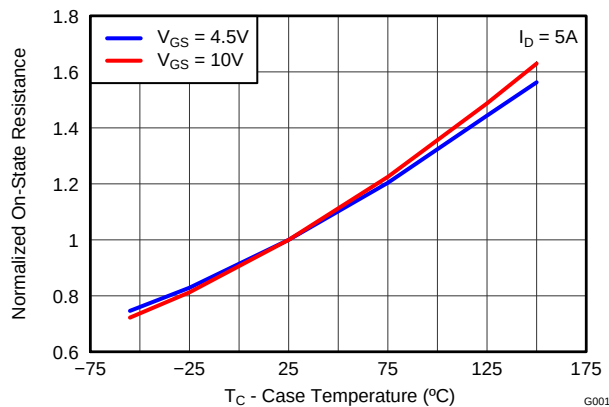


Figure 8. Normalized On-State Resistance vs. Temperature

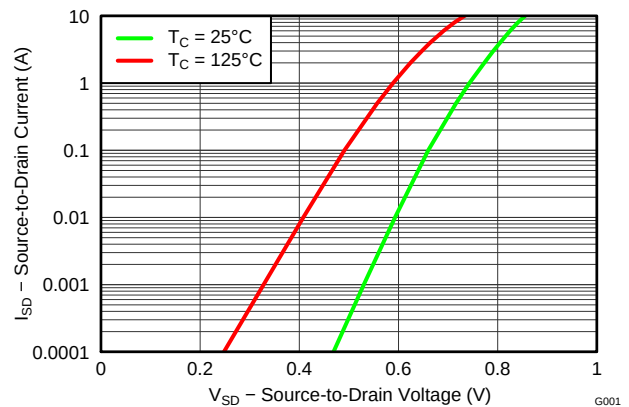


Figure 9. Typical Diode Forward Voltage

TYPICAL MOSFET CHARACTERISTICS (continued)

($T_A = 25^\circ\text{C}$ unless otherwise stated)

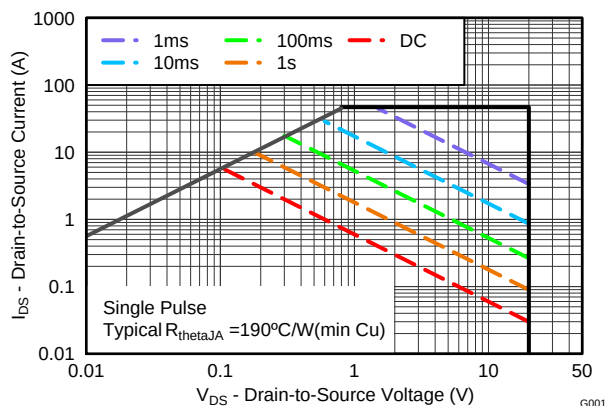


Figure 10. Maximum Safe Operating Area

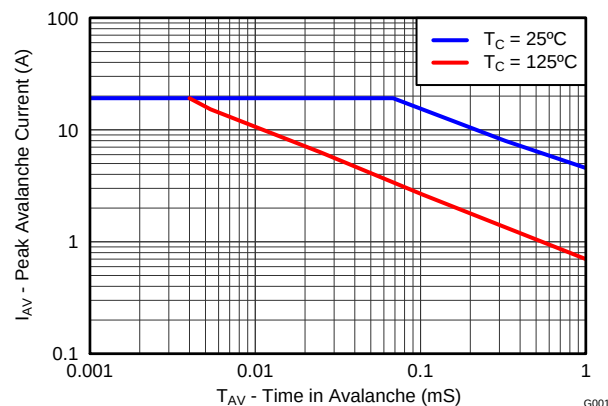


Figure 11. Single Pulse Unclamped Inductive Switching

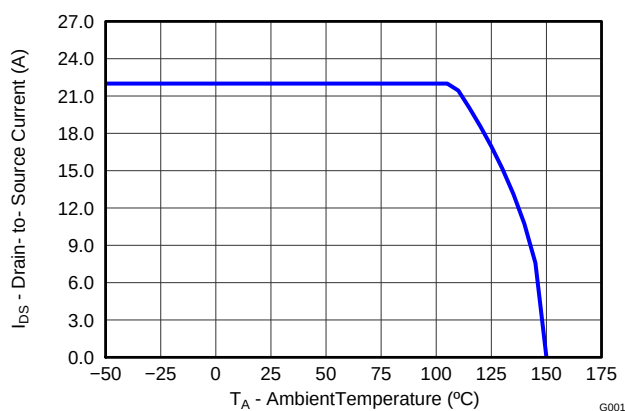
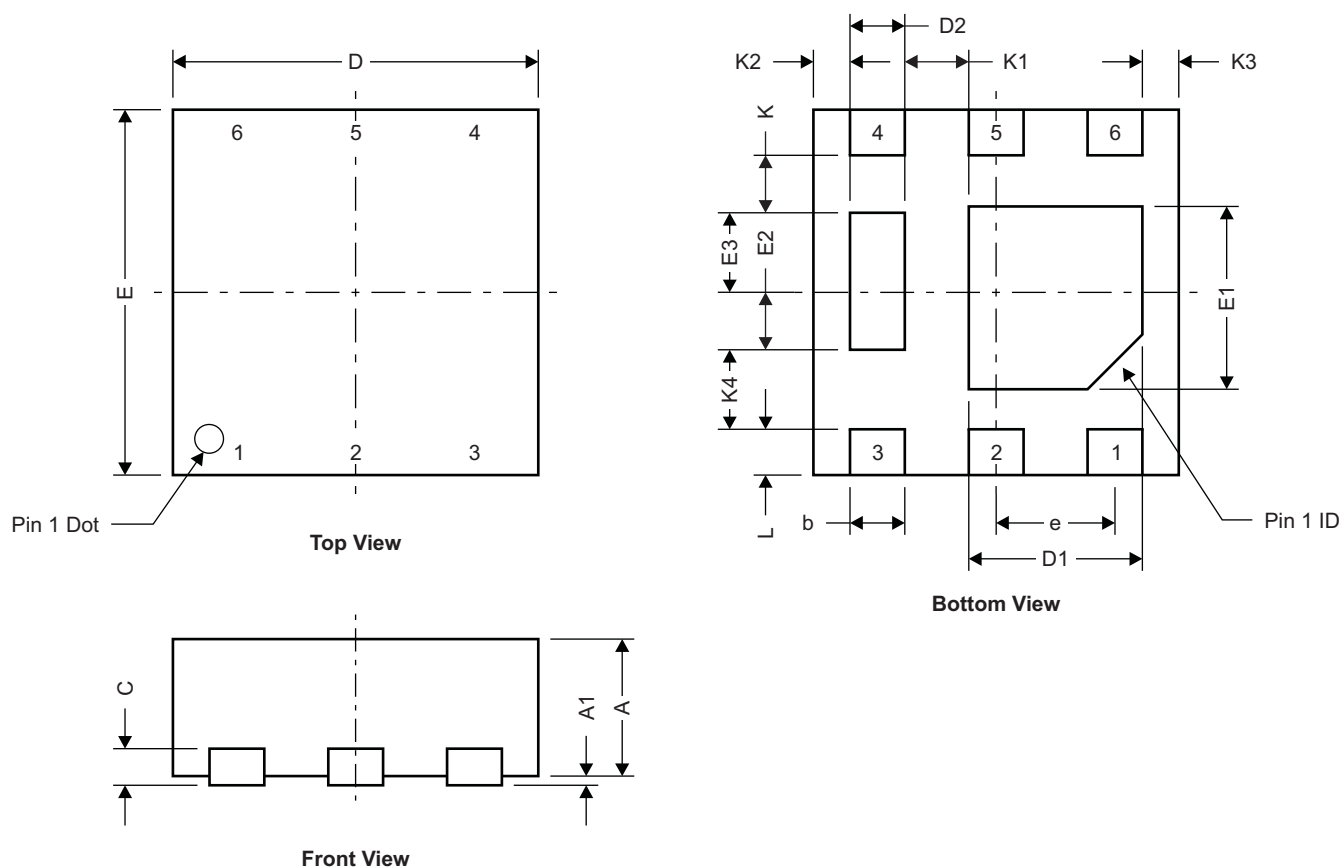


Figure 12. Maximum Drain Current vs. Temperature

MECHANICAL DATA

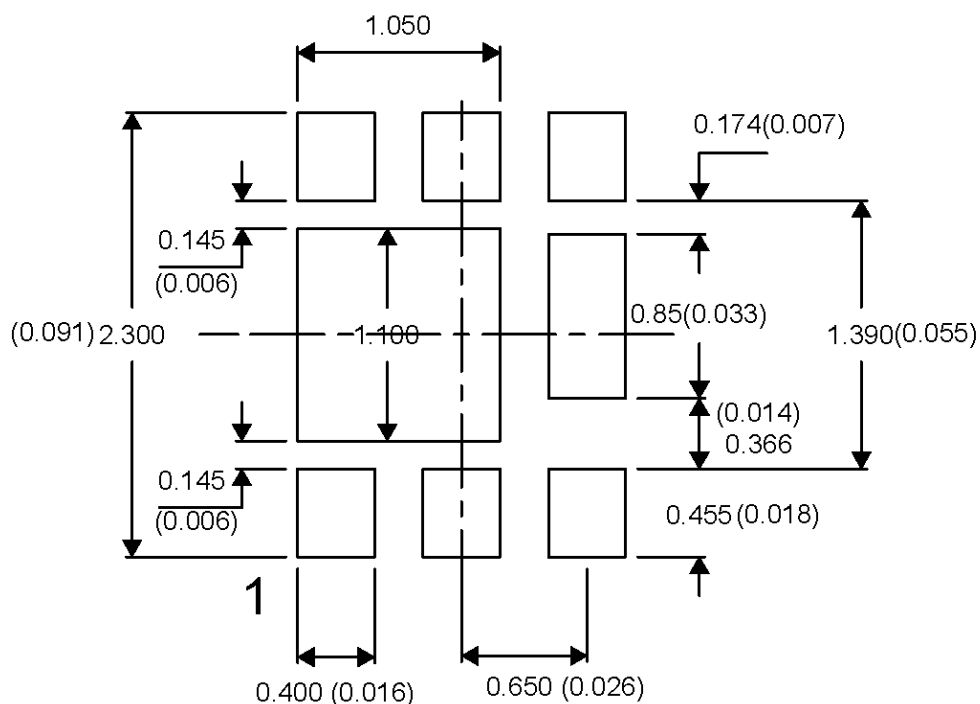
Q2 Package Dimensions



M0165-01

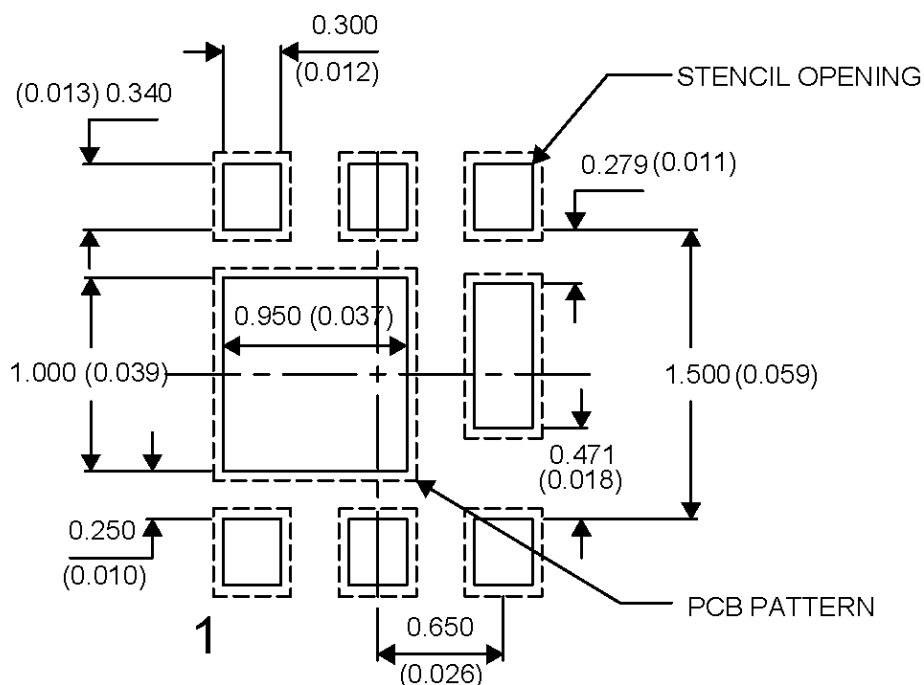
DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.700	0.750	0.800	0.028	0.030	0.032
A1	0.000		0.050	0.000		0.002
b	0.250	0.300	0.350	0.010	0.012	0.014
C	0.203 TYP			0.008 TYP		
D	2.000 TYP			0.080 TYP		
D1	0.900	0.950	1.000	0.036	0.038	0.040
D2	0.300 TYP			0.012 TYP		
E	2.000 TYP			0.080 TYP		
E1	0.900	1.000	1.100	0.036	0.040	0.044
E2	0.280 TYP			0.0112 TYP		
E3	0.470 TYP			0.0188 TYP		
e	0.650 BSC			0.026 TYP		
K	0.280 TYP			0.0112 TYP		
K1	0.350 TYP			0.014 TYP		
K2	0.200 TYP			0.008 TYP		
K3	0.200 TYP			0.008 TYP		
K4	0.470 TYP			0.0188 TYP		
L	0.200	0.25	0.300	0.008	0.010	0.012

Recommended PCB Pattern



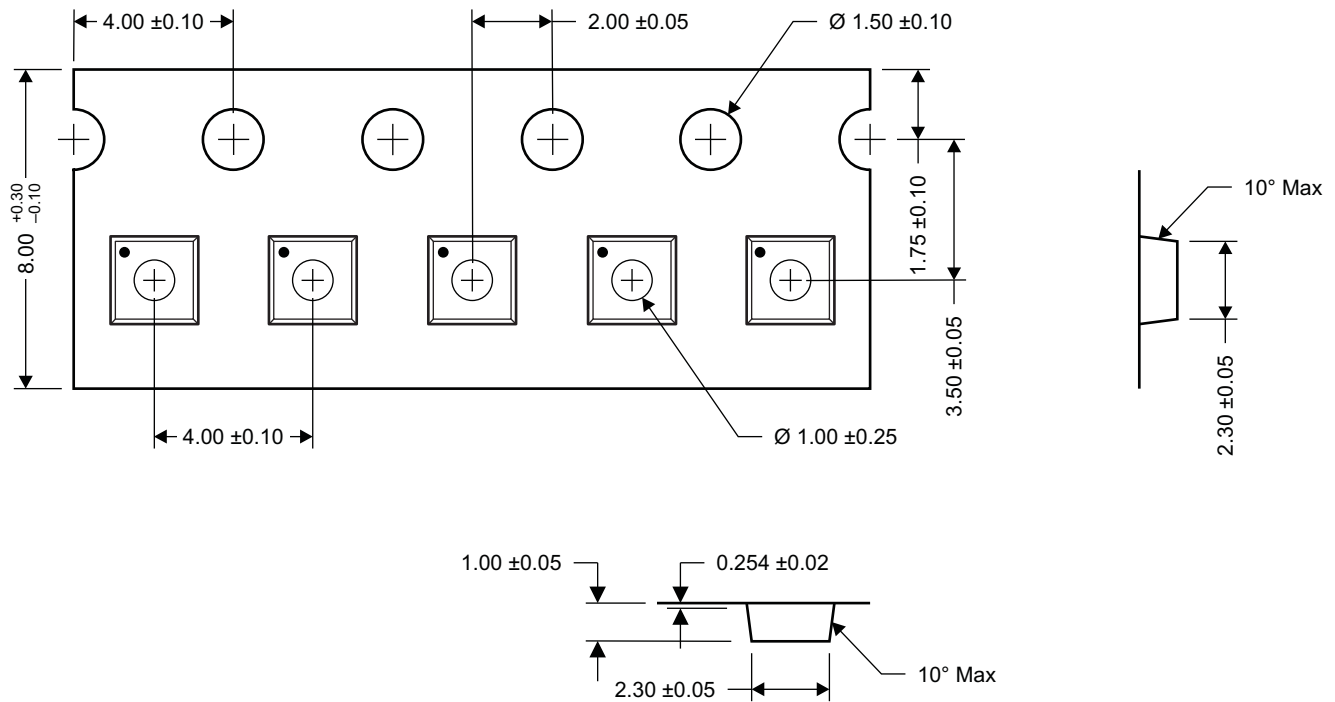
For recommended circuit layout for PCB designs, see application note [SLPA005 – Reducing Ringing Through PCB Layout Techniques](#).

Recommended Stencil Pattern



Note: All dimensions are in mm, unless otherwise specified.

Q2 Tape and Reel Information



M0168-01

- Notes:
1. Measured from centerline of sprocket hole to centerline of pocket
 2. Cumulative tolerance of 10 sprocket holes is ± 0.20
 3. Other material available
 4. Typical SR of form tape Max 10^9 OHM/SQ
 5. All dimensions are in mm, unless otherwise specified.

PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package Pins	Package qty Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
CSD15571Q2	Active	Production	WSON (DQK) 6	3000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-55 to 150	1551
CSD15571Q2.B	Active	Production	WSON (DQK) 6	3000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-55 to 150	1551
CSD15571Q2G4.B	Active	Production	WSON (DQK) 6	3000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-55 to 150	1551

⁽¹⁾ **Status:** For more details on status, see our [product life cycle](#).

⁽²⁾ **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

⁽³⁾ **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

⁽⁴⁾ **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

⁽⁵⁾ **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

⁽⁶⁾ **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you fully indemnify TI and its representatives against any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to [TI's Terms of Sale](#), [TI's General Quality Guidelines](#), or other applicable terms available either on [ti.com](#) or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products. Unless TI explicitly designates a product as custom or customer-specified, TI products are standard, catalog, general purpose devices.

TI objects to and rejects any additional or different terms you may propose.

Copyright © 2025, Texas Instruments Incorporated

Last updated 10/2025