

P-Channel 60-V (D-S) 175 °C MOSFET

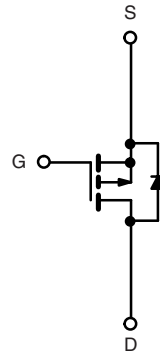
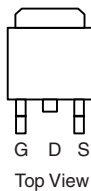
PRODUCT SUMMARY

V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A) ^d
- 60	0.0069 at V _{GS} = - 10 V	- 110
	0.0088 at V _{GS} = - 4.5 V	- 110

FEATURES

- TrenchFET[®] Power MOSFET
- Package with Low Thermal Resistance


 Available
RoHS*
 COMPLIANT

TO-263


P-Channel MOSFET

Ordering Information: SUM110P06-07L
 SUM110P06-07L-E3 (Lead (Pb)-free)

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)	I _D	T _C = 25 °C	- 110
		T _C = 125 °C	- 95
Pulsed Drain Current	I _{DM}	- 240	A
Avalanche Current	I _{AS}	- 75	
Single Pulse Avalanche Energy ^a	E _{AS}	281	
Power Dissipation	P _D	T _C = 25 °C	375 ^c
		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	Typical	Unit
Junction-to-Ambient	R _{thJA}	40	°C/W
Junction-to-Case	R _{thJC}	0.4	

Notes:

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

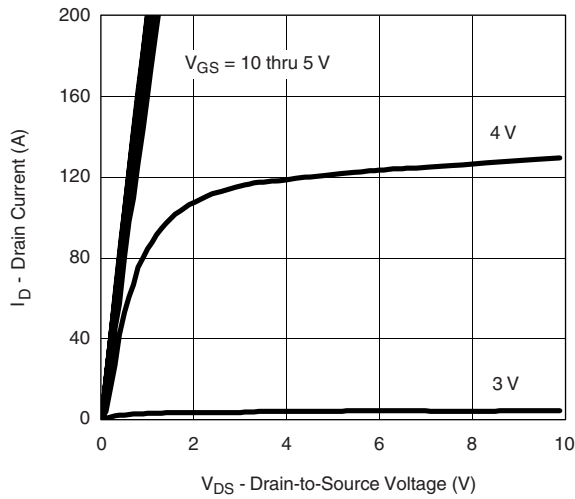
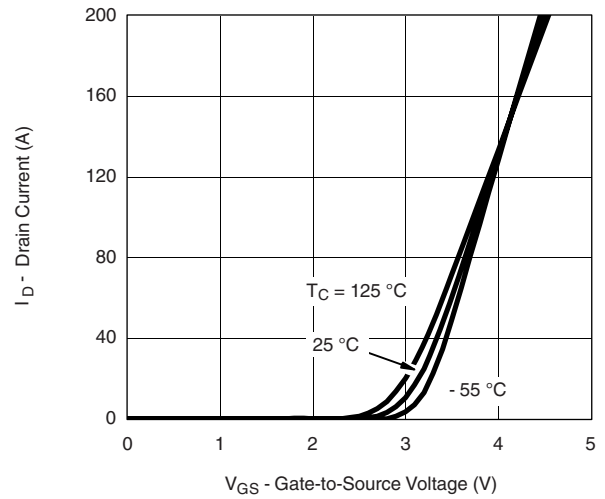
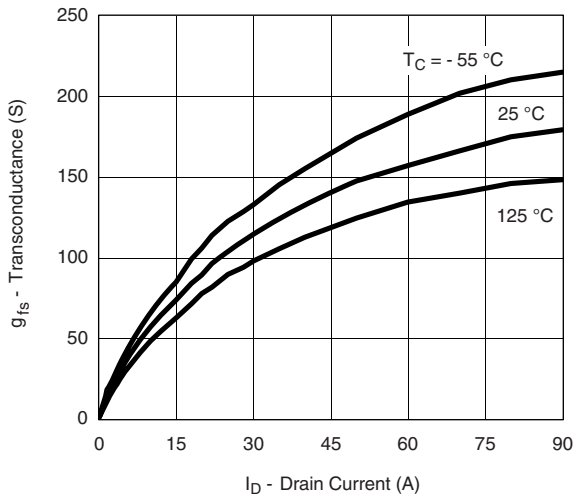
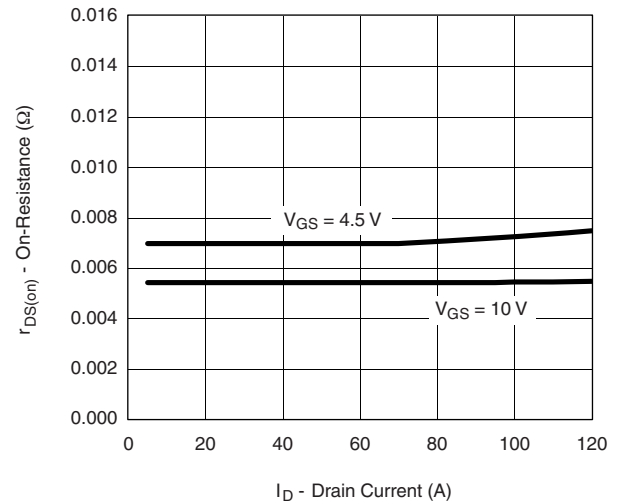
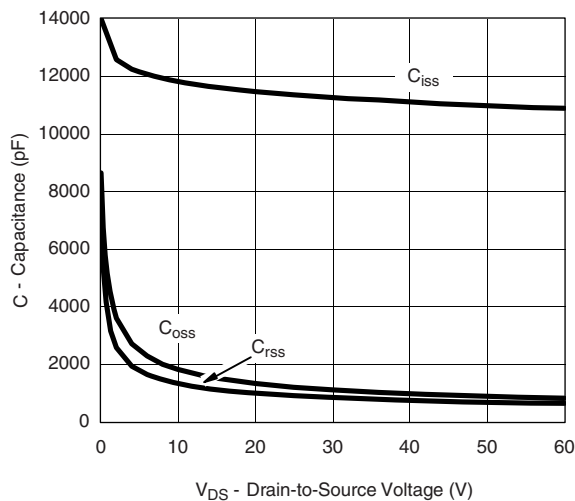
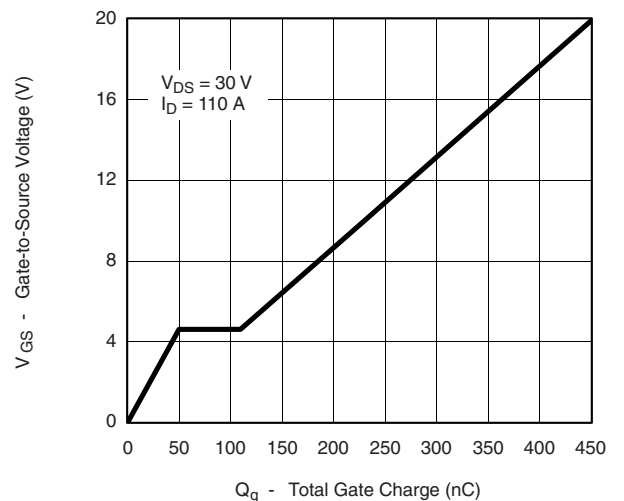
* Pb containing terminations are not RoHS compliant, exemptions may apply.

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	$r_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -30\text{ A}$		0.0055	0.0069	Ω
		$V_{GS} = -10\text{ V}, I_D = -30\text{ A}, T_J = 125\text{ }^\circ\text{C}$			0.0115	
		$V_{GS} = -10\text{ V}, I_D = -30\text{ A}, T_J = 175\text{ }^\circ\text{C}$			0.0138	
		$V_{GS} = -4.5\text{ V}, I_D = -20\text{ A}$		0.007	0.0088	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15\text{ V}, I_D = -50\text{ A}$	20			S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = -25\text{ V}, f = 1\text{ MHz}$		11400		μF
Output Capacitance	C_{oss}			1200		
Reverse Transfer Capacitance	C_{rss}			900		
Total Gate Charge ^c	Q_g	$V_{DS} = -30\text{ V}, V_{GS} = -10\text{ V}, I_D = -110\text{ A}$		230	345	nC
Gate-Source Charge ^c	Q_{gs}			50		
Gate-Drain Charge ^c	Q_{gd}			60		
Gate Resistance	R_g	$f = 1.0\text{ MHz}$		3		Ω
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = -30\text{ V}, R_L = 0.27\text{ }\Omega$ $I_D \cong -110\text{ A}, V_{GEN} = -10\text{ V}, R_g = 2.5\text{ }\Omega$		20	30	ns
Rise Time ^c	t_r			160	240	
Turn-Off Delay Time ^c	$t_{d(off)}$			200	300	
Fall Time ^c	t_f			240	360	
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}	$I_F = -85\text{ A}, V_{GS} = 0\text{ V}$		- 1.0	- 1.5	V
Reverse Recovery Time	t_{rr}	$I_F = -85\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		65	100	ns
Peak Reverse Recovery Charge	$I_{RM(REC)}$			- 4.2	- 6.3	A
Reverse Recovery Charge	Q_{rr}			0.14	0.32	μC

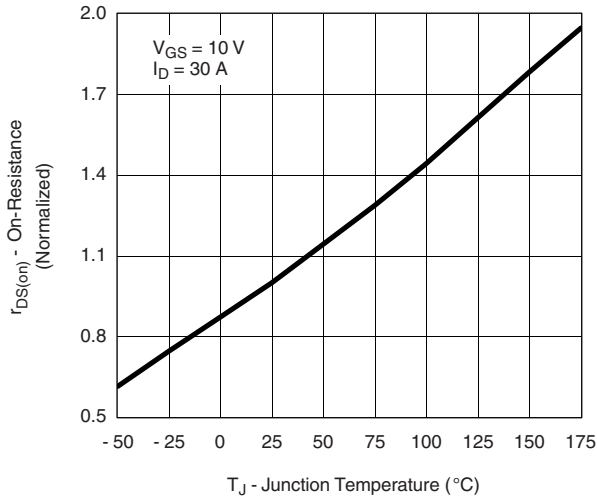
Notes:

- 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.

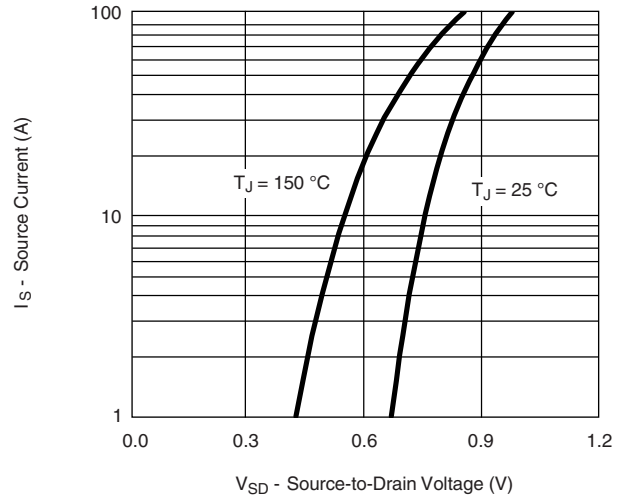
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

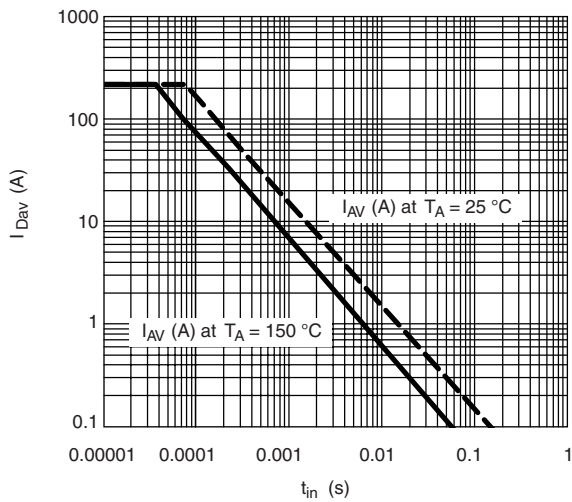
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



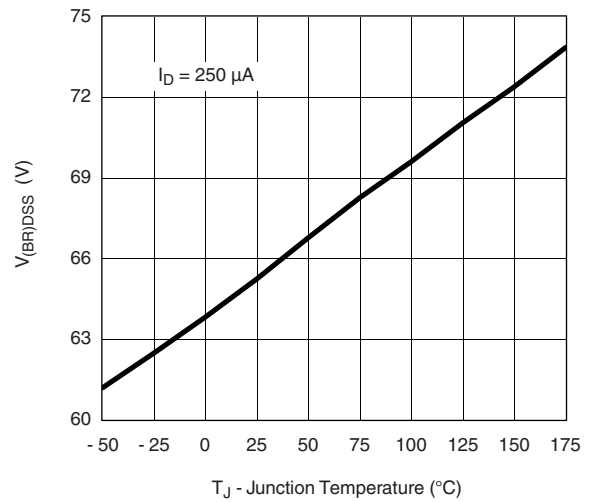
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

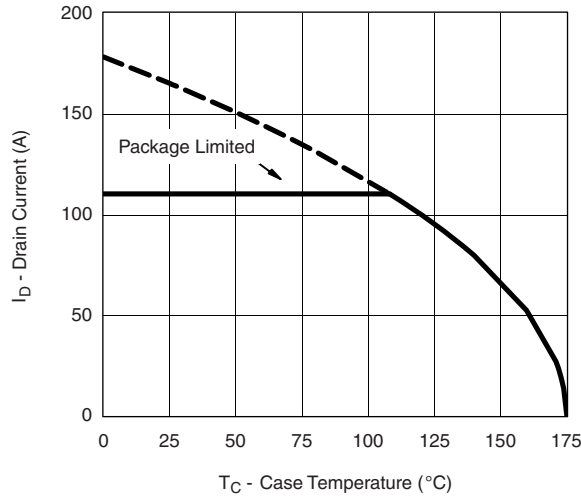


Avalanche Current vs. Time

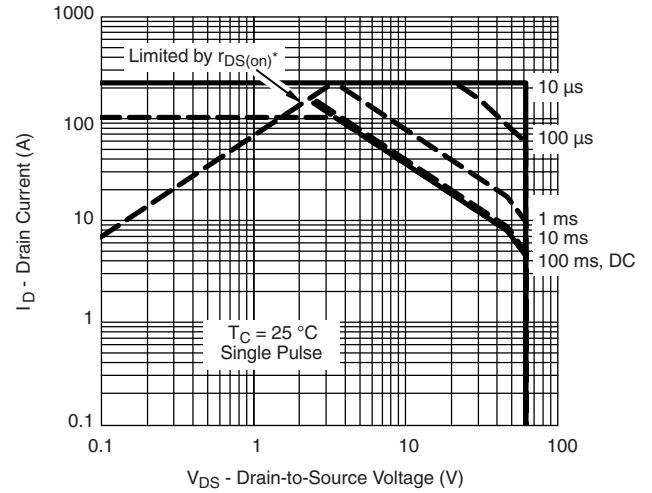


Drain Source Breakdown vs. Junction Temperature

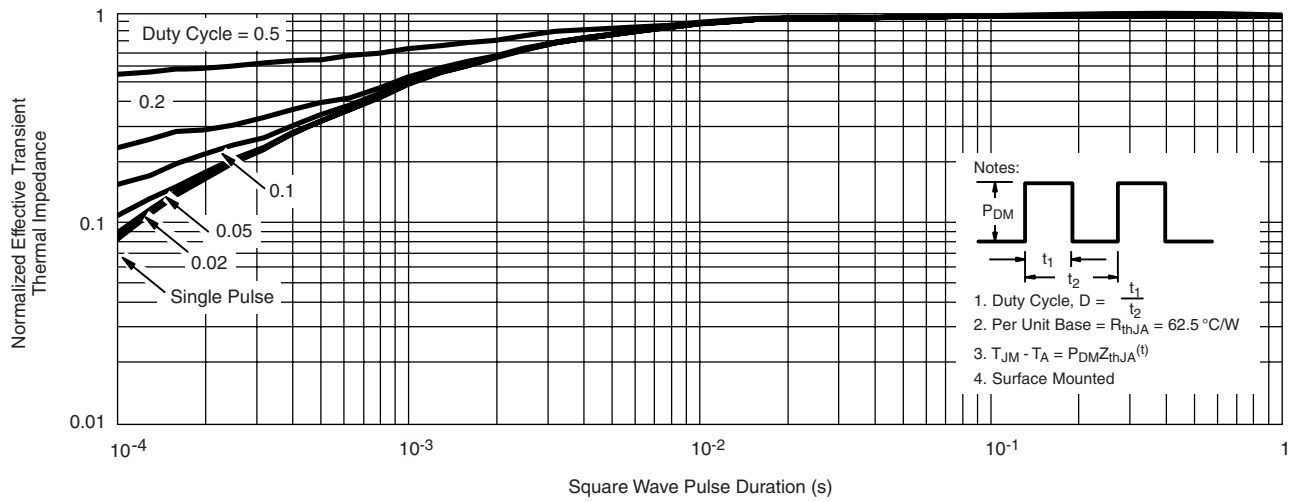
THERMAL RATINGS



Maximum Avalanche and 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

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see <http://www.vishay.com/ppg?72439>.



Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.