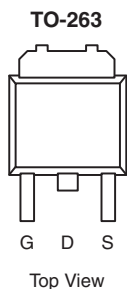


## P-Channel 100-V (D-S) MOSFET

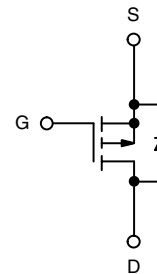
PRODUCT SUMMARY			
$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)	$Q_g$ (Typ.)
- 100	0.019 at $V_{GS} = - 10$ V	- 90	97 nC
	0.021 at $V_{GS} = - 4.5$ V	- 85	

### FEATURES

- TrenchFET<sup>®</sup> 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		$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 150$ °C)	$T_C = 25$ °C	$I_D$	- 90	A
	$T_C = 125$ °C		- 52	
	$T_A = 25$ °C		- 17.2 <sup>b, c</sup>	
	$T_A = 125$ °C		- 9.9 <sup>b, c</sup>	
Pulsed Drain Current		$I_{DM}$	- 90	
Continuous Source-Drain Diode Current	$T_C = 25$ °C	$I_S$	- 250	
	$T_A = 25$ °C		- 9 <sup>b, c</sup>	
Avalanche Current		$I_{AS}$	- 70	
Single-Pulse Avalanche Energy	L = 0.1 mH	$E_{AS}$	245	mJ
Maximum Power Dissipation	$T_C = 25$ °C	$P_D$	375	W
	$T_C = 125$ °C		125	
	$T_A = 25$ °C		13.6 <sup>b, c</sup>	
	$T_A = 125$ °C		4.5 <sup>b, c</sup>	
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 <sup>b, d</sup>	$t \leq 10$ s	$R_{thJA}$	8	11	°C/W
Maximum Junction-to-Case (Drain)	Steady State	$R_{thJC}$	0.33	0.4	

Notes:

a. Package Limited.

b. Surface Mounted on 1" x 1" FR4 board.

 c.  $t = 10$  s.

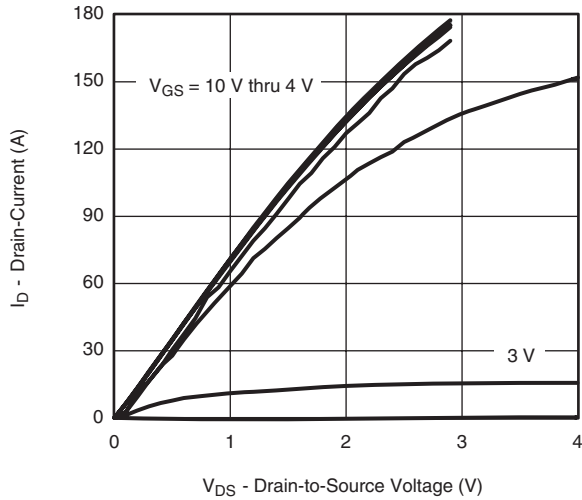
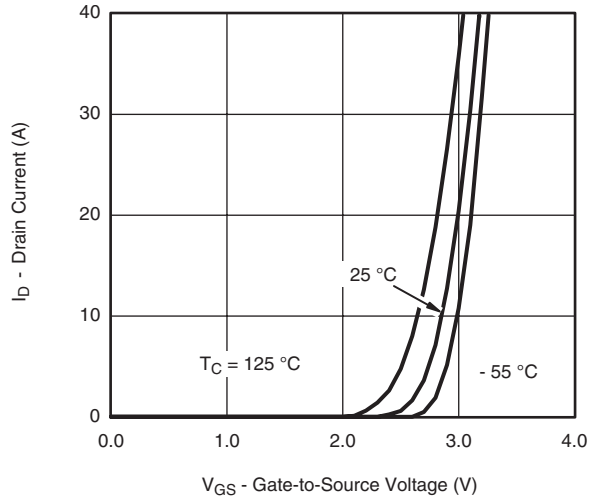
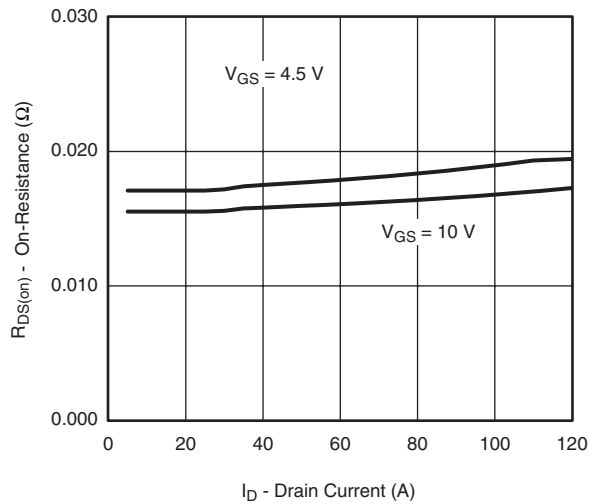
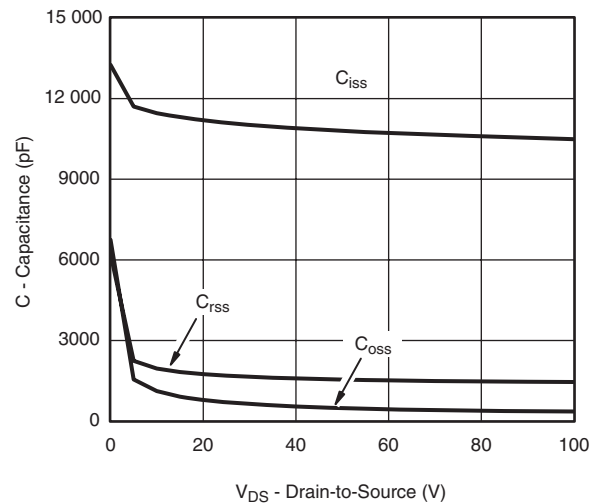
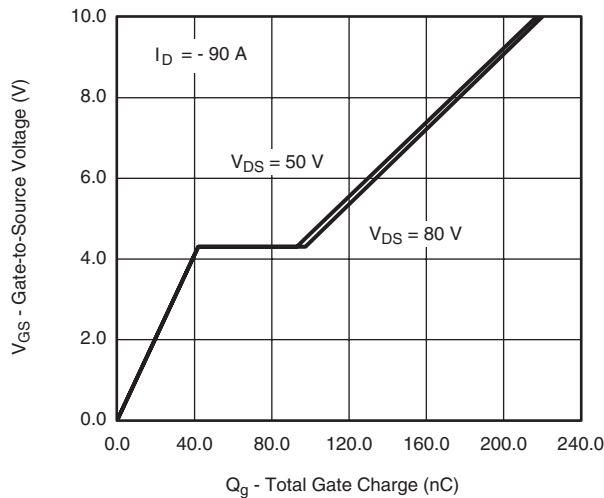
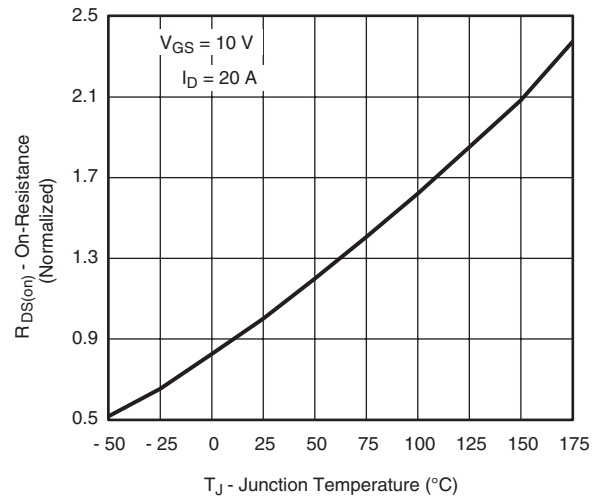
d. Maximum under Steady State conditions is 40 °C/W.

<b>SPECIFICATIONS</b> $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
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	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -100\text{ V}, V_{GS} = 0\text{ V}$			- 1	$\mu\text{A}$
		$V_{DS} = -100\text{ V}, V_{GS} = 0\text{ V}, T_J = 175\text{ }^\circ\text{C}$			- 500	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq 10\text{ V}, V_{GS} = -10\text{ V}$	- 90			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -20\text{ A}$		0.0156	0.019	$\Omega$
		$V_{GS} = -4.5\text{ V}, I_D = -15\text{ A}$		0.0173	0.021	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -15\text{ V}, I_D = -20\text{ A}$		80		S
<b>Dynamic<sup>b</sup></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		$\Omega$
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	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$			- 90	A
Pulse Diode Forward Current <sup>a</sup>	$I_{SM}$				- 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		

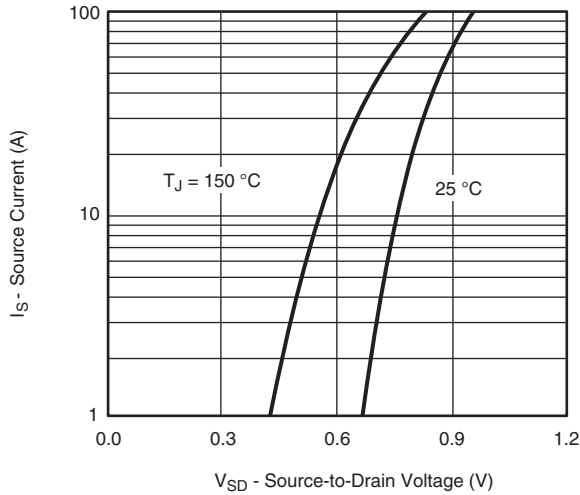
### Notes

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

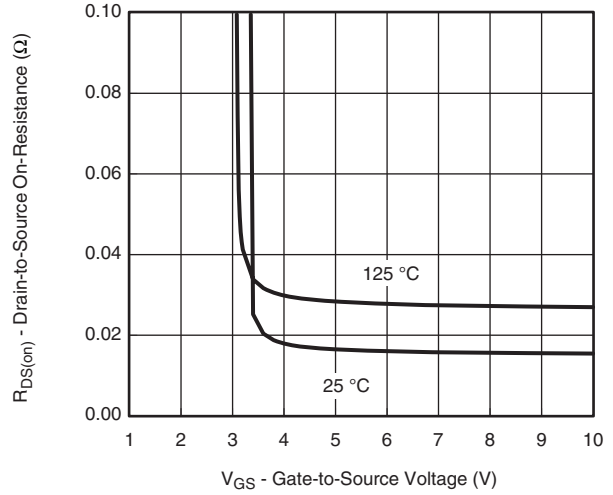
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

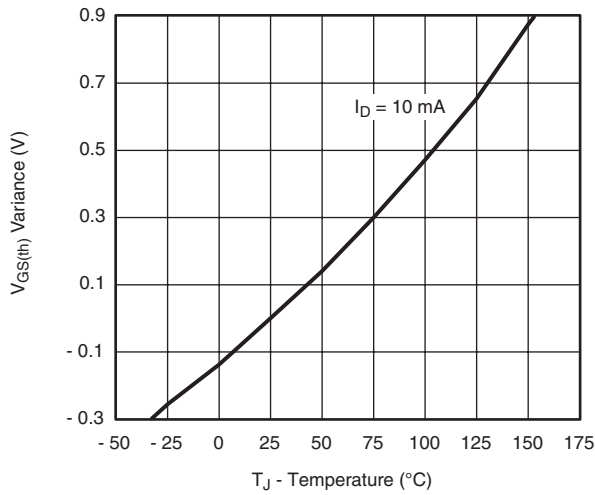
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



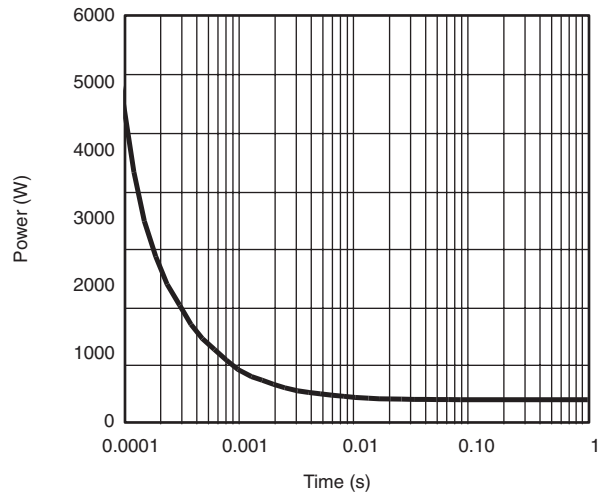
**Source-Drain Diode Forward Voltage**



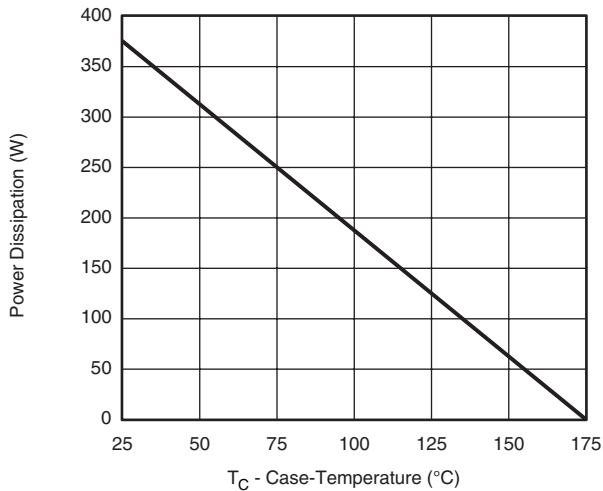
**On-Resistance vs. Gate-to-Source Voltage**



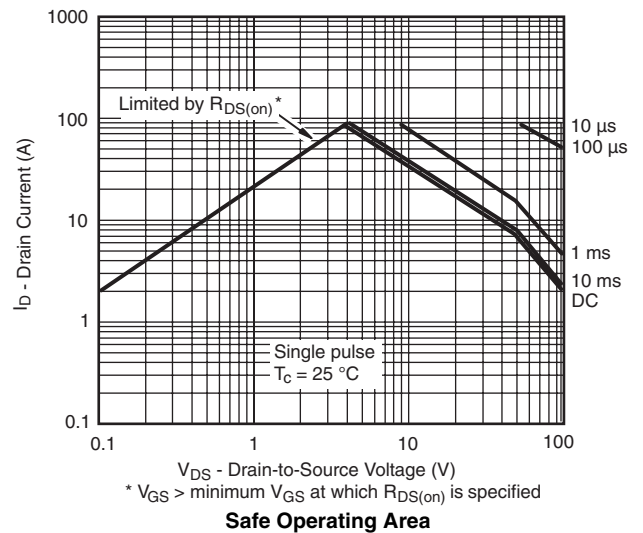
**Threshold Voltage**



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

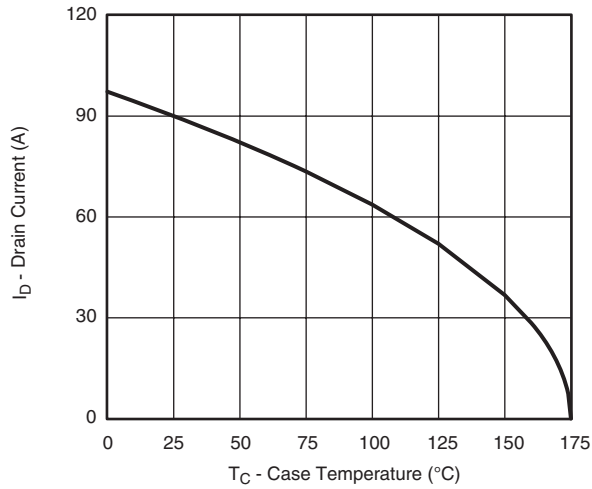


**Power Derating (Junction-to-Case)**

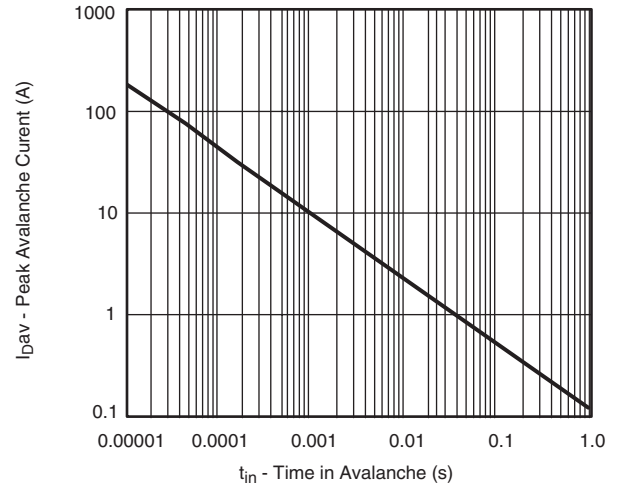


**Safe Operating Area**

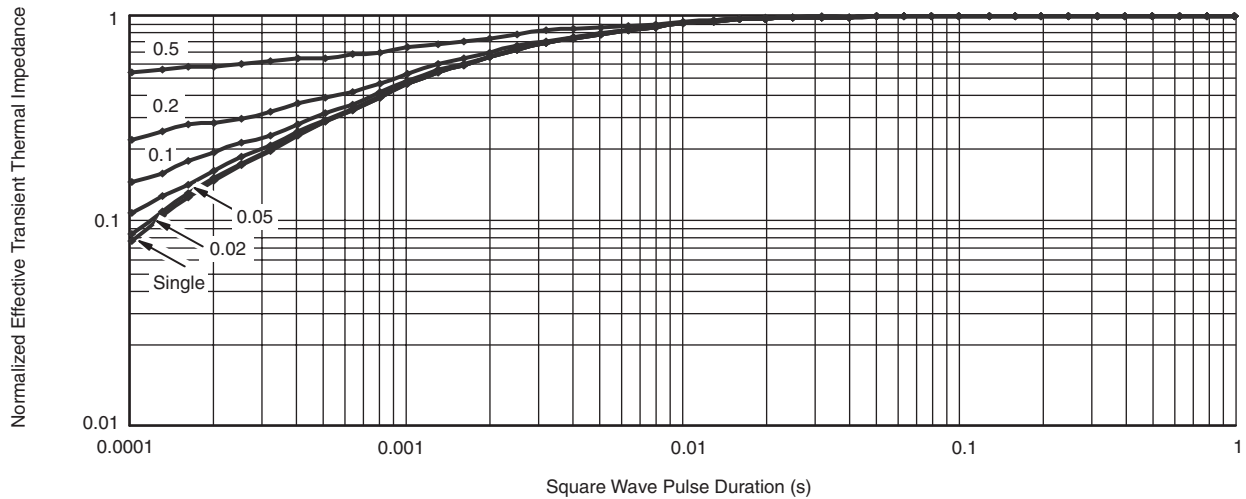
**TYPICAL CHARACTERISTICS** 25 °C, unless otherwise noted



**Max Avalanche and Drain Current vs. Case Temperature**



**Avalanche Current vs. Time**



**Normalized Thermal Transient Impedance, Junction-to-Case**

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