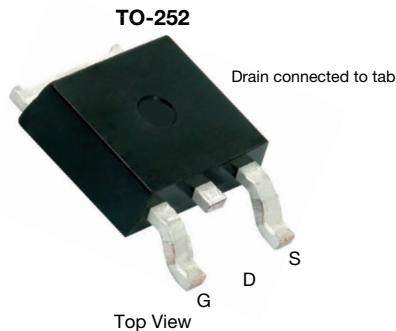


N-Channel 100 V (D-S) MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω) MAX.	I _D (A) ^c	Q _g (TYP.)
100	0.0089 at V _{GS} = 10 V	50	33 nC
	0.0093 at V _{GS} = 7.5 V	50	


Ordering Information:

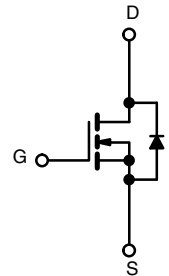
SUD70090E-GE3 (lead (Pb)-free and halogen-free)

FEATURES

- ThunderFET® power MOSFET
- Maximum 175 °C junction temperature
- Q_{gd} / Q_{gs} ratio < 1 optimizes switching characteristics
- 100 % R_g and UIS tested
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT
HALOGEN
FREE
APPLICATIONS

- DC/DC converter
- Power tools
- Motor drive switch
- DC/AC inverter
- Battery management



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T _C = 25 °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V _{DS}	100	V
Gate-Source Voltage		V _{GS}	± 20	
Continuous Drain Current (T _J = 150 °C)	T _C = 25 °C	I _D	50 ^c	A
	T _C = 70 °C		50 ^c	
Pulsed Drain Current (t = 100 μs)		I _{DM}	120	
Avalanche Current		I _{AS}	40	
Single Avalanche Energy ^a	L = 0.1 mH	E _{AS}	80	mJ
Maximum Power Dissipation ^a	T _C = 25 °C	P _D	125	W
	T _C = 70 °C ^b		87.5	
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) ^b		R _{thJA}	40	°C/W
Junction-to-Case (Drain)		R _{thJC}	1.2	

Notes

- Duty cycle ≤ 1 %.
- When mounted on 1" square PCB (FR4 material).
- Package limited.



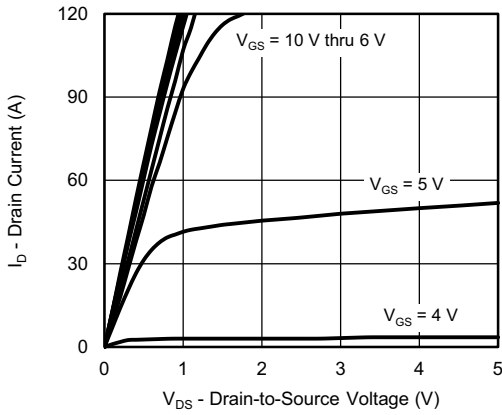
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	100	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2	-	4	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	-	-	± 250	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 100 V, V _{GS} = 0 V	-	-	1	μA
		V _{DS} = 100 V, V _{GS} = 0 V, T _J = 125 °C	-	-	150	
		V _{DS} = 100 V, V _{GS} = 0 V, T _J = 175 °C	-	-	5	mA
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 10 V, V _{GS} = 10 V	50	-	-	A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 20 A	-	0.0074	0.0089	Ω
		V _{GS} = 7.5 V, I _D = 15 A	-	0.0077	0.0093	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 10 A	-	38	-	S
Dynamic ^b						
Input Capacitance	C _{ISS}	V _{GS} = 0 V, V _{DS} = 50 V, f = 1 MHz	-	1950	-	pF
Output Capacitance	C _{OSS}		-	845	-	
Reverse Transfer Capacitance	C _{RSS}		-	54	-	
Total Gate Charge ^c	Q _g	V _{DS} = 50 V, V _{GS} = 10 V, I _D = 20 A	-	33	50	nC
Gate-Source Charge ^c	Q _{gs}		-	8.8	-	
Gate-Drain Charge ^c	Q _{gd}		-	7.5	-	
Gate Resistance	R _g	f = 1 MHz	0.7	3.5	7	Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 50 V, R _L = 5 Ω I _D ≅ 10 A, V _{GEN} = 10 V, R _g = 1 Ω	-	15	30	ns
Rise Time ^c	t _r		-	27	54	
Turn-Off Delay Time ^c	t _{d(off)}		-	36	72	
Fall Time ^c	t _f		-	45	90	
Drain-Source Body Diode Ratings and Characteristics ^b (T_C = 25 °C)						
Pulsed Current (t = 100 μs)	I _{SM}		-	-	120	A
Forward Voltage ^a	V _{SD}	I _F = 10 A, V _{GS} = 0 V	-	0.8	1.5	V
Reverse Recovery Time	t _{rr}	I _F = -10 A, di/dt = 100 A/μs	-	77	116	ns
Peak Reverse Recovery Charge	I _{RM(REC)}		-	4.2	6.3	A
Reverse Recovery Charge	Q _{rr}		-	145	365	nC

Notes

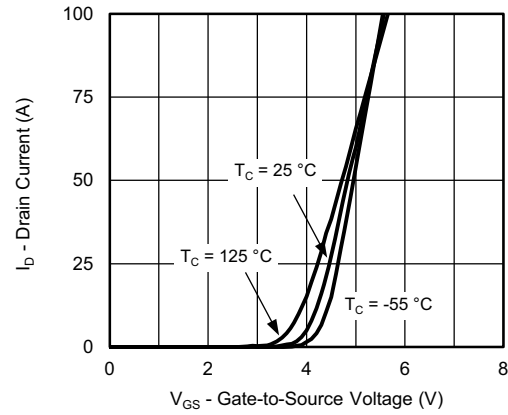
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

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.

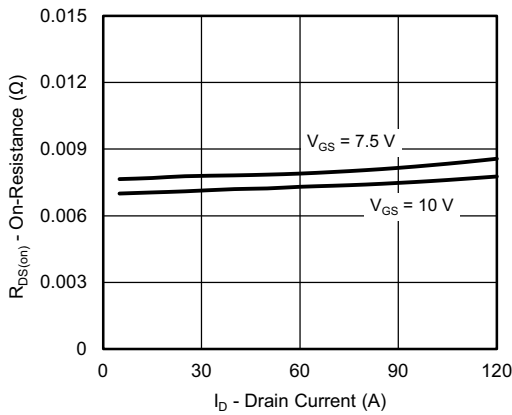
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



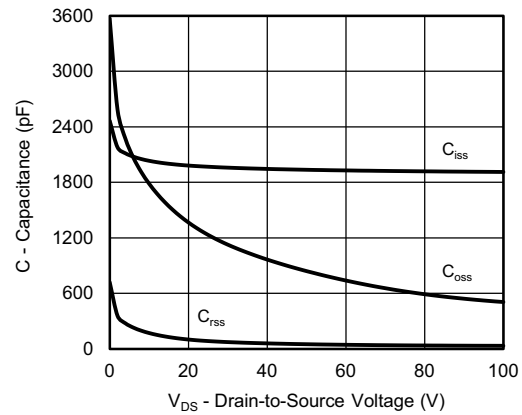
Output Characteristics



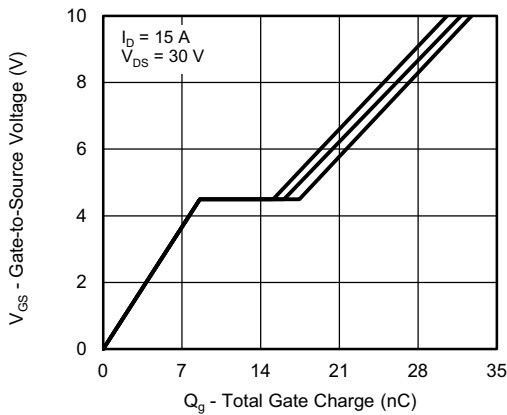
Transfer Characteristics



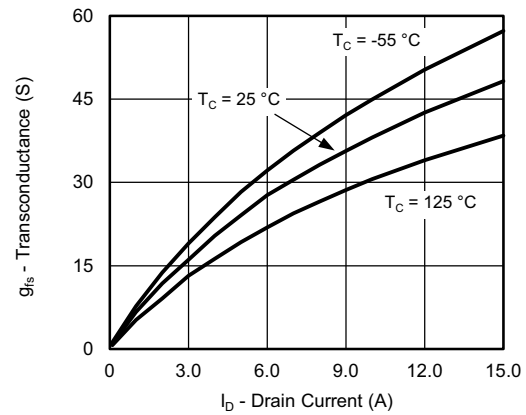
On-Resistance vs. Drain Current



Capacitance



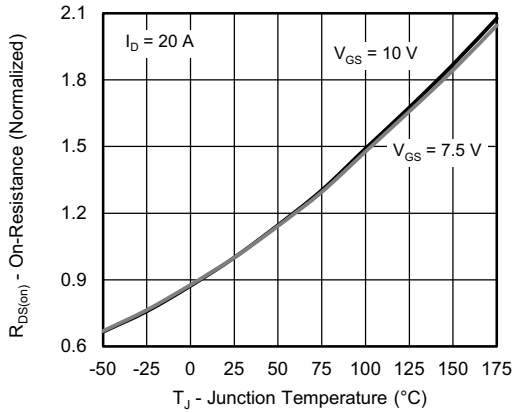
Gate Charge



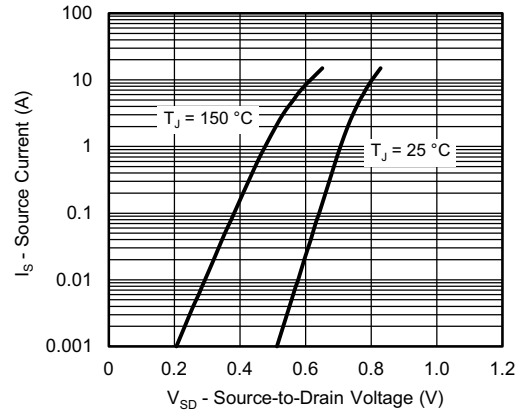
Transconductance



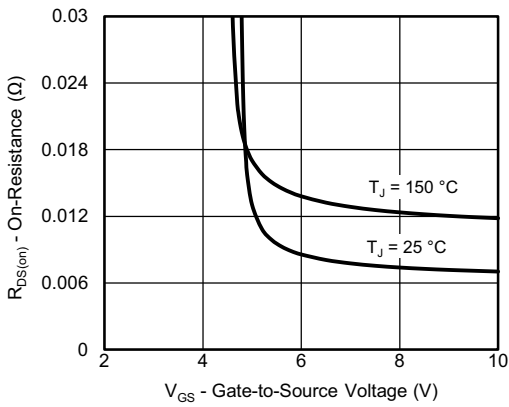
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



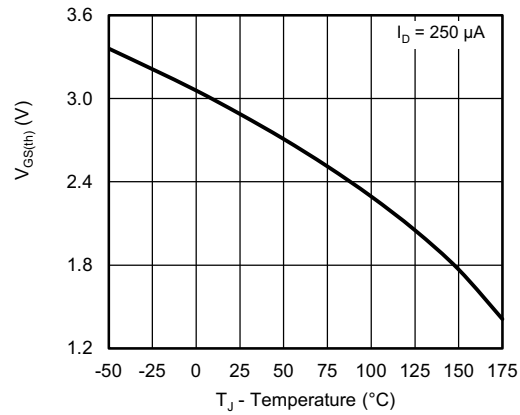
On-Resistance vs. Junction Temperature



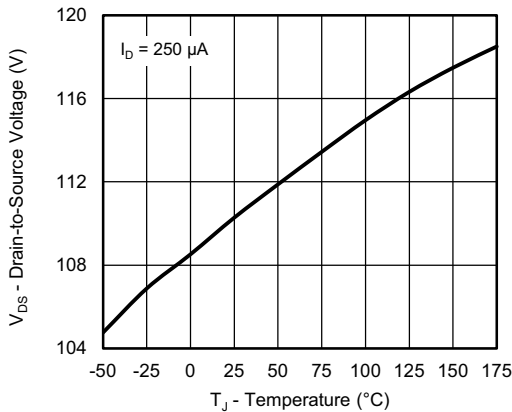
Source Drain Diode Forward Voltage



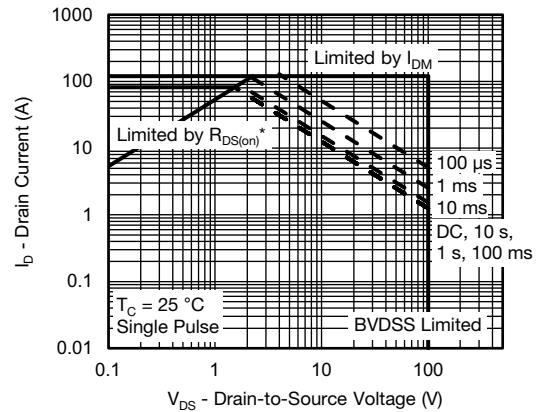
On-Resistance vs. Gate-to-Source Voltage



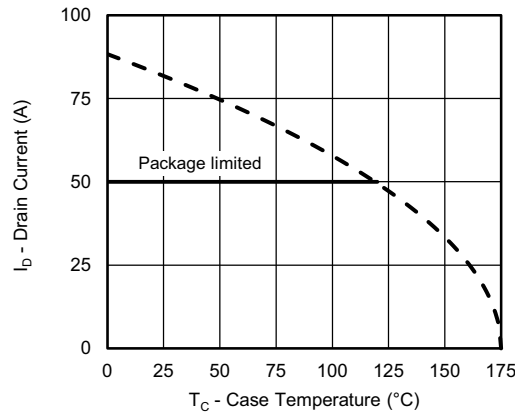
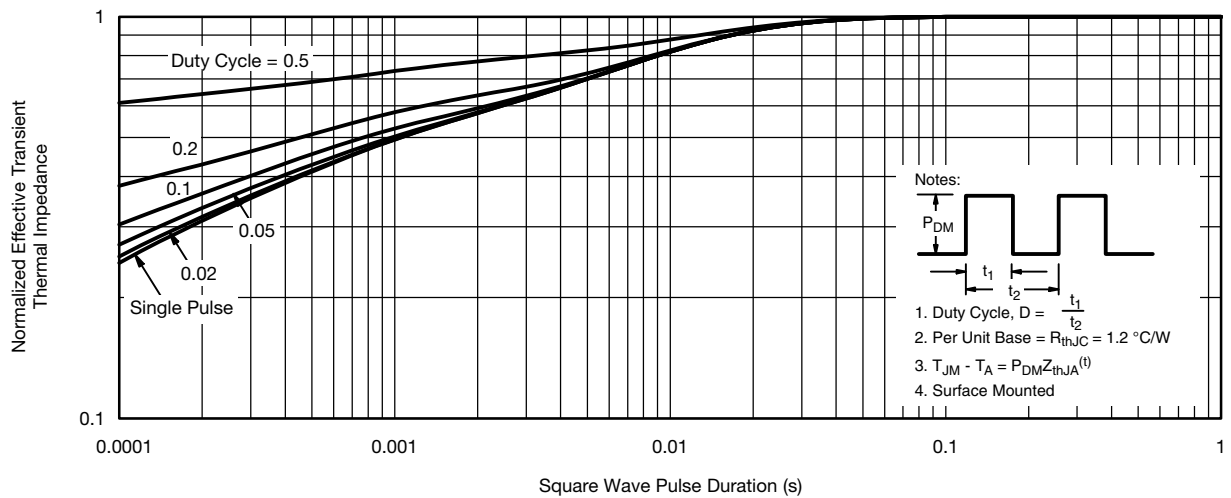
Threshold Voltage



Drain Source Voltage vs. Junction Temperature



Safe Operating Area

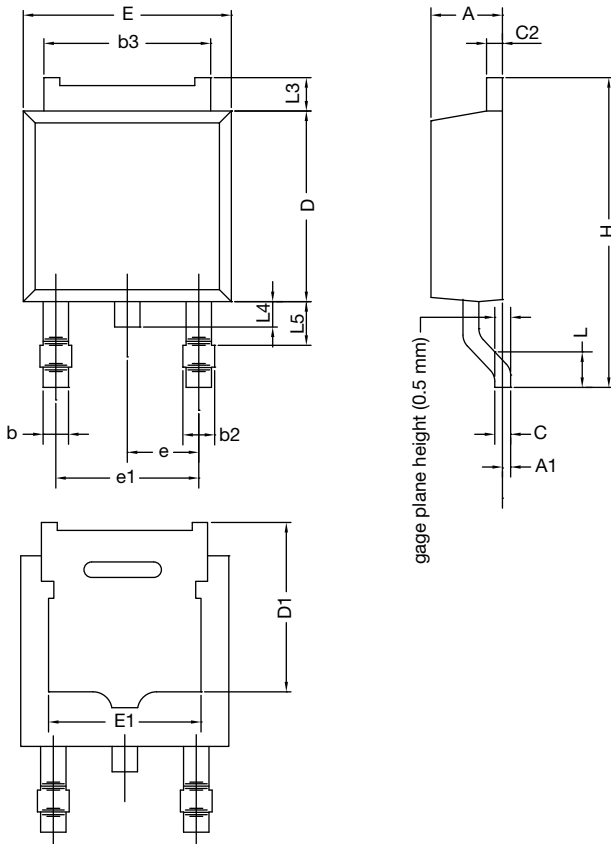
THERMAL RATINGS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)

Current De-Rating

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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TO-252AA Case Outline

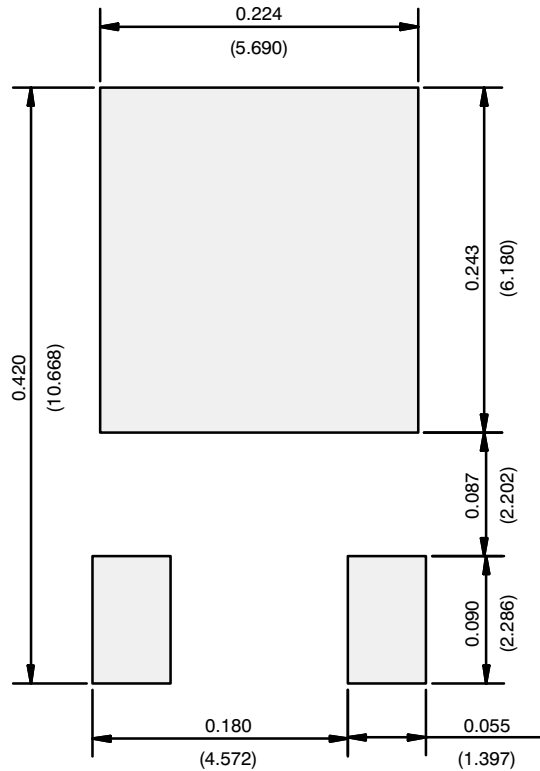


DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.38	0.086	0.094
A1	-	0.127	-	0.005
b	0.64	0.88	0.025	0.035
b2	0.76	1.14	0.030	0.045
b3	4.95	5.46	0.195	0.215
C	0.46	0.61	0.018	0.024
C2	0.46	0.89	0.018	0.035
D	5.97	6.22	0.235	0.245
D1	4.10	-	0.161	-
E	6.35	6.73	0.250	0.265
E1	4.32	-	0.170	-
H	9.40	10.41	0.370	0.410
e	2.28 BSC		0.090 BSC	
e1	4.56 BSC		0.180 BSC	
L	1.40	1.78	0.055	0.070
L3	0.89	1.27	0.035	0.050
L4	-	1.02	-	0.040
L5	1.01	1.52	0.040	0.060
ECN: T16-0236-Rev. P, 16-May-16				
DWG: 5347				

Notes

- Dimension L3 is for reference only.

RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)



Recommended Minimum Pads
Dimensions in Inches/(mm)

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