



Automotive N-Channel 150 V (D-S) 175 °C MOSFET

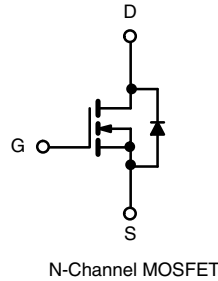
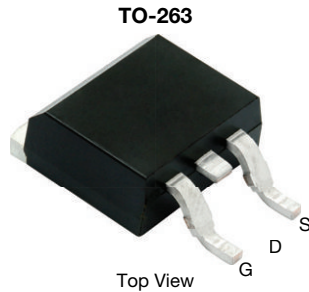


RoHS COMPLIANT HALOGEN FREE

PRODUCT SUMMARY	
V _{DS} (V)	150
R _{DS(on)} (Ω) at V _{GS} = 10 V	0.052
I _D (A)	25
Configuration	Single
Package	TO-263

FEATURES

- TrenchFET® power MOSFET
- Package with low thermal resistance
- 100 % R_g and UIS tested
- AEC-Q101 qualified ^d
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNIT	
Drain-Source Voltage	V _{DS}	150	V	
Gate-Source Voltage	V _{GS}	± 20		
Continuous Drain Current	I _D	T _C = 25 °C	A	
		T _C = 125 °C		16
Continuous Source Current (Diode Conduction) ^a	I _S	50		
Pulsed Drain Current ^b	I _{DM}	65		
Single Pulse Avalanche Energy	L = 0.1 mH	I _{AS}		30
Single Pulse Avalanche Current		E _{AS}		45
Maximum Power Dissipation ^b	P _D	T _C = 25 °C	107	W
		T _C = 125 °C	35	
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}	40	°C/W
Junction-to-Case (Drain)	R _{thJC}	1.4	

Notes

- Package limited.
- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
- When mounted on 1" square PCB (FR4 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}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$		150	-	-	V
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$		2.5	3	4	
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}	$V_{GS} = 0\text{ V}$	$V_{DS} = 150\text{ V}$	-	-	1	μA
		$V_{GS} = 0\text{ V}$	$V_{DS} = 150\text{ V}, T_J = 125\text{ }^\circ\text{C}$	-	-	50	
		$V_{GS} = 0\text{ V}$	$V_{DS} = 150\text{ V}, T_J = 175\text{ }^\circ\text{C}$	-	-	250	
On-State Drain Current ^a	$I_{D(on)}$	$V_{GS} = 10\text{ V}$	$V_{DS} \geq 5\text{ V}$	30	-	-	A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$	$I_D = 15\text{ A}$	-	0.041	0.052	Ω
		$V_{GS} = 10\text{ V}$	$I_D = 15\text{ A}, T_J = 125\text{ }^\circ\text{C}$	-	-	0.106	
		$V_{GS} = 10\text{ V}$	$I_D = 15\text{ A}, T_J = 175\text{ }^\circ\text{C}$	-	-	0.138	
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 15\text{ A}$		-	33	-	S
Dynamic ^b							
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}$	$V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	-	1886	2360	pF
Output Capacitance	C_{oss}			-	215	270	
Reverse Transfer Capacitance	C_{rss}			-	97	125	
Total Gate Charge ^c	Q_g	$V_{GS} = 10\text{ V}$	$V_{DS} = 75\text{ V}, I_D = 25\text{ A}$	-	34	51	nC
Gate-Source Charge ^c	Q_{gs}			-	14.5	-	
Gate-Drain Charge ^c	Q_{gd}			-	5.4	-	
Gate Resistance	R_g	$f = 1\text{ MHz}$		0.35	1.0	3.2	Ω
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = 75\text{ V}, R_L = 3\text{ }\Omega$ $I_D \cong 25\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$		-	11	17	ns
Rise Time ^c	t_r			-	21	33	
Turn-Off Delay Time ^c	$t_{d(off)}$			-	20	30	
Fall Time ^c	t_f			-	12	20	
Source-Drain Diode Ratings and Characteristics ^b							
Pulsed Current ^a	I_{SM}			-	-	65	A
Forward Voltage	V_{SD}	$I_F = 20\text{ A}, V_{GS} = 0\text{ V}$		-	0.85	1.5	V

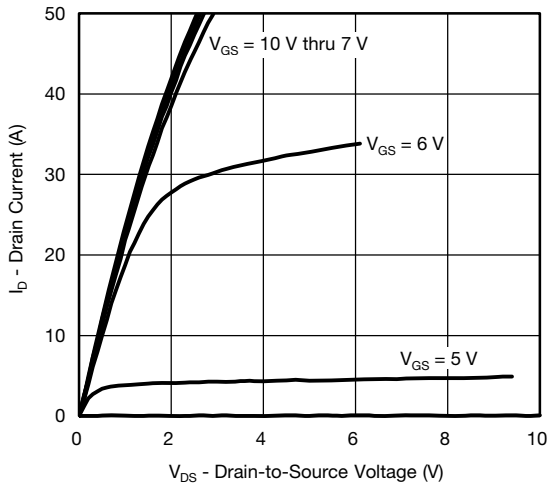
Notes

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

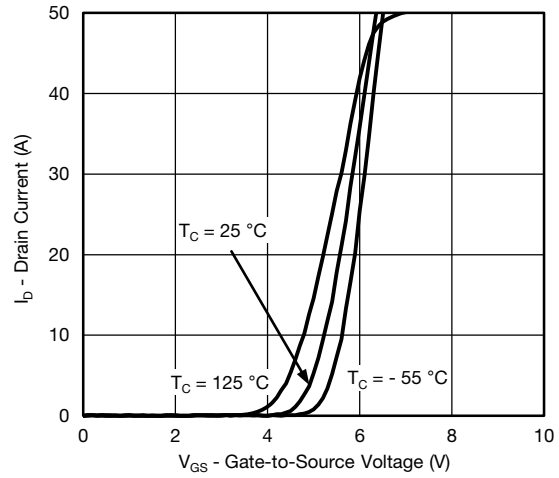
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



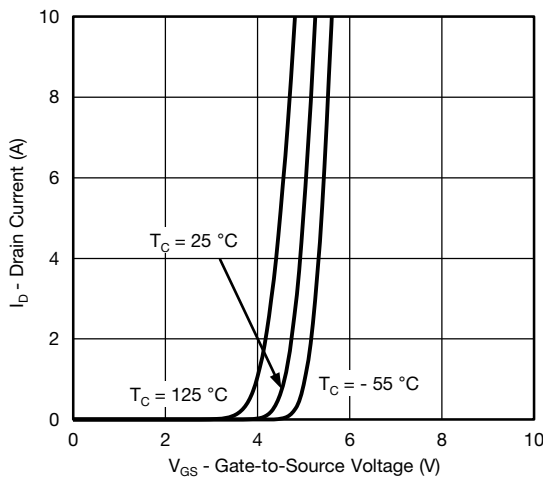
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



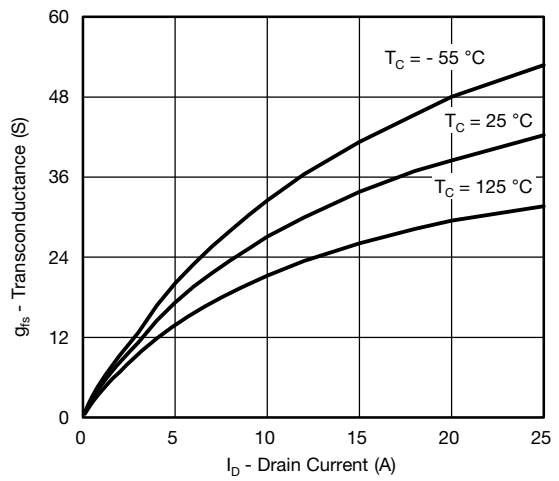
Output Characteristics



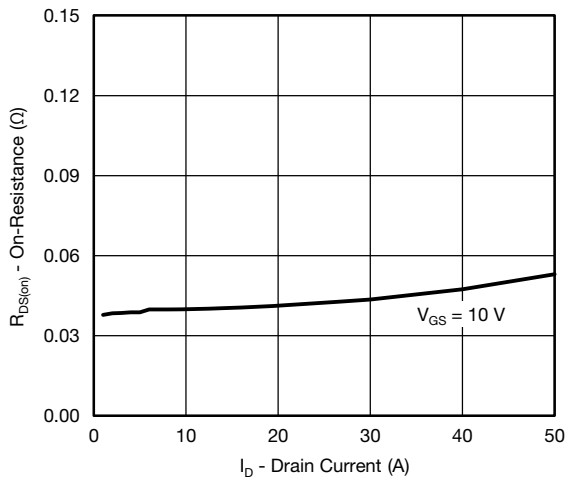
Transfer Characteristics



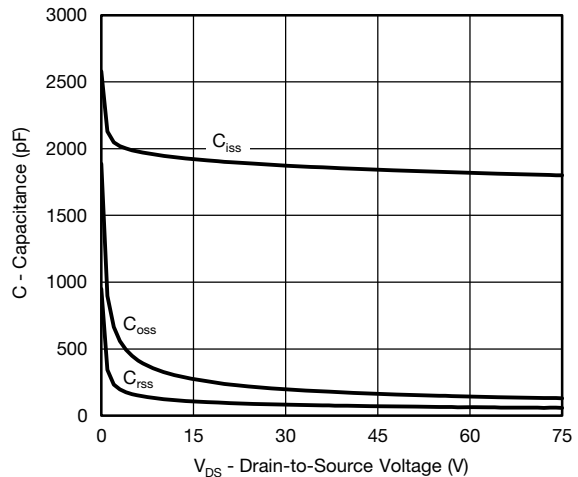
Transfer Characteristics



Transconductance



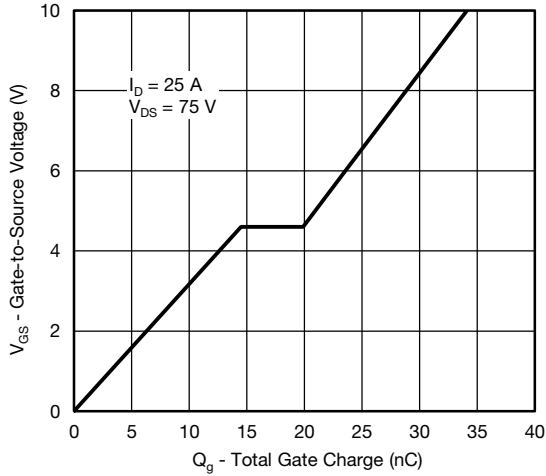
On-Resistance vs. Drain Current



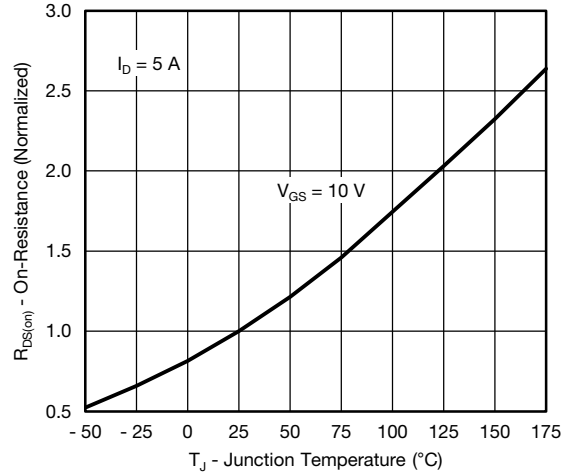
Capacitance



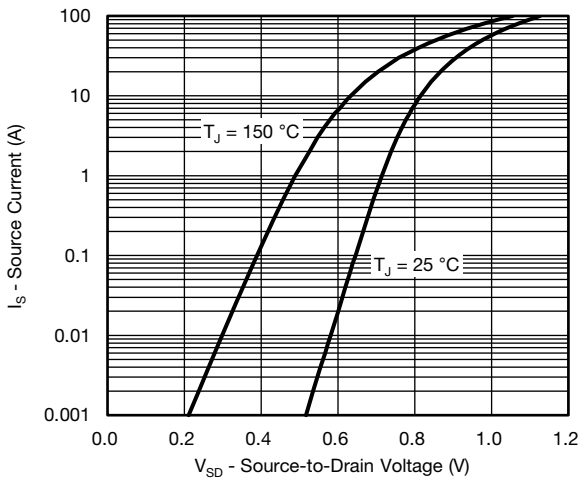
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



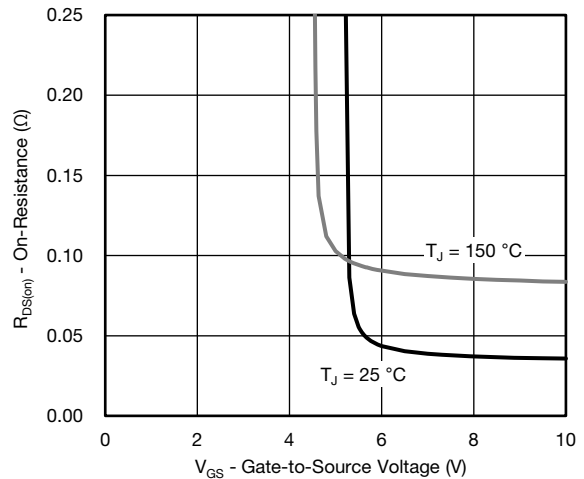
Gate Charge



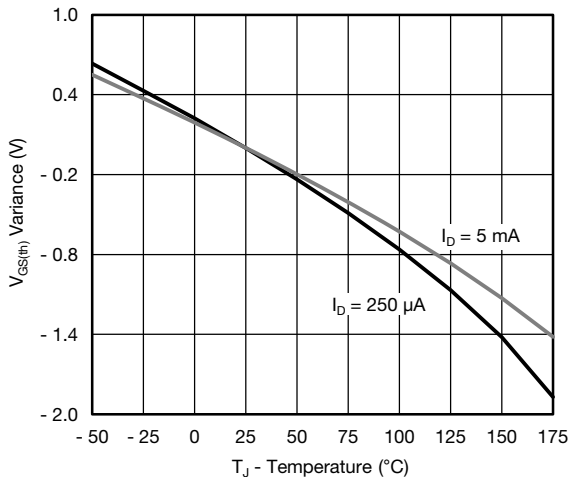
On-Resistance vs. Junction Temperature



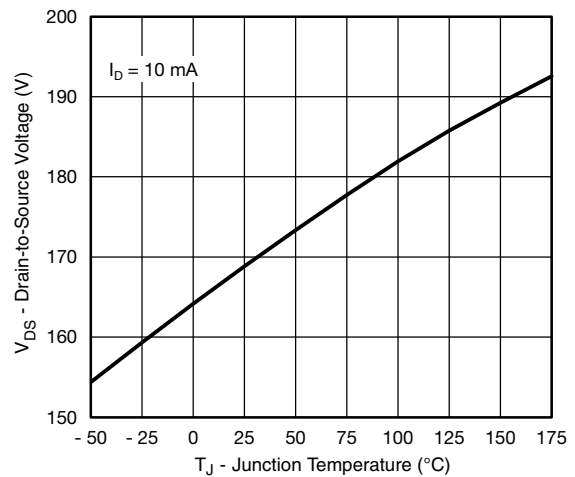
Source Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



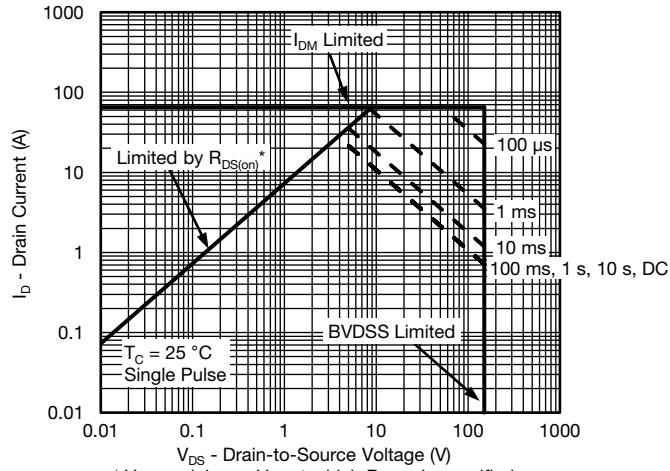
Threshold Voltage



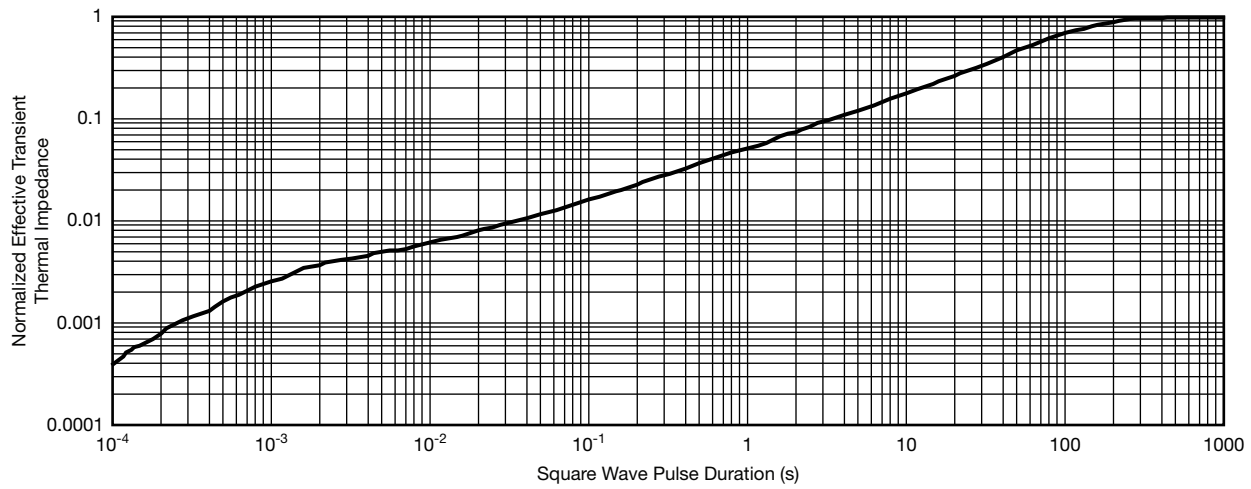
Drain Source Breakdown vs. Junction Temperature



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



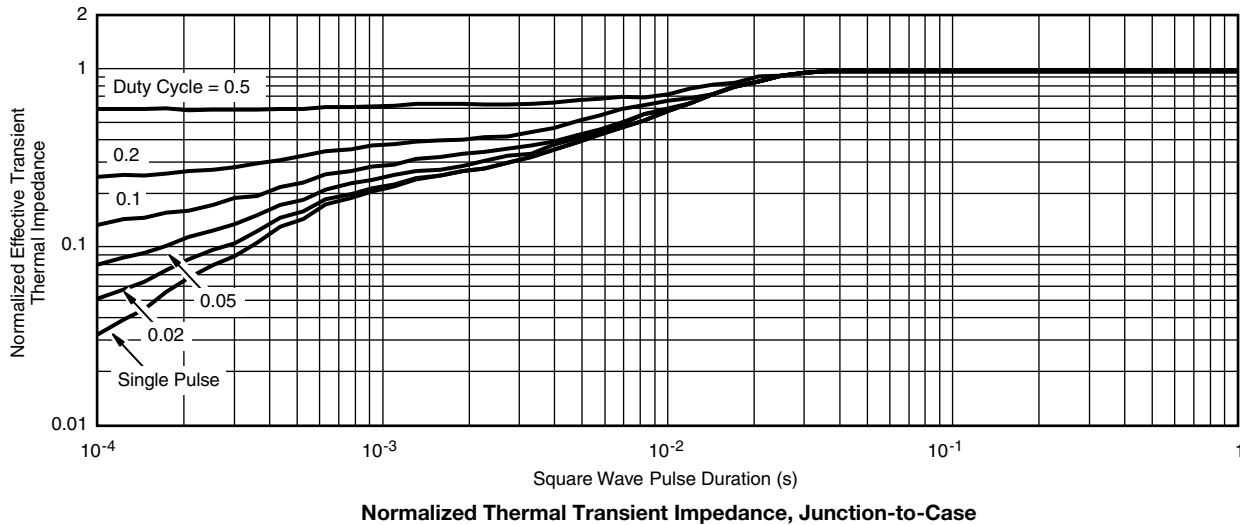
Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient



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



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.

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see www.vishay.com/ppg?72148.



REVISION HISTORY ^a		
REVISION	DATE	DESCRIPTION OF CHANGE
D	08-Aug-15	• R_g , C_{RSS} , t_r and t_f changed

Note

a. As of April 2014



D²PAK / TO-263 and TO-262

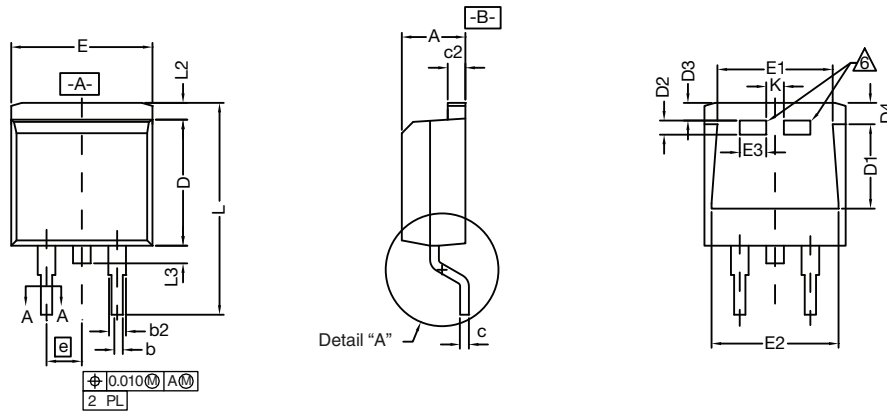
Ordering codes for the SQ rugged series power MOSFETs in the D²PAK / TO-263 and TO-262 packages:

DATASHEET PART NUMBER	OLD ORDERING CODE ^a	NEW ORDERING CODE
SQM100N04-2m7	SQM100N04-2M7-GE3	SQM100N04-2M7_GE3
SQM100N10-10	SQM100N10-10-GE3	SQM100N10-10_GE3
SQM110N05-06L	SQM110N05-06L-GE3	SQM110N05-06L_GE3
SQM110P06-8m9L	SQM110P06-8M9L-GE3	SQM110P06-8M9L_GE3
SQM120N02-1m3L	SQM120N02-1M3L-GE3	SQM120N02-1M3L_GE3
SQM120N03-1m5L	SQM120N03-1M5L-GE3	SQM120N03-1M5L_GE3
SQM120N04-1m7	SQM120N04-1M7-GE3	SQM120N04-1M7_GE3
SQM120N04-1m7L	SQM120N04-1M7L-GE3	SQM120N04-1M7L_GE3
SQM120N04-1m9	SQM120N04-1M9-GE3	SQM120N04-1M9_GE3
SQM120N06-06	SQM120N06-06-GE3	SQM120N06-06_GE3
SQM120N06-3m5L	SQM120N06-3M5L-GE3	SQM120N06-3M5L_GE3
SQM120N10-09	SQM120N10-09-GE3	SQM120N10-09_GE3
SQM120N10-3m8	SQM120N10-3M8-GE3	SQM120N10-3M8_GE3
SQM120P04-04L	SQM120P04-04L-GE3	SQM120P04-04L_GE3
SQM120P06-07L	SQM120P06-07L-GE3	SQM120P06-07L_GE3
SQM120P10-10m1L	-	SQM120P10_10m1LGE3
SQM200N04-1m1L	SQM200N04-1M1L-GE3	SQM200N04-1M1L_GE3
SQM200N04-1m7L	SQM200N04-1M7L-GE3	SQM200N04-1M7L_GE3
SQM200N04-1m8	SQM200N04-1M8-GE3	SQM200N04-1M8_GE3
SQM25N15-52	SQM25N15-52-GE3	SQM25N15-52_GE3
SQM35N30-97	SQM35N30-97-GE3	SQM35N30-97_GE3
SQM40N10-30	SQM40N10-30-GE3	SQM40N10-30_GE3
SQM40N15-38	SQM40N15-38-GE3	SQM40N15-38_GE3
SQM40P10-40L	SQM40P10-40L-GE3	SQM40P10-40L_GE3
SQM47N10-24L	SQM47N10-24L-GE3	SQM47N10-24L_GE3
SQM50020EL	-	SQM50020EL_GE3
SQM50N04-4m0L	SQM50N04-4M0L-GE3	SQM50N04-4M0L_GE3
SQM50N04-4m1	SQM50N04-4M1-GE3	SQM50N04-4M1_GE3
SQM50P03-07	SQM50P03-07-GE3	SQM50P03-07_GE3
SQM50P04-09L	SQM50P04-09L-GE3	SQM50P04-09L_GE3
SQM50P06-15L	SQM50P06-15L-GE3	SQM50P06-15L_GE3
SQM50P08-25L	SQM50P08-25L-GE3	SQM50P08-25L_GE3
SQM60030E	-	SQM60030E_GE3
SQM60N06-15	SQM60N06-15-GE3	SQM60N06-15_GE3
SQM60N20-35	SQM60N20-35-GE3	SQM60N20-35_GE3
SQM85N15-19	SQM85N15-19-GE3	SQM85N15-19_GE3
SQV120N10-3m8	SQV120N10-3m8-GE3	SQV120N10-3m8_GE3
SQV120N06-4m7L	-	SQV120N06-4m7L_GE3

Note

a. Old ordering code is obsolete and no longer valid for new orders

TO-263 (D²PAK): 3-LEAD



DIM.	INCHES		MILLIMETERS		
	MIN.	MAX.	MIN.	MAX.	
A	0.160	0.190	4.064	4.826	
b	0.020	0.039	0.508	0.990	
b1	0.020	0.035	0.508	0.889	
b2	0.045	0.055	1.143	1.397	
c*	Thin lead	0.013	0.018	0.330	0.457
	Thick lead	0.023	0.028	0.584	0.711
c1	Thin lead	0.013	0.017	0.330	0.431
	Thick lead	0.023	0.027	0.584	0.685
c2	0.045	0.055	1.143	1.397	
D	0.340	0.380	8.636	9.652	
D1	0.220	0.240	5.588	6.096	
D2	0.038	0.042	0.965	1.067	
D3	0.045	0.055	1.143	1.397	
D4	0.044	0.052	1.118	1.321	
E	0.380	0.410	9.652	10.414	
E1	0.245	-	6.223	-	
E2	0.355	0.375	9.017	9.525	
E3	0.072	0.078	1.829	1.981	
e	0.100 BSC		2.54 BSC		
K	0.045	0.055	1.143	1.397	
L	0.575	0.625	14.605	15.875	
L1	0.090	0.110	2.286	2.794	
L2	0.040	0.055	1.016	1.397	
L3	0.050	0.070	1.270	1.778	
L4	0.010 BSC		0.254 BSC		
M	-	0.002	-	0.050	
ECN: T13-0707-Rev. K, 30-Sep-13					
DWG: 5843					

Notes

- Plane B includes maximum features of heat sink tab and plastic.
- No more than 25 % of L1 can fall above seating plane by max. 8 mils.
- Pin-to-pin coplanarity max. 4 mils.
- *: Thin lead is for SUB, SYB.
Thick lead is for SUM, SYM, SQM.
- Use inches as the primary measurement.
- This feature is for thick lead.

RECOMMENDED MINIMUM PADS FOR D²PAK: 3-Lead



Recommended Minimum Pads
Dimensions in Inches/(mm)

[Return to Index](#)



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Material Category Policy

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

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Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.



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- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
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- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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