

P-Channel 100-V (D-S) MOSFET

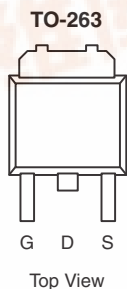
PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)	Q _g (Typ.)
- 100	0.019 at V _{GS} = - 10 V	- 90	97 nC
	0.021 at V _{GS} = - 4.5 V	- 85	

FEATURES

- TrenchFET[®] Power MOSFET
- Compliant to RoHS Directive 2002/95/EC

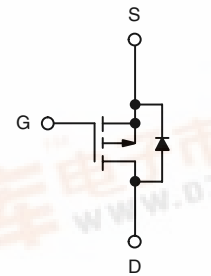


RoHS
COMPLIANT



Drain Connected to Tab

Ordering Information: SUM90P10-19L-E3 (Lead (Pb)-free)



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T _A = 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)	I _D	T _C = 25 °C	- 90	A
		T _C = 125 °C	- 52	
		T _A = 25 °C	- 17.2 ^{b, c}	
		T _A = 125 °C	- 9.9 ^{b, c}	
Pulsed Drain Current	I _{DM}	- 90		
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	- 250	
		T _A = 25 °C	- 9 ^{b, c}	
Avalanche Current	I _{AS}	- 70		
Single-Pulse Avalanche Energy	E _{AS}	245	mJ	
Maximum Power Dissipation	P _D	T _C = 25 °C	375	W
		T _C = 125 °C	125	
		T _A = 25 °C	13.6 ^{b, c}	
		T _A = 125 °C	4.5 ^{b, c}	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 175	°C	

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient ^{b, d}	R _{thJA}	8	11	°C/W	
Maximum Junction-to-Case (Drain)	R _{thJC}	0.33	0.4		

Notes:

- Package Limited.
- Surface Mounted on 1" x 1" FR4 board.
- t = 10 s.
- Maximum under Steady State conditions is 40 °C/W.



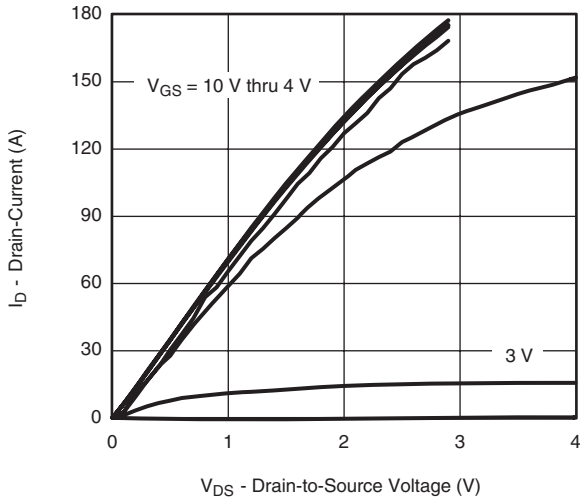
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	- 100			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		- 125		mV/ $^\circ\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			5.9		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	- 1		- 3	V
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}	$V_{DS} = -100\text{ V}, V_{GS} = 0\text{ V}$			- 1	μA
		$V_{DS} = -100\text{ V}, V_{GS} = 0\text{ V}, T_J = 175\text{ }^\circ\text{C}$			- 500	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 10\text{ V}, V_{GS} = -10\text{ V}$	- 90			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -20\text{ A}$		0.0156	0.019	Ω
		$V_{GS} = -4.5\text{ V}, I_D = -15\text{ A}$		0.0173	0.021	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15\text{ V}, I_D = -20\text{ A}$		80		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = -50\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		11100		pF
Output Capacitance	C_{oss}			700		
Reverse Transfer Capacitance	C_{rss}			1690		
Total Gate Charge	Q_g	$V_{DS} = -50\text{ V}, V_{GS} = -10\text{ V}, I_D = -90\text{ A}$		217	326	nC
				97	146	
Gate-Source Charge	Q_{gs}	$V_{DS} = -50\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -90\text{ A}$		42		
Gate-Drain Charge	Q_{gd}			51		
Gate Resistance	R_g	$f = 1\text{ MHz}$		3.5		Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -50\text{ V}, R_L = 0.56\text{ }\Omega$ $I_D \cong -90\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$		20	30	ns
Rise Time	t_r			510	855	
Turn-Off Delay Time	$t_{d(off)}$			145	220	
Fall Time	t_f			870	1300	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			- 90	A
Pulse Diode Forward Current ^a	I_{SM}				- 250	
Body Diode Voltage	V_{SD}	$I_S = -20\text{ A}$		- 0.8	- 1.5	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -20\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		80	120	ns
Body Diode Reverse Recovery Charge	Q_{rr}			220	330	nC
Reverse Recovery Fall Time	t_a			56		ns
Reverse Recovery Rise Time	t_b			24		

Notes

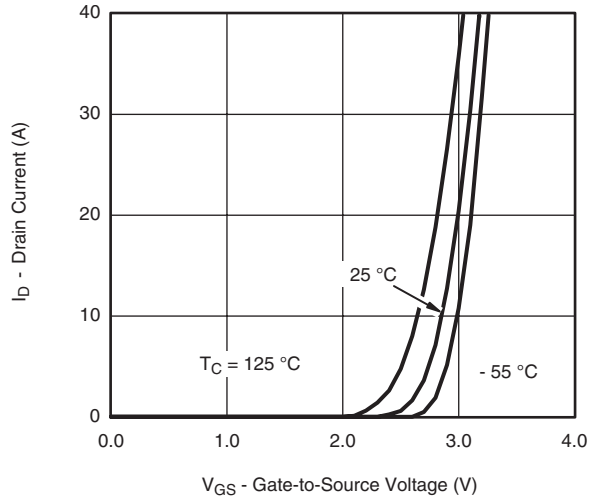
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- b. Guaranteed by design, not subject to production testing.

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.

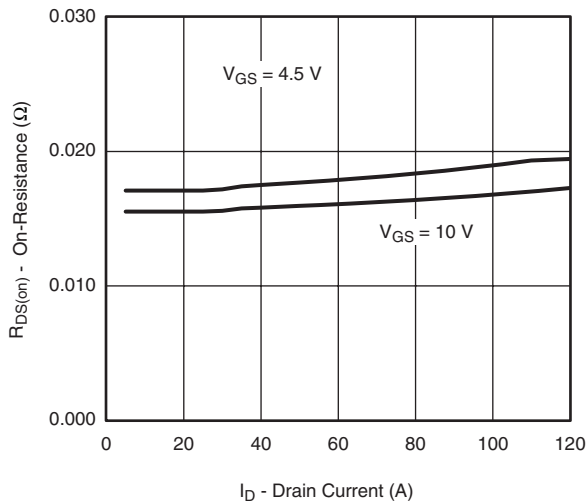
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



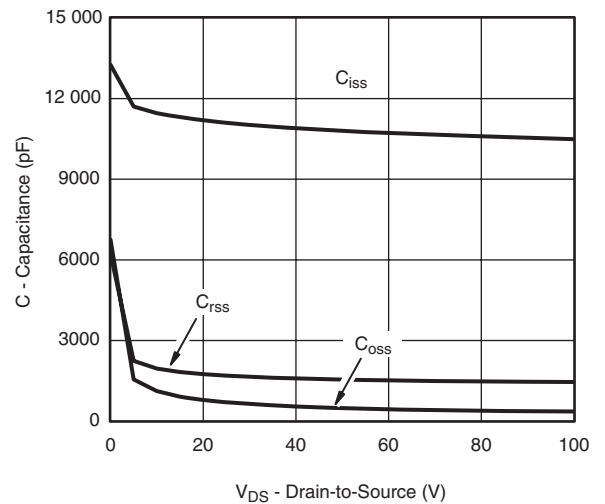
Output Characteristics



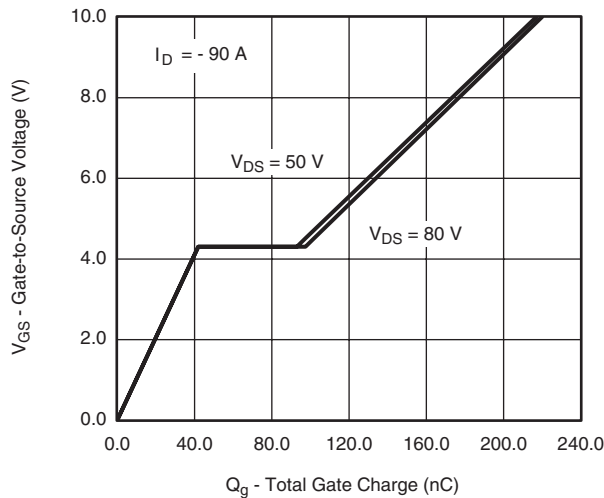
Transfer Characteristics



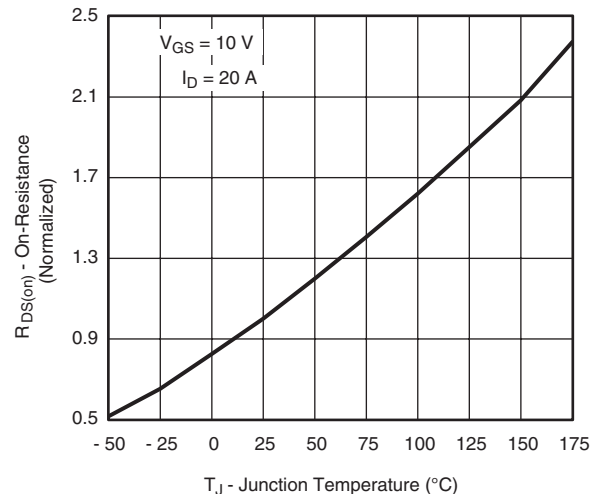
On-Resistance vs. Drain Current



Capacitance

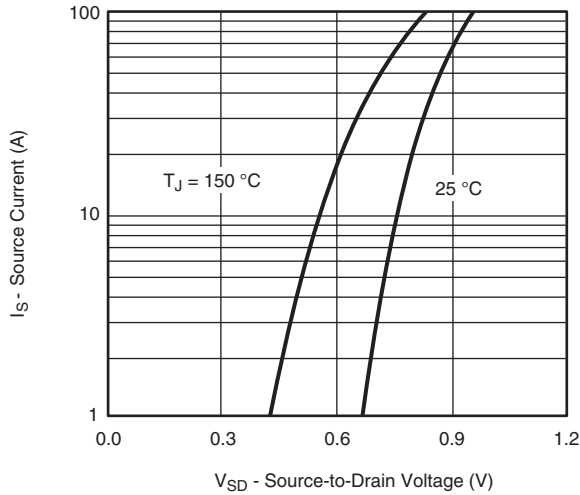


Gate Charge

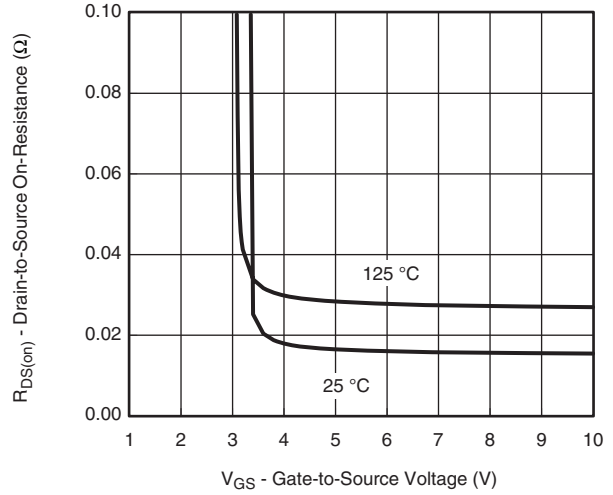


On-Resistance vs. Junction Temperature

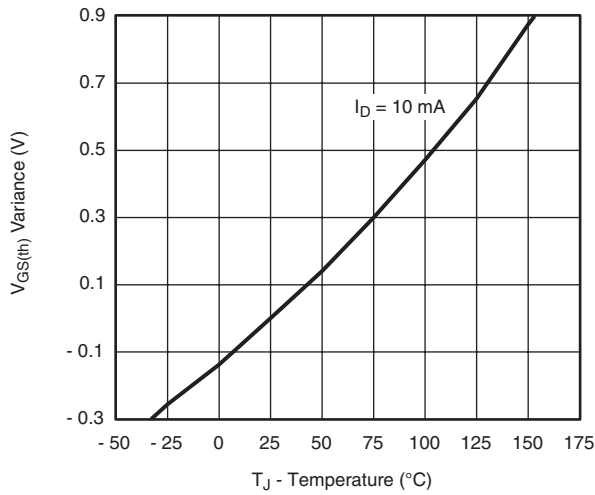
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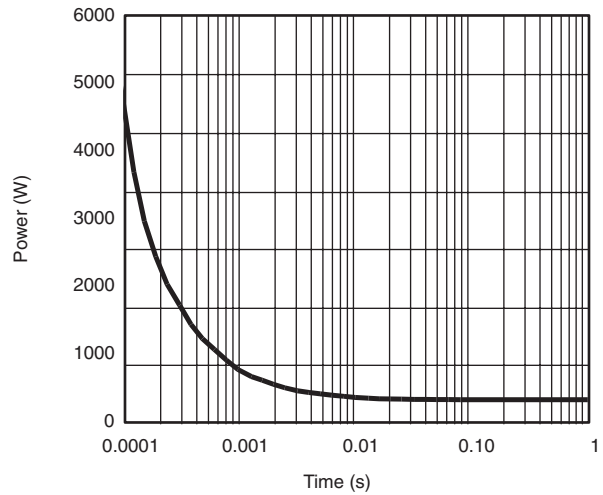
Source-Drain Diode Forward Voltage



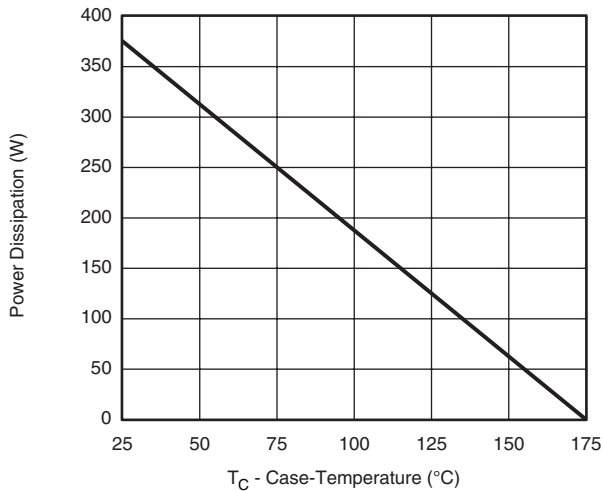
On-Resistance vs. Gate-to-Source Voltage



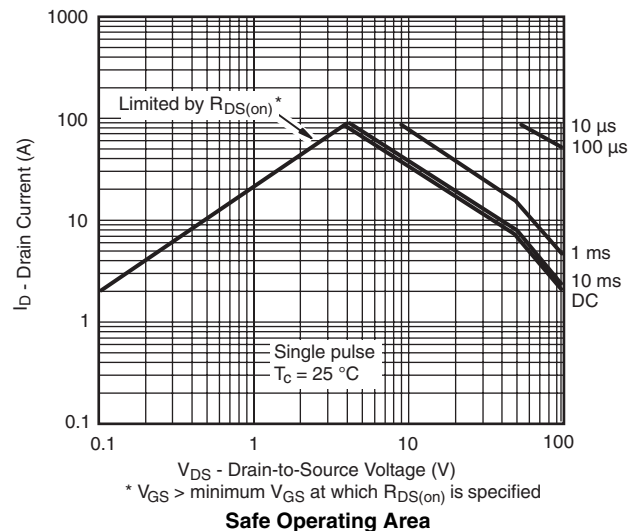
Threshold Voltage



Single Pulse, Junction-to-Case ($T_C = 25^\circ\text{C}$)

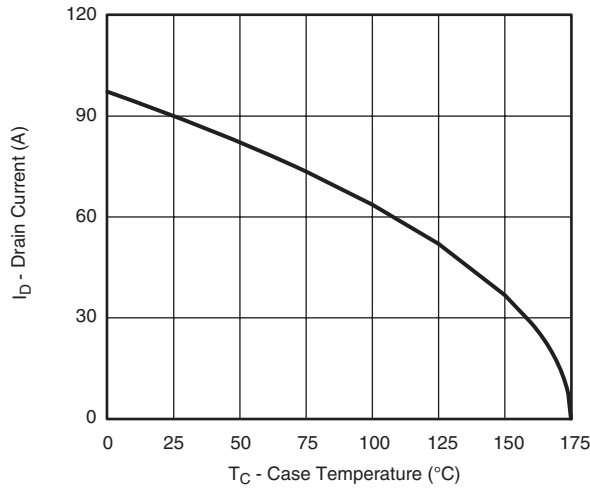


Power Derating (Junction-to-Case)

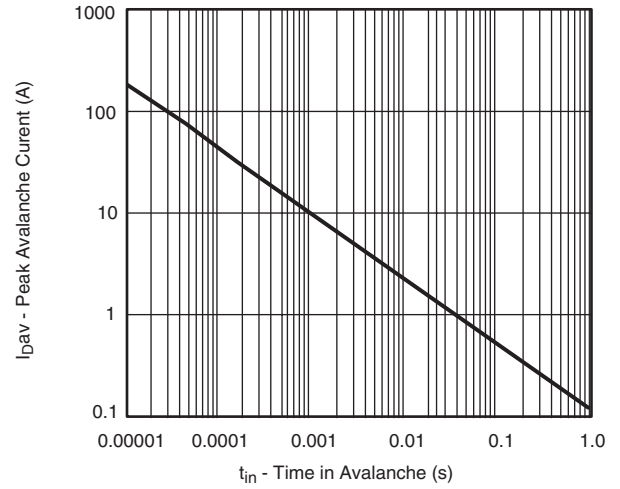


Safe Operating Area

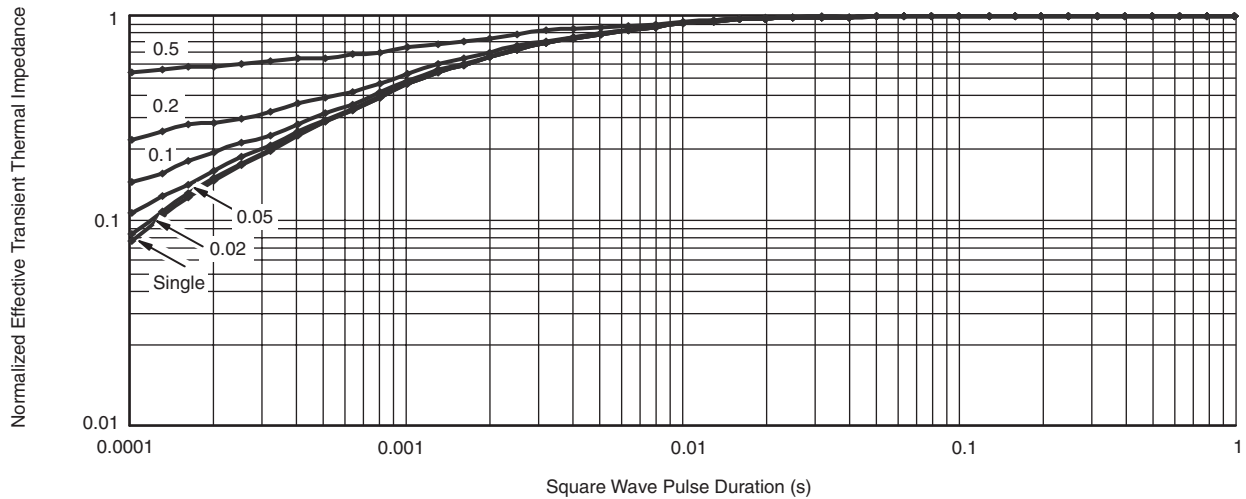
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Max Avalanche and Drain Current vs. Case Temperature



Avalanche Current vs. Time



Normalized Thermal Transient Impedance, Junction-to-Case

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