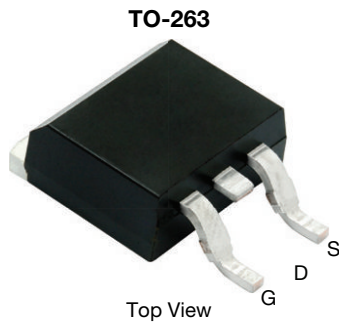


N-Channel 200 V (D-S) 175 °C MOSFET



FEATURES

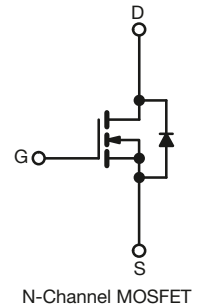
- ThunderFET® power MOSFET
- Maximum 175 °C junction temperature
- 100 % R_g and UIS tested
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Power supplies:
 - Uninterruptible power supplies
 - AC/DC switch-mode power supplies
 - Lighting
- Synchronous rectification
- DC/DC converter
- Motor drive switch
- DC/AC inverter
- Solar micro inverter
- Class D audio amplifier



PRODUCT SUMMARY	
V _{DS} (V)	200
R _{DS(on)} max. (Ω) at V _{GS} = 10 V	0.0150
R _{DS(on)} max. (Ω) at V _{GS} = 7.5 V	0.0165
Q _g typ. (nC)	58
I _D (A)	90
Configuration	Single

ORDERING INFORMATION	
Package	TO-263
Lead (Pb)-free and halogen-free	SUM90142E-GE3

ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C, unless otherwise noted)				
PARAMETER	SYMBOL	LIMIT	UNIT	
Drain-source voltage	V _{DS}	200	V	
Gate-source voltage	V _{GS}	± 20		
Continuous drain current	I _D	T _C = 25 °C	A	
		T _C = 125 °C		90
Pulsed drain current (t = 100 μs)	I _{DM}	240	A	
Continuous source-drain diode current	I _S	90		
Single pulse avalanche current ^a	L = 0.1 mH	I _{AS}	60	
Single pulse avalanche energy ^a		E _{AS}	180	mJ
Maximum power dissipation	P _D	T _C = 25 °C	375 ^b	W
		T _C = 125 °C	125 ^b	
Operating junction and storage temperature range	T _J , T _{stg}	-55 to +175	°C	
Soldering recommendations (peak temperature) ^c		260		

THERMAL RESISTANCE RATINGS			
PARAMETER	SYMBOL	MAXIMUM	UNIT
Maximum junction-to-ambient (PCB mount) ^c	R _{thJA}	40	°C/W
Maximum junction-to-case (drain)	Steady state	R _{thJC}	

Notes

- Duty cycle ≤ 1 %.
- See SOA curve for voltage derating.
- When mounted on 1" square PCB (FR4 material).
- Package limited.

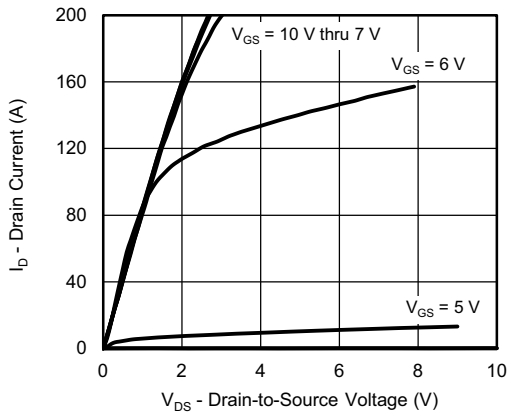
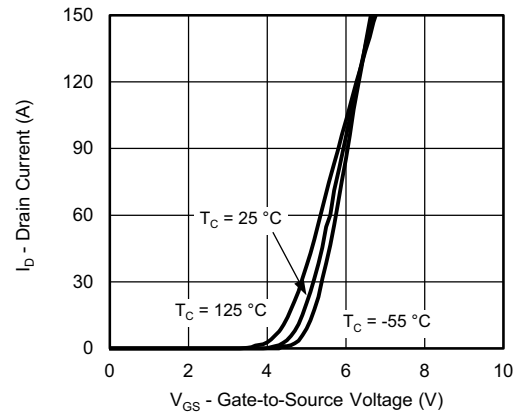
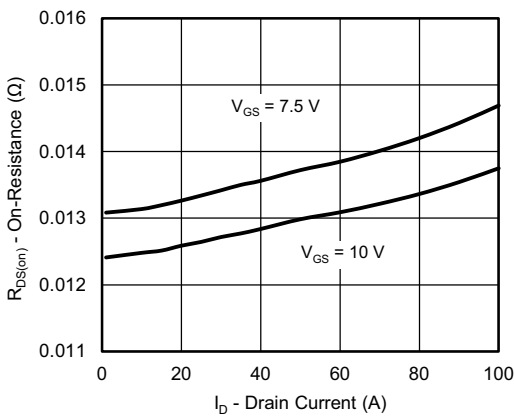
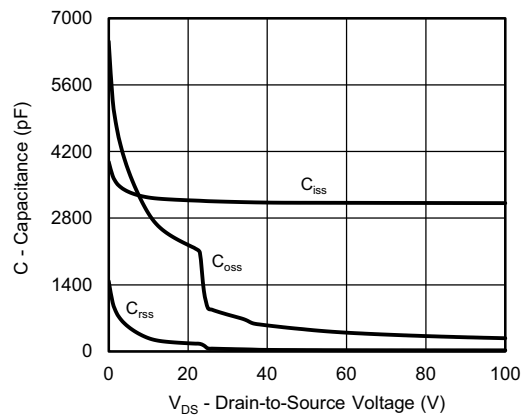
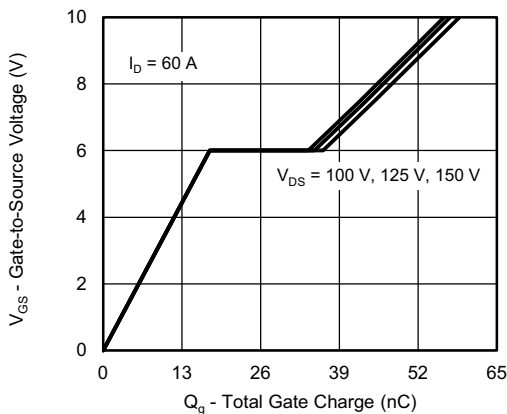
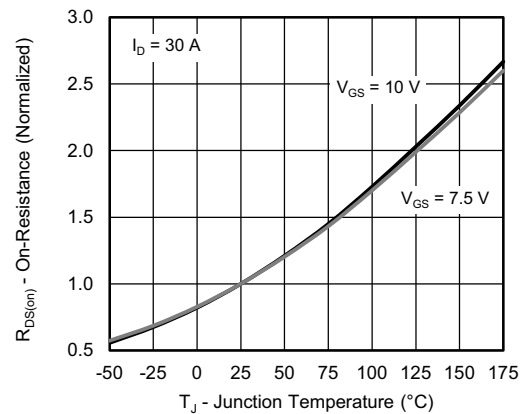


SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-source breakdown voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	200	-	-	V
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2	-	4	V
Gate-source leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	-	-	250	nA
Zero gate voltage drain current	I _{DSS}	V _{DS} = 200 V, V _{GS} = 0 V	-	-	1	μA
		V _{DS} = 200 V, V _{GS} = 0 V, T _J = 125 °C	-	-	150	
		V _{DS} = 200 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	60	-	-	A
Drain-source on-state resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 30 A	-	0.0123	0.0150	Ω
		V _{GS} = 7.5 V, I _D = 30 A	-	0.0130	0.0165	
Forward transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 30 A	-	63	-	S
Dynamic ^b						
Input capacitance	C _{iss}	V _{DS} = 100 V, V _{GS} = 0 V, f = 1 MHz	-	3120	-	pF
Output capacitance	C _{oss}		-	280	-	
Reverse transfer capacitance	C _{rss}		-	24	-	
Total gate charge	Q _g	V _{DS} = 100 V, V _{GS} = 10 V, I _D = 60 A	-	58	87	nC
Gate-source charge	Q _{gs}		-	17.6	-	
Gate-drain charge	Q _{gd}		-	17.2	-	
Output charge	Q _{oss}	V _{DS} = 100 V, V _{GS} = 0 V	-	108	162	
Gate resistance	R _g	f = 1 MHz	1.5	3	5	Ω
Turn-on delay time	t _{d(on)}	V _{DD} = 100 V, R _L = 1.66 Ω, I _D ≅ 60 A, V _{GEN} = 10 V, R _g = 1 Ω	-	14	28	ns
Rise time	t _r		-	125	250	
Turn-off delay time	t _{d(off)}		-	27	54	
Fall time	t _f		-	80	150	
Drain-Source Body Diode Characteristics						
Pulse diode forward current (t = 100 μs)	I _{SM}		-	-	240	A
Body diode voltage	V _{SD}	I _F = 30 A, V _{GS} = 0 V	-	0.85	1.5	V
Body diode reverse recovery time	t _{rr}	I _F = 30 A, dI/dt = 100 A/μs	-	150	300	ns
Body diode reverse recovery charge	Q _{rr}		-	0.9	1.8	nC
Reverse recovery fall time	t _a		-	125	-	ns
Reverse recovery rise time	t _b		-	25	-	
Body diode peak reverse recovery charge	I _{RM(REC)}		-	11.5	20	A

Notes

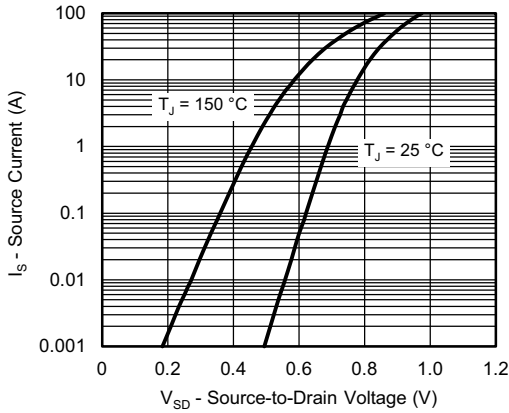
- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

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.

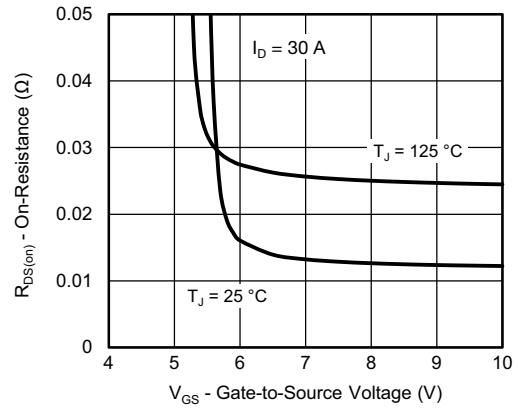
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

Output Characteristics

Transfer Characteristics

On-Resistance vs. Drain Current and Gate Voltage

Capacitance

Gate Charge

On-Resistance vs. Junction Temperature



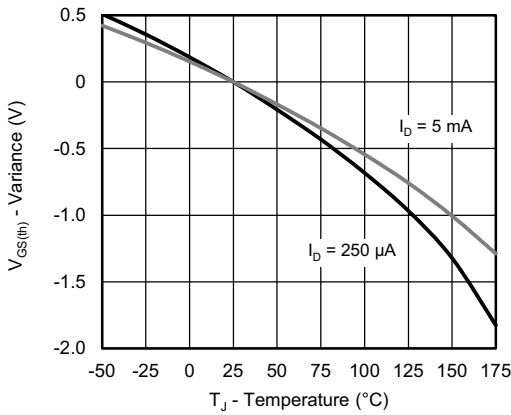
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



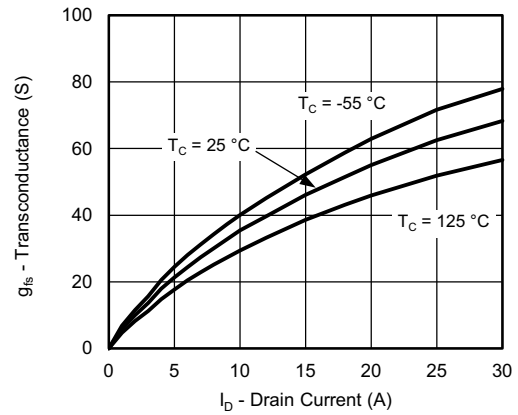
Source-Drain Diode Forward Voltage



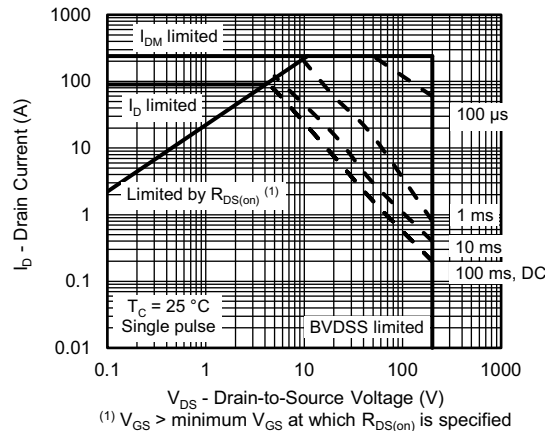
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Transconductance

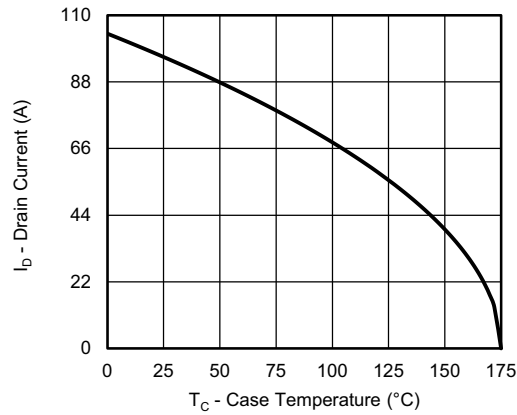


Safe Operating Area, Junction-to-Ambient

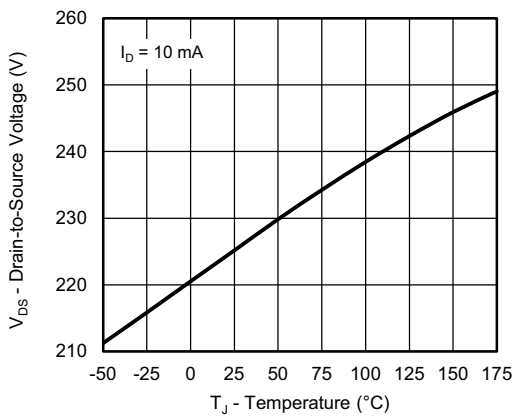
⁽¹⁾ $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified



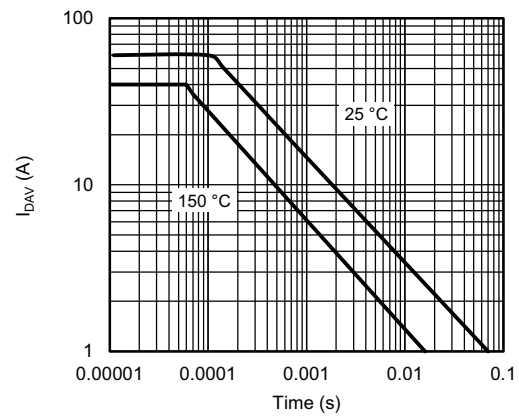
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating ^a



Drain Source Breakdown vs. Junction Temperature



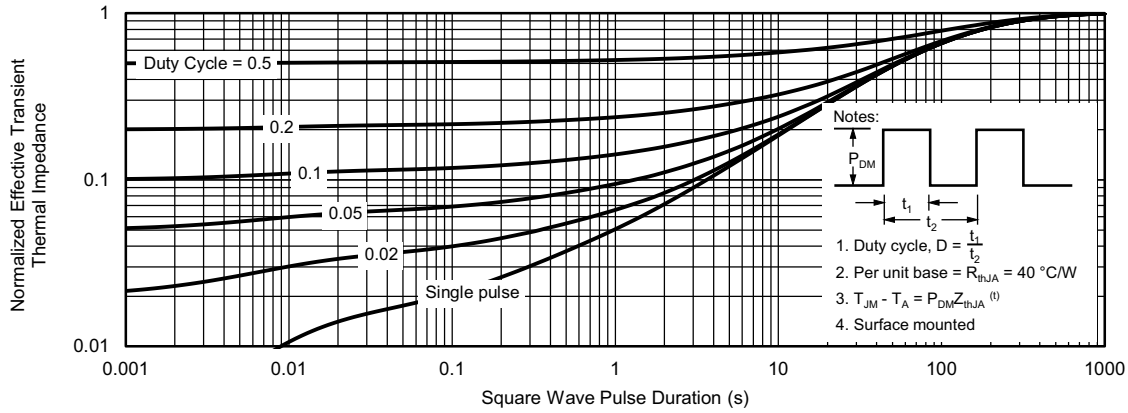
I_{DAV} vs. Time

Note

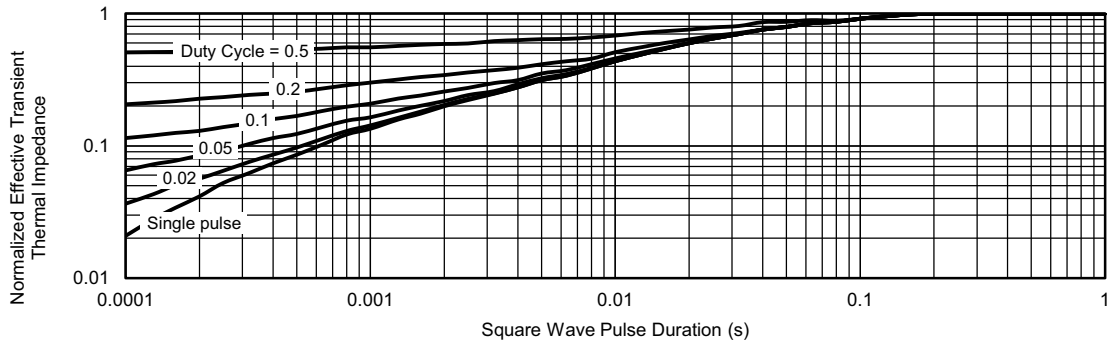
- a. The power dissipation P_D is based on T_J max. = 25 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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