

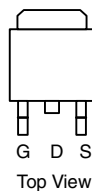
P-Channel 60-V (D-S) 175 °C MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A) ^d	Q_g (Typ.)
- 60	0.019 at $V_{GS} = - 10$ V	- 55	76
	0.025 at $V_{GS} = - 4.5$ V	- 48	

FEATURES

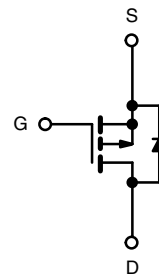
- TrenchFET[®] Power MOSFET


 Available
RoHS*
 COMPLIANT

TO-263


Top View

Ordering Information: SUM55P06-19L
 SUM55P06-19L-E3 (Lead (Pb)-free)



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_C = 25$ °C, unless otherwise noted				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	- 60	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ^d ($T_J = 175$ °C)	$T_C = 25$ °C	I_D	- 55	A
	$T_C = 125$ °C		- 31	
Pulsed Drain Current		I_{DM}	- 150	
Avalanche Current	L = 0.1 mH	I_{AS}	- 45	
Single Pulse Avalanche Energy ^a		E_{AS}	101	mJ
Power Dissipation	$T_C = 25$ °C	P_D	125 ^c	W
	$T_A = 25$ °C ^b		3.75	
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		R_{thJC}	1.2	

Notes:

- Duty cycle $\leq 1\%$.
- When Mounted on 1" square PCB (FR-4 material).
- See SOA curve for voltage derating.
- Limited by package.

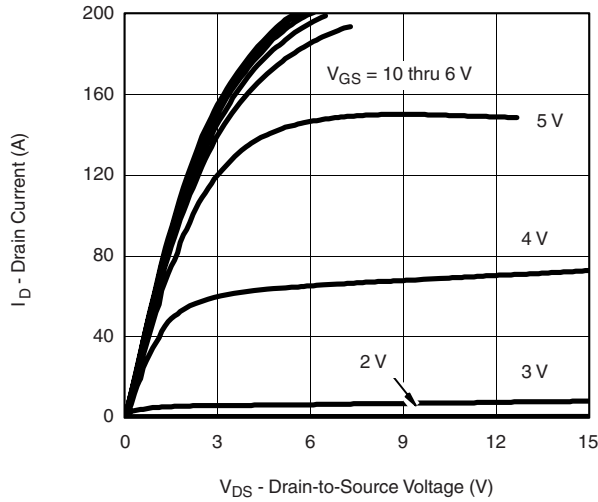
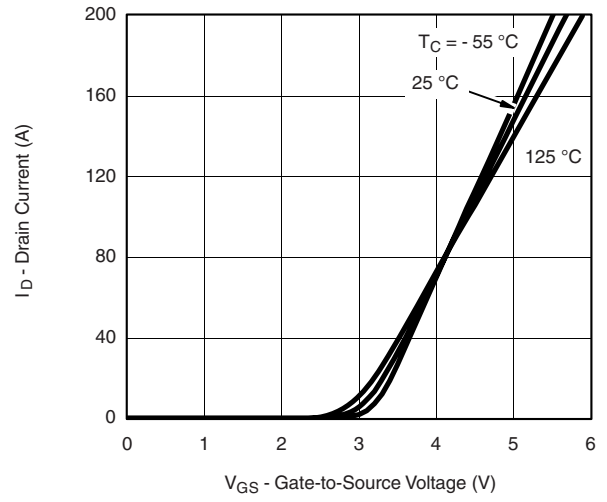
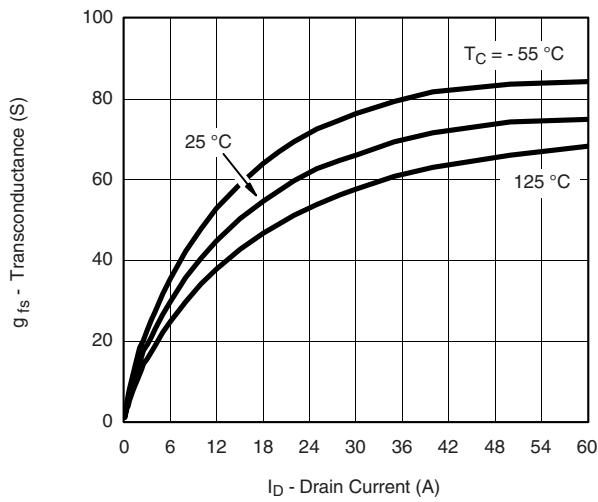
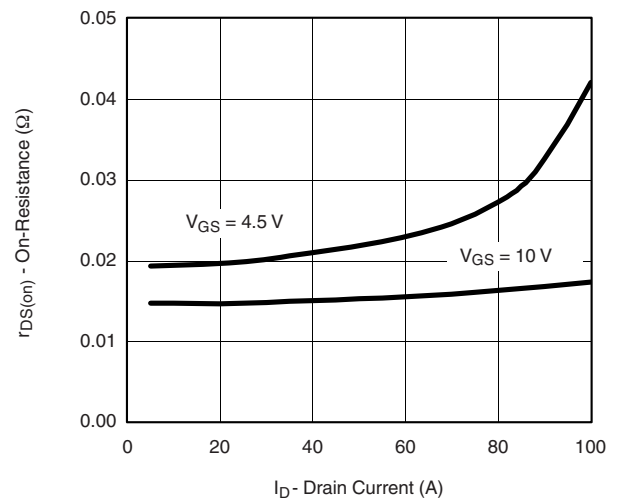
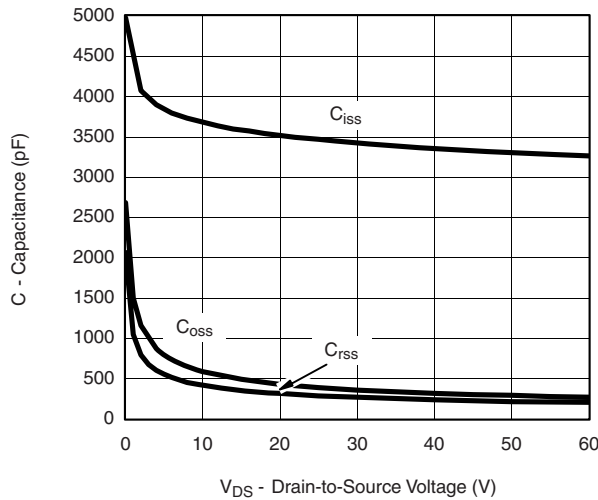
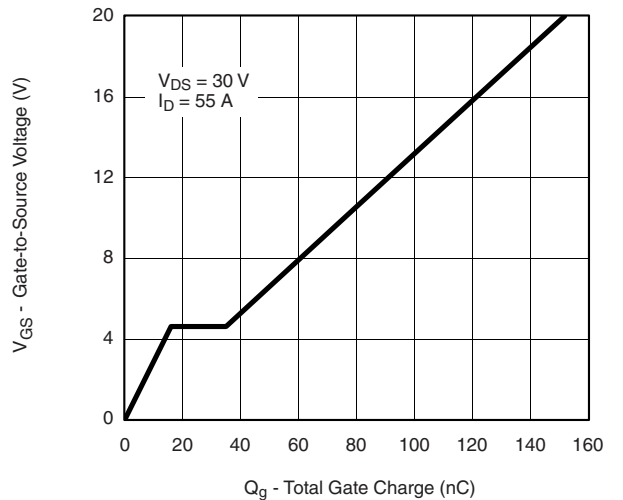
* Pb containing terminations are not RoHS compliant, exemptions may apply.

SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	- 60			V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	- 1		- 3	
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}	$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}$			- 1	μA
		$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			- 50	
		$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}, T_J = 175\text{ }^\circ\text{C}$			- 250	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = -5\text{ V}, V_{GS} = -10\text{ V}$	- 120			A
Drain-Source On-State Resistance ^a	$r_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -30\text{ A}$		0.015	0.019	Ω
		$V_{GS} = -10\text{ V}, I_D = -30\text{ A}, T_J = 125\text{ }^\circ\text{C}$			0.033	
		$V_{GS} = -10\text{ V}, I_D = -30\text{ A}, T_J = 175\text{ }^\circ\text{C}$			0.041	
		$V_{GS} = -4.5\text{ V}, I_D = -20\text{ A}$		0.020	0.025	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15\text{ V}, I_D = -50\text{ A}$	20			S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = -25\text{ V}, f = 1\text{ MHz}$		3500		μF
Output Capacitance	C_{oss}			390		
Reverse Transfer Capacitance	C_{rss}			290		
Total Gate Charge ^c	Q_g	$V_{DS} = -30\text{ V}, V_{GS} = -10\text{ V}, I_D = -55\text{ A}$		76	115	nC
Gate-Source Charge ^c	Q_{gs}			16		
Gate-Drain Charge ^c	Q_{gd}			19		
Gate Resistance	R_g	$f = 1.0\text{ MHz}$		5.2		Ω
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = -30\text{ V}, R_L = 0.54\text{ }\Omega$ $I_D \cong -55\text{ A}, V_{GEN} = -10\text{ V}, R_g = 2.5\text{ }\Omega$		12	20	ns
Rise Time ^c	t_r			15	25	
Turn-Off Delay Time ^c	$t_{d(off)}$			80	120	
Fall Time ^c	t_f			230	350	
Source-Drain Diode Ratings and Characteristics $T_C = 25\text{ }^\circ\text{C}^b$						
Continuous Current	I_S				- 110	A
Pulsed Current	I_{SM}				- 240	
Forward Voltage ^a	V_{SD}	$I_F = -50\text{ A}, V_{GS} = 0\text{ V}$		- 1.0	- 1.5	V
Reverse Recovery Time	t_{rr}	$I_F = -50\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		45	68	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			- 2.6	4.0	A
Reverse Recovery Charge	Q_{rr}				0.059	0.136

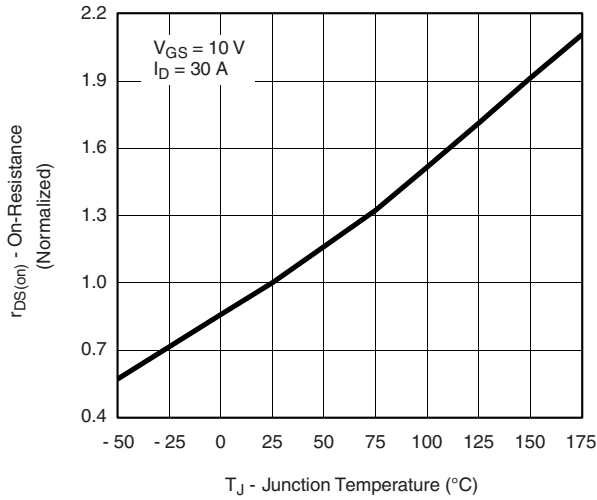
Notes:

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

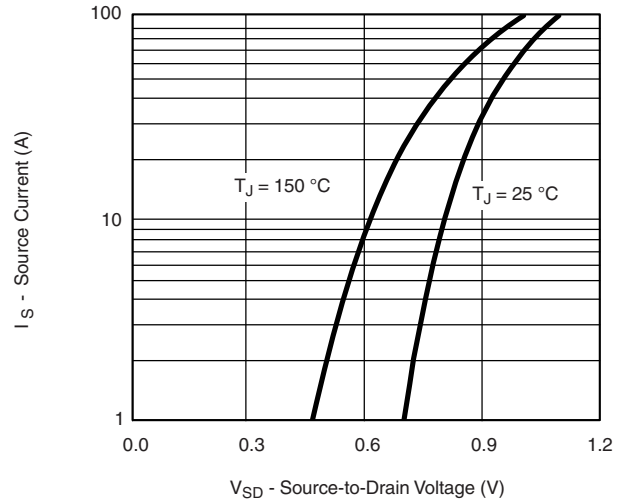
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

Output Characteristics

Transfer Characteristics

Transconductance

On-Resistance vs. Drain Current

Capacitance

Gate Charge

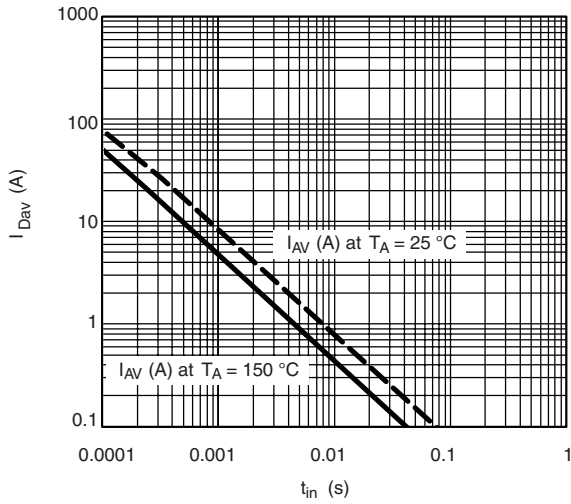
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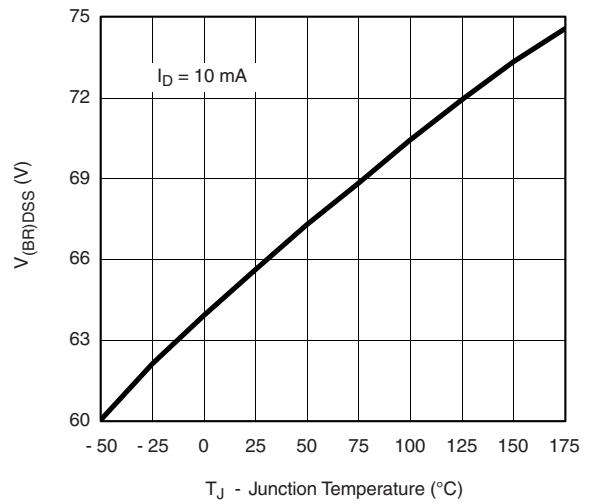
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

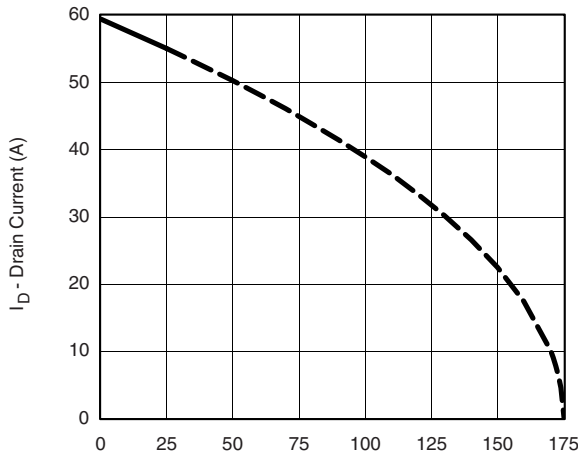


Avalanche Current vs. Time

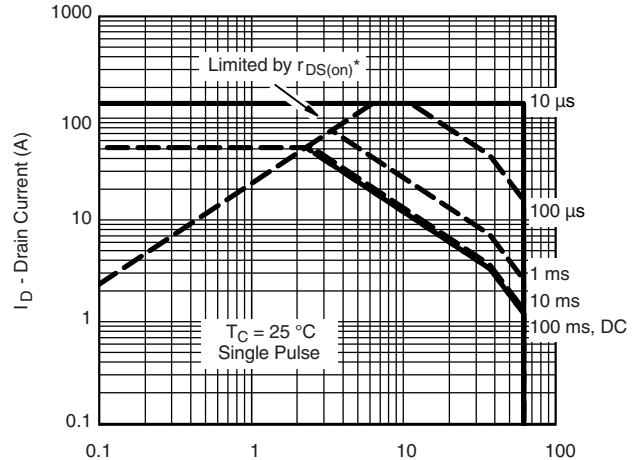


Drain Source Breakdown vs. Junction Temperature

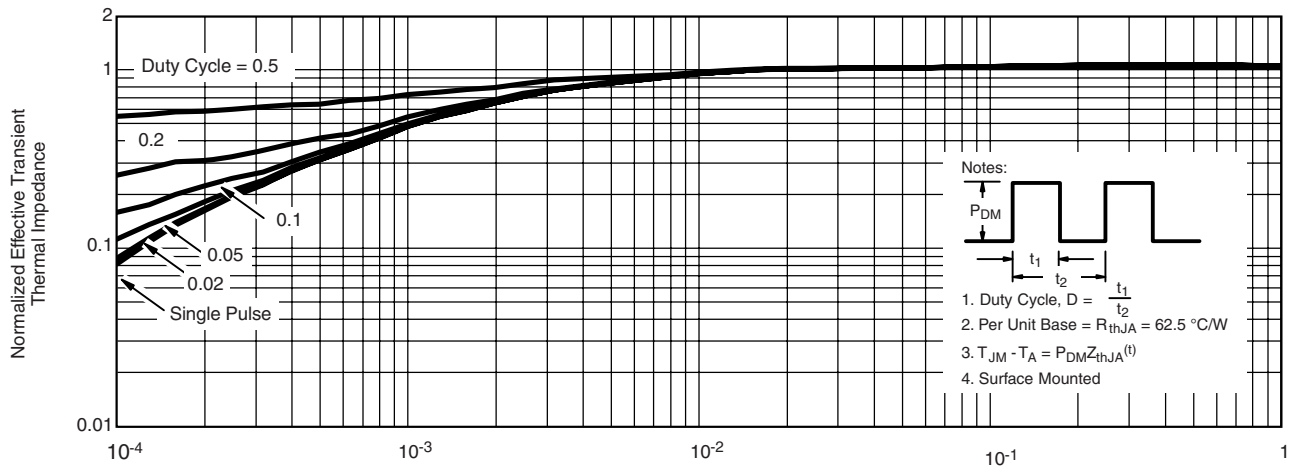
THERMAL RATINGS



Maximum Drain Current vs. Case Temperature



Safe Operating Area
* $V_{GS} >$ minimum V_{GS} at which $r_{DS(on)}$ is specified



Normalized Thermal Transient Impedance, Junction-to-Case

- Notes:
- Duty Cycle, $D = \frac{t_1}{t_2}$
 - Per Unit Base = $R_{thJA} = 62.5 \text{ } ^\circ\text{C/W}$
 - $T_{JM} - T_A = P_{DM}Z_{thJA}^{(t)}$
 - Surface Mounted

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