

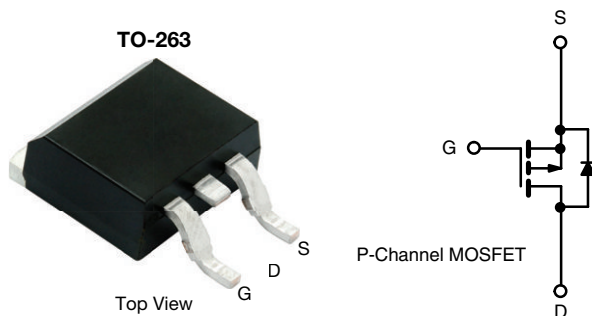
P-Channel 60 V (D-S) 175 °C MOSFET

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	

FEATURES

- TrenchFET® power MOSFET
- Package with low thermal resistance
- Material categorization:
for definitions of compliance please see
www.vishay.com/doc?99912


RoHS
COMPLIANT


Ordering Information:

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	A
		$T_C = 125$ °C	
Pulsed Drain Current	I_{DM}	-240	
Avalanche Current	I_{AS}	-75	
Single Pulse Avalanche Energy ^a	E_{AS}	281	mJ
Power Dissipation	P_D	$T_C = 25$ °C ^c	W
		$T_A = 25$ °C ^b	
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 (FR4 material).
- See SOA curve for voltage derating.
- Limited by package.



SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = -250 μA	-60	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250 μA	-1	-	-3	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	-	-	± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -60 V, V _{GS} = 0 V	-	-	-1	μA
		V _{DS} = -60 V, V _{GS} = 0 V, T _J = 125 °C	-	-	-50	
		V _{DS} = -60 V, V _{GS} = 0 V, T _J = 175 °C	-	-	-250	
On-State Drain Current ^a	I _{D(on)}	V _{DS} = -5 V, V _{GS} = -10 V	-120	-	-	A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = -10 V, I _D = -30 A	-	0.0055	0.0069	Ω
		V _{GS} = -10 V, I _D = -30 A, T _J = 125 °C	-	-	0.0115	
		V _{GS} = -10 V, I _D = -30 A, T _J = 175 °C	-	-	0.0138	
		V _{GS} = -4.5 V, I _D = -20 A	-	0.0070	0.0088	
Forward Transconductance ^a	g _{fs}	V _{DS} = -15 V, I _D = -50 A	20	-	-	S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = -25 V, f = 1 MHz	-	11 400	-	pF
Output Capacitance	C _{oss}		-	1200	-	
Reverse Transfer Capacitance	C _{rss}		-	900	-	
Total Gate Charge ^c	Q _g	V _{DS} = -30 V, V _{GS} = -10 V, I _D = -110 A	-	230	345	nC
Gate-Source Charge ^c	Q _{gs}		-	50	-	
Gate-Drain Charge ^c	Q _{gd}		-	60	-	
Gate Resistance	R _g	f = 1 MHz	-	3	-	Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = -30 V, R _L = 0.27 Ω I _D ≡ -110 A, V _{GEN} = -10 V, R _g = 1 Ω	-	20	30	ns
Rise Time ^c	t _r		-	25	40	
Turn-Off Delay Time ^c	t _{d(off)}		-	110	200	
Fall Time ^c	t _f		-	50	100	
Drain-Source Body Diode Characteristics (T _C = 25 °C ^b)						
Continuous Current	I _S		-	-	-110	A
Pulsed Current	I _{SM}		-	-	-240	
Forward Voltage ^a	V _{SD}	I _F = -85 A, V _{GS} = 0 V	-	-1	-1.5	V
Reverse Recovery Time	t _{rr}	I _F = -85 A, dI/dt = 100 A/μs	-	91	137	ns
Peak Reverse Recovery Charge	I _{RM(REC)}		-	-6	-9	A
Reverse Recovery Charge	Q _{rr}		-	0.21	0.44	μC

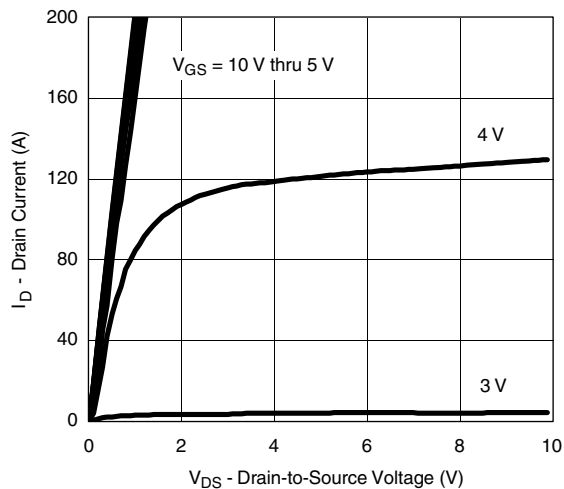
Notes

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

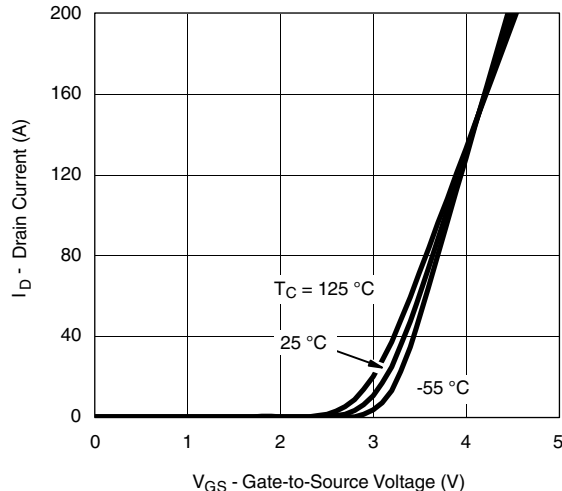
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



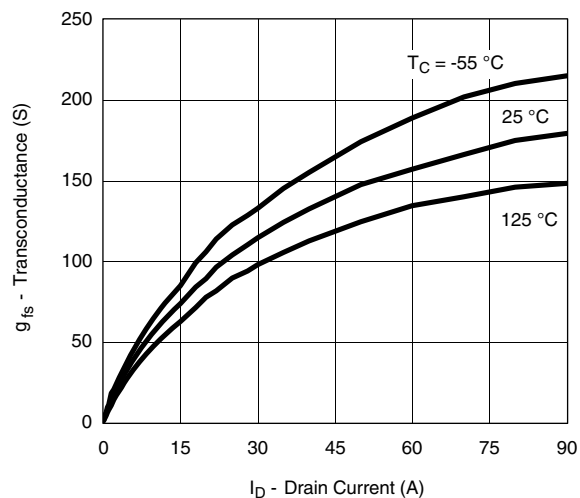
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



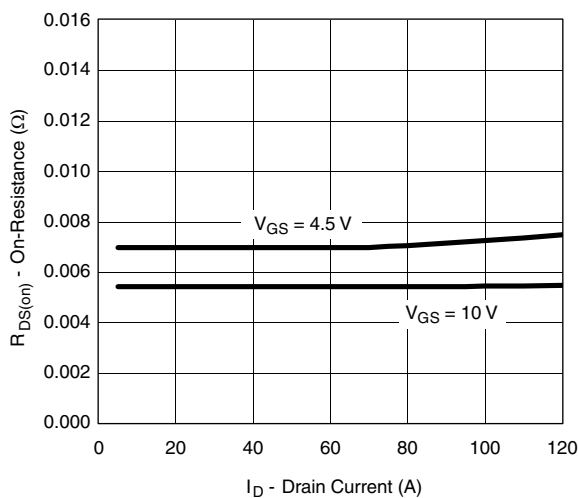
Output Characteristics



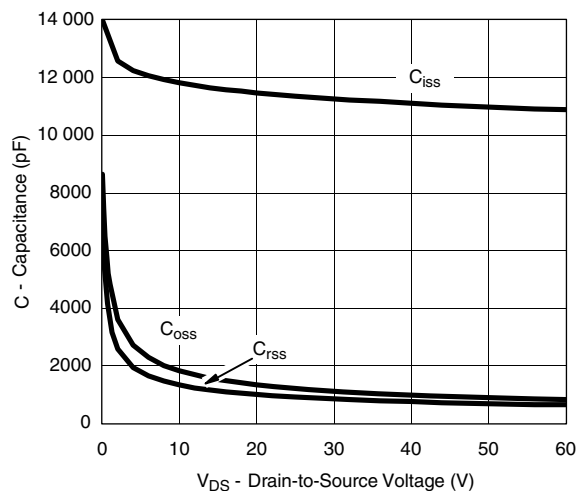
Transfer Characteristics



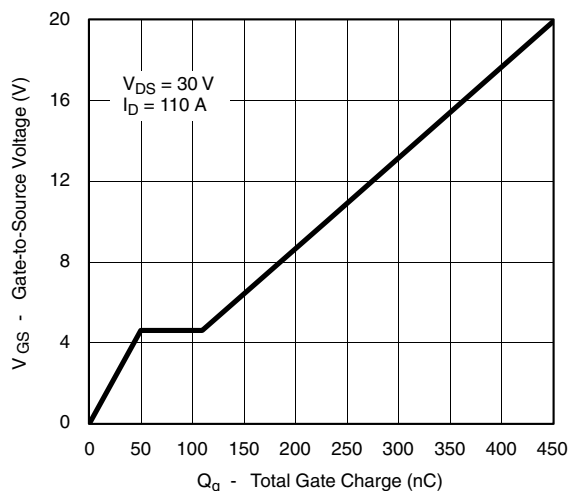
Transconductance



On-Resistance vs. Drain Current



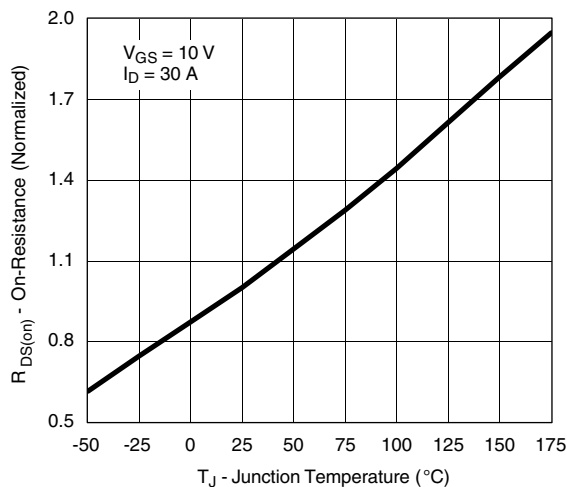
Capacitance



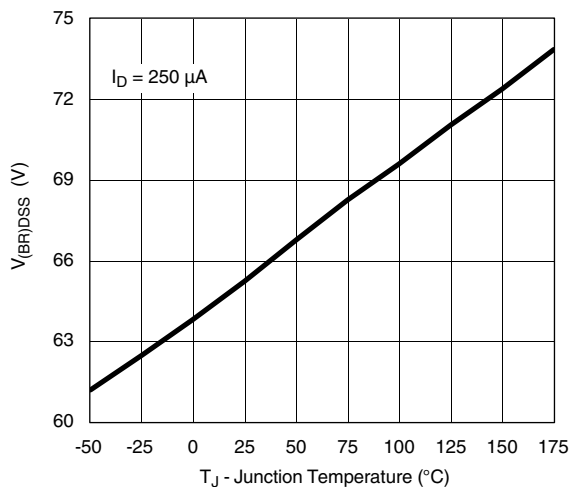
Gate Charge



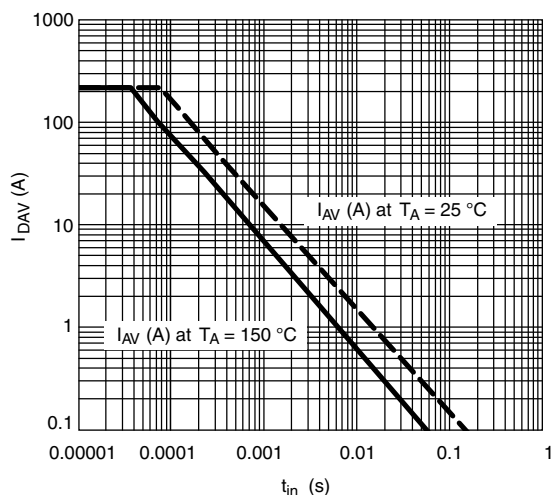
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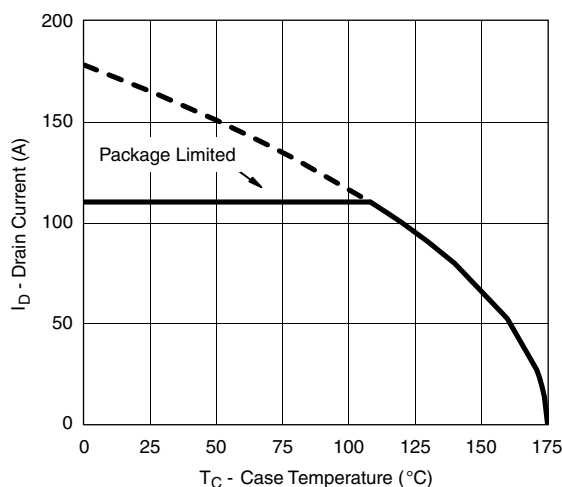
On-Resistance vs. Junction Temperature



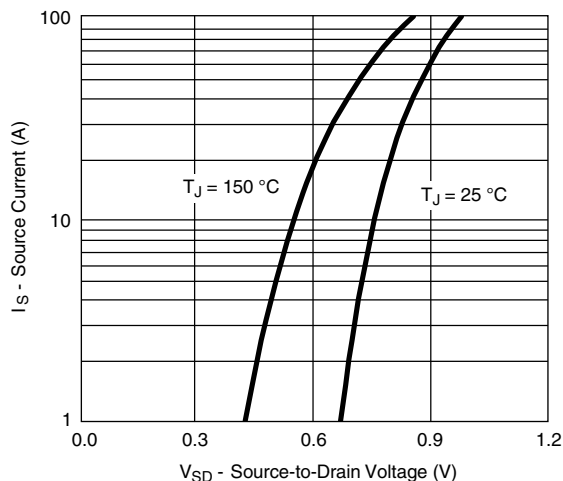
Drain Source Breakdown vs. Junction Temperature



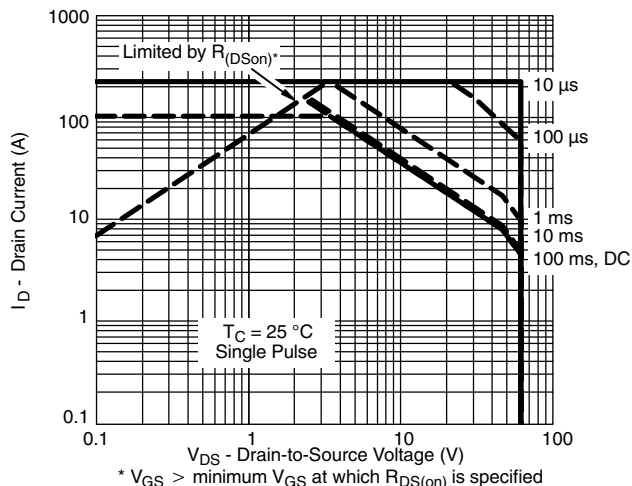
Avalanche Current vs. Time



Maximum Avalanche and Drain Current vs. Case Temperature



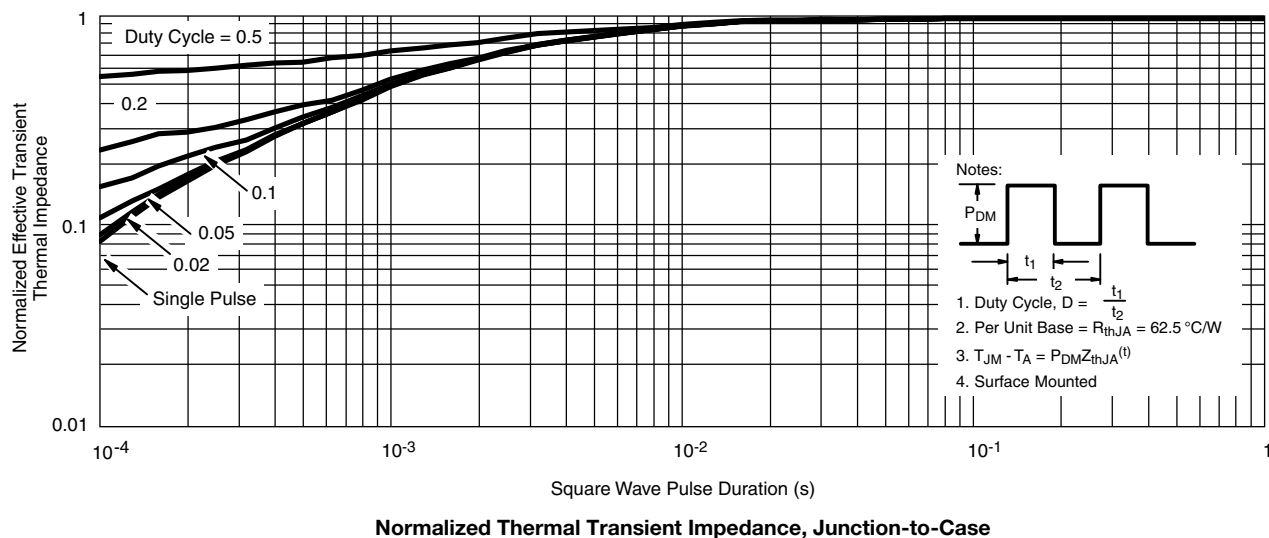
Source-Drain Diode Forward Voltage



Safe Operating Area



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



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 www.vishay.com/ppg?72439.

TO-263 (D²PAK): 3-LEAD



DETAIL A (ROTATED 90°)



SECTION A-A

Notes

- Plane B includes maximum features of heat sink tab and plastic.
- No more than 25 % of L1 can fall above seating plane by max. 8 mils.
- Pin-to-pin coplanarity max. 4 mils.
- *: Thin lead is for SUB, SYB.
Thick lead is for SUM, SYM, SQM.
- Use inches as the primary measurement.
-  This feature is for thick lead.

DIM.		INCHES		MILLIMETERS	
		MIN.	MAX.	MIN.	MAX.
A		0.160	0.190	4.064	4.826
b		0.020	0.039	0.508	0.990
b1		0.020	0.035	0.508	0.889
b2		0.045	0.055	1.143	1.397
c*	Thin lead	0.013	0.018	0.330	0.457
	Thick lead	0.023	0.028	0.584	0.711
c1	Thin lead	0.013	0.017	0.330	0.431
	Thick lead	0.023	0.027	0.584	0.685
c2		0.045	0.055	1.143	1.397
D		0.340	0.380	8.636	9.652
D1		0.220	0.240	5.588	6.096
D2		0.038	0.042	0.965	1.067
D3		0.045	0.055	1.143	1.397
D4		0.044	0.052	1.118	1.321
E		0.380	0.410	9.652	10.414
E1		0.245	-	6.223	-
E2		0.355	0.375	9.017	9.525
		0.072	0.078	1.829	1.981
e		0.100 BSC		2.54 BSC	
K		0.045	0.055	1.143	1.397
L		0.575	0.625	14.605	15.875
L1		0.090	0.110	2.286	2.794
L2		0.040	0.055	1.016	1.397
L3		0.050	0.070	1.270	1.778
L4		0.010 BSC		0.254 BSC	
M		-	0.002	-	0.050
ECN: T13-0707-Rev. K, 30-Sep-13					
DWG: 5843					

RECOMMENDED MINIMUM PADS FOR D²PAK: 3-Lead



Recommended Minimum Pads
Dimensions in Inches/(mm)

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