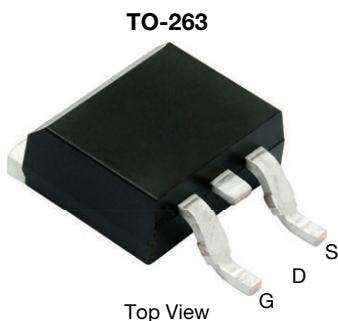


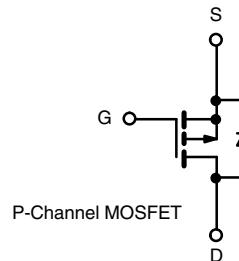
P-Channel 100 V (D-S) 175 °C MOSFET


TO-263
FEATURES

- TrenchFET® power MOSFET
- Package with low thermal resistance
- Maximum 175 °C junction temperature
- Low $R_{DS(on)}$ minimizes power loss from conduction
- Compatible with logic-level gate driving
- 100 % R_g and UIS tested
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT
HALOGEN
FREE
APPLICATIONS

- Battery protection
- Motor drive control
- Load switch


PRODUCT SUMMARY

V_{DS} (V)	-100
$R_{DS(on)}$ max. (Ω) at $V_{GS} = -10$ V	0.0101
$R_{DS(on)}$ max. (Ω) at $V_{GS} = -4.5$ V	0.0150
Q_g typ. (nC)	125
I_D (A)	-120
Configuration	Single

ORDERING INFORMATION

Package	TO-263
Lead (Pb)-free and halogen-free	SUM70101EL-GE3

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 ^d ($T_J = 175$ °C)	I_D	-120	A
		-78	
Pulsed drain current (100 μ s)	I_{DM}	-240	A
Avalanche current	I_{AS}	-75	
Single pulse avalanche energy ^a	E_{AS}	281	mJ
Power dissipation	P_D	375	W
		125	
Operating junction and storage temperature range	T_J, T_{stg}	-55 to +175	°C

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	TYPICAL	UNIT
Junction-to-ambient	R_{thJA}	40	°C/W
Junction-to-case		0.4	

Notes

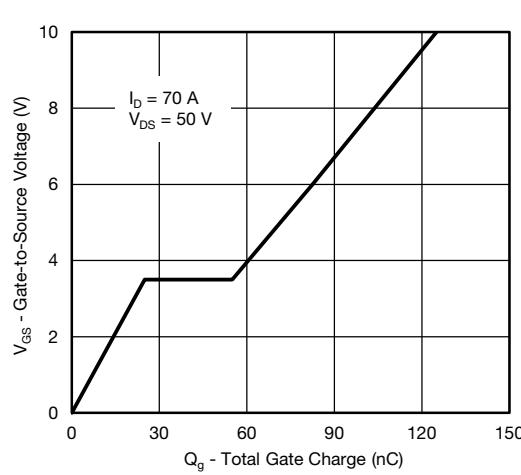
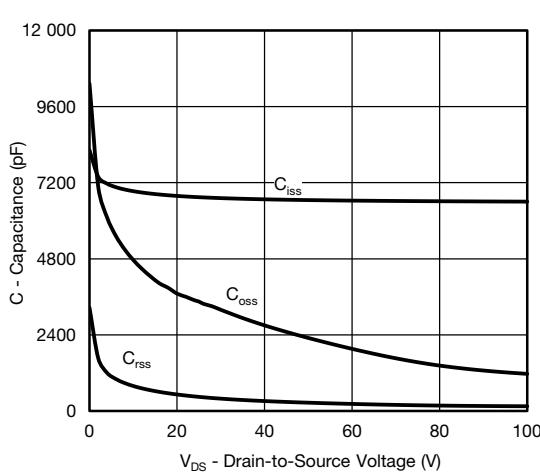
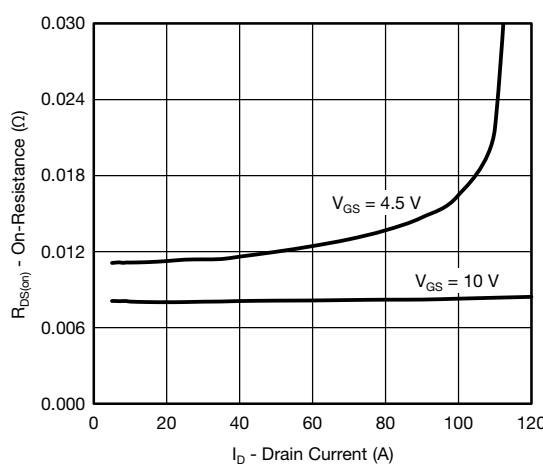
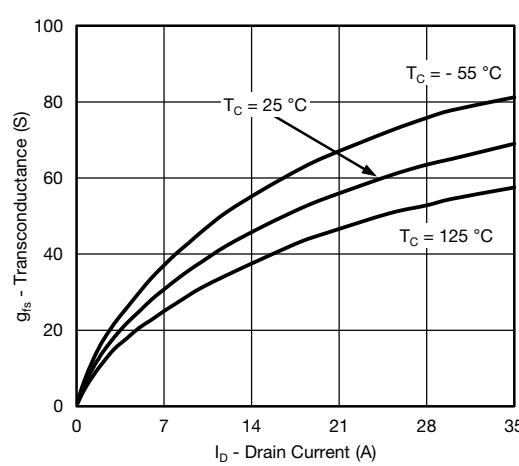
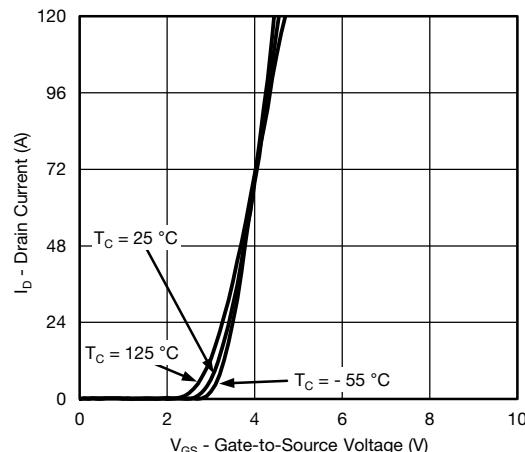
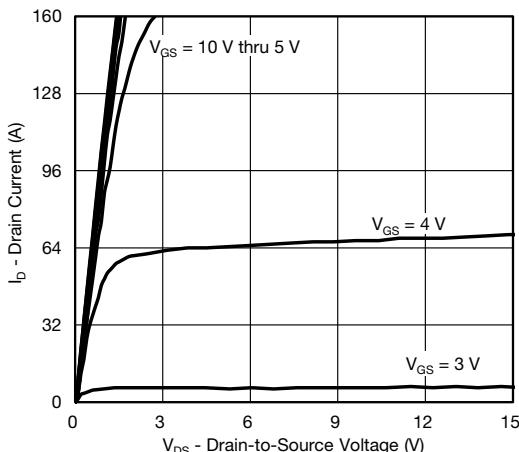
- Duty cycle ≤ 1 %
- When mounted on 1" square PCB (FR4 material)
- See SOA curve for voltage derating
- Limited by package

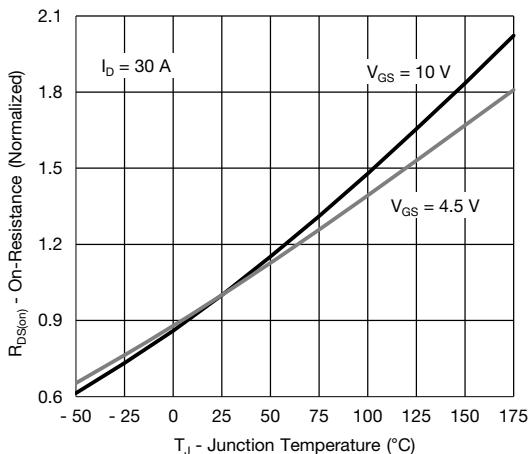
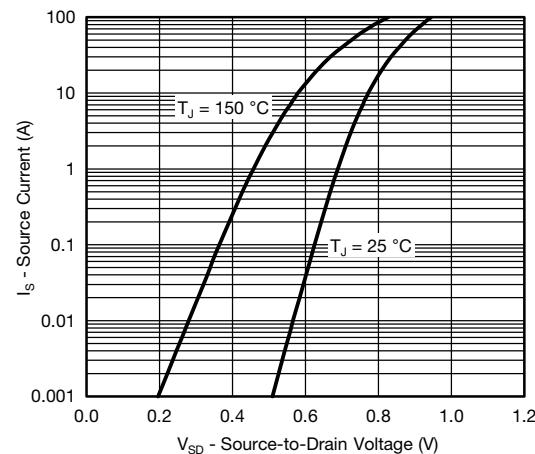
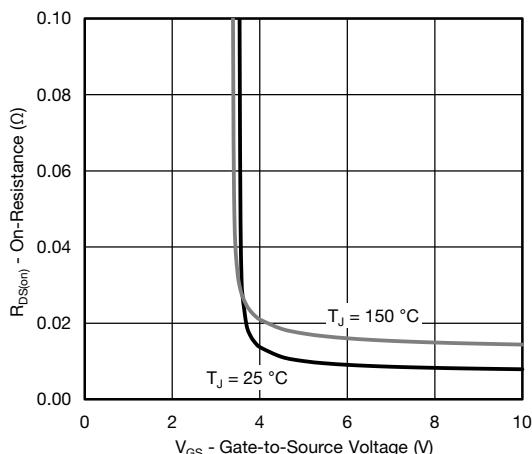
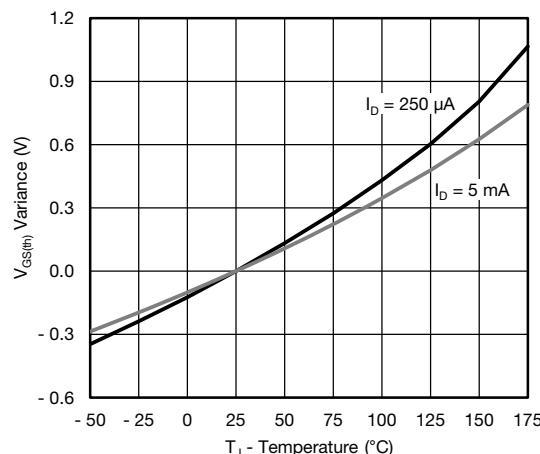
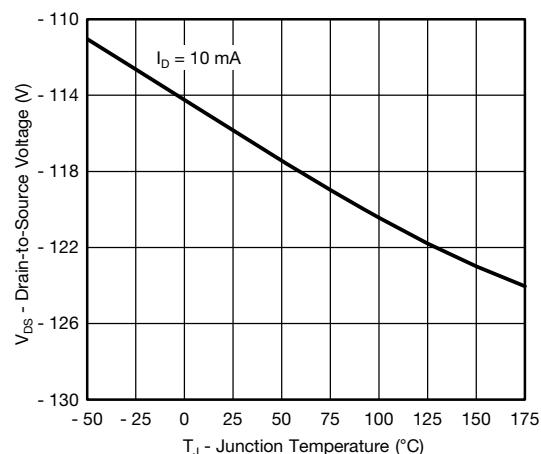
SPECIFICATIONS ($T_J = 25^\circ\text{C}$, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-source breakdown voltage	V_{DS}	$V_{GS} = 0 \text{ V}$, $I_D = -250 \mu\text{A}$	-100	-	-	V
Gate threshold voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = -250 \mu\text{A}$	-1.5	-	-2.5	
Gate-body leakage	I_{GSS}	$V_{DS} = 0 \text{ V}$, $V_{GS} = \pm 20 \text{ V}$	-	-	± 100	nA
Zero gate voltage drain current	I_{DSS}	$V_{DS} = -100 \text{ V}$, $V_{GS} = 0 \text{ V}$	-	-	-1	
		$V_{DS} = -100 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 125^\circ\text{C}$	-	-	-50	μA
		$V_{DS} = -100 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 175^\circ\text{C}$	-	-	-250	
On-state drain current ^a	$I_{D(\text{on})}$	$V_{DS} \leq -5 \text{ V}$, $V_{GS} = -10 \text{ V}$	-120	-	-	A
Drain-source on-state resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = -10 \text{ V}$, $I_D = -30 \text{ A}$	-	0.0081	0.0101	Ω
		$V_{GS} = -4.5 \text{ V}$, $I_D = -20 \text{ A}$	-	0.0114	0.0150	
Forward transconductance ^a	g_{fs}	$V_{DS} = -15 \text{ V}$, $I_D = -25 \text{ A}$	-	60	-	S
Dynamic ^b						
Input capacitance	C_{iss}	$V_{GS} = 0 \text{ V}$, $V_{DS} = -50 \text{ V}$, $f = 1 \text{ MHz}$	-	7000	-	pF
Output capacitance	C_{oss}		-	2180	-	
Reverse transfer capacitance	C_{rss}		-	170	-	
Total gate charge ^c	Q_g	$V_{DS} = -50 \text{ V}$, $V_{GS} = -10 \text{ V}$, $I_D = -110 \text{ A}$	-	125	190	nC
Gate-source charge ^c	Q_{gs}		-	29	-	
Gate-drain charge ^c	Q_{gd}		-	30	-	
Gate resistance	R_g		$f = 1 \text{ MHz}$	1.3	6.5	13
Turn-on delay time ^c	$t_{d(\text{on})}$	$V_{DD} = -50 \text{ V}$, $R_L = 0.71 \Omega$ $I_D \approx -70 \text{ A}$, $V_{GEN} = -10 \text{ V}$, $R_g = 1 \Omega$	-	20	30	ns
Rise time ^c	t_r		-	40	60	
Turn-off delay time ^c	$t_{d(\text{off})}$		-	110	200	
Fall time ^c	t_f		-	40	60	
Drain-Source Body Diode Characteristics ($T_C = 25^\circ\text{C}$ ^b)						
Continuous current	I_S	$I_F = -85 \text{ A}$, $V_{GS} = 0 \text{ V}$	-	-	-110	A
Pulsed current	I_{SM}		-	-	-240	
Forward voltage ^a	V_{SD}	$I_F = -85 \text{ A}$, $dI/dt = 100 \text{ A}/\mu\text{s}$	-	-1	-1.5	V
Reverse recovery time	t_{rr}		-	110	170	ns
Peak reverse recovery charge	$I_{RM(\text{REC})}$		-	-7	-11	A
Reverse recovery charge	Q_{rr}		-	0.38	0.57	μC

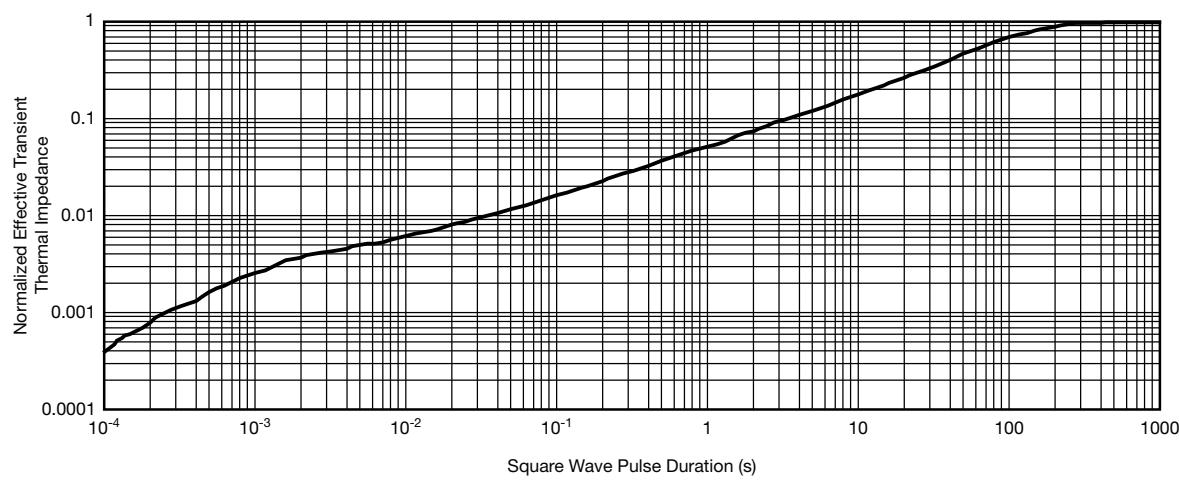
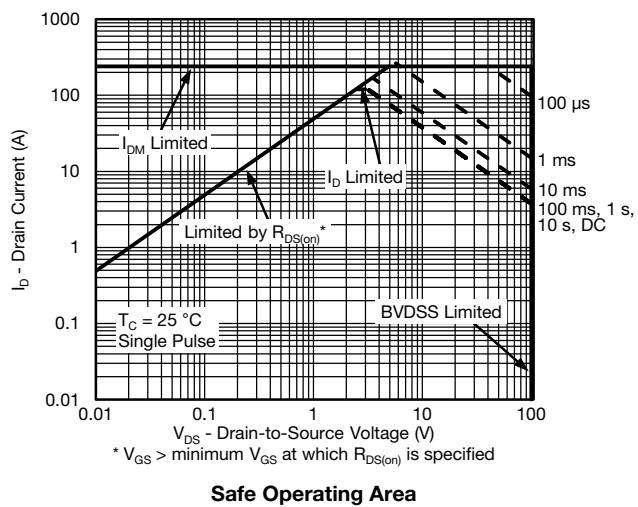
Notes

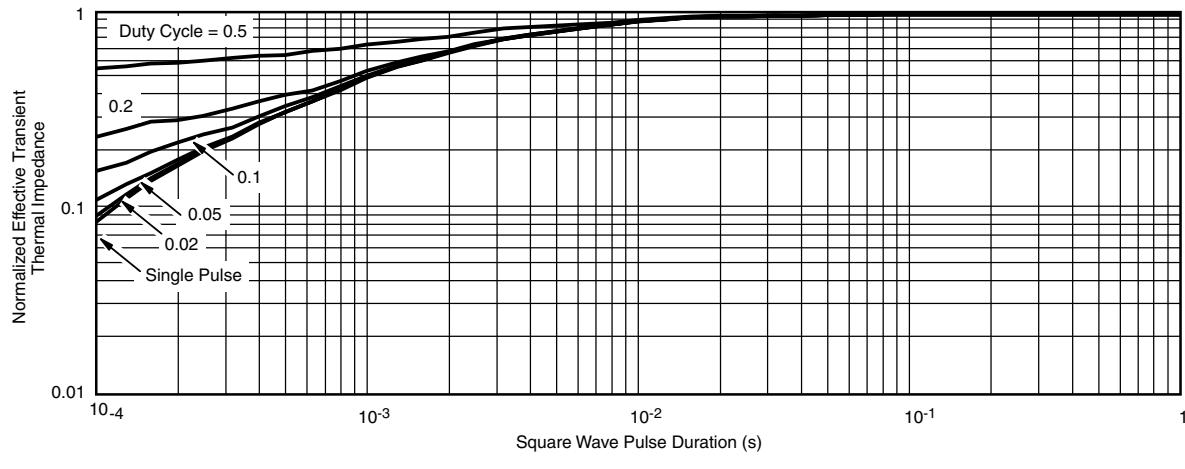
- a. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$
- b. Guaranteed by design, not subject to production testing
- c. Independent of operating temperature

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


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

On-Resistance vs. Junction Temperature

Source Drain Diode Forward Voltage

On-Resistance vs. Gate-to-Source Voltage

Threshold Voltage

Drain Source Breakdown vs. Junction Temperature

THERMAL RATINGS (T_A = 25 °C, unless otherwise noted)


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

Note

- The characteristics shown in the two graphs
 - Normalized Transient Thermal Impedance Junction to Ambient (25°C)
 - Normalized Transient Thermal Impedance Junction to Case (25°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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