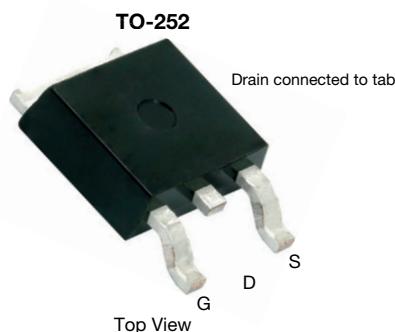


P-Channel 60 V (D-S) MOSFET



FEATURES

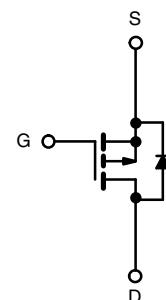
- TrenchFET® power MOSFET
- Material categorization:
for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Load switch



P-Channel MOSFET

PRODUCT SUMMARY

V_{DS} (V)	-60
$R_{DS(on)}$ max. (Ω) at $V_{GS} = -10$ V	0.015
$R_{DS(on)}$ max. (Ω) at $V_{GS} = -4.5$ V	0.020
I_D (A) ^d	-50
Configuration	Single

ORDERING INFORMATION

Package	TO-252
Lead (Pb)-free and halogen-free	SUD50P06-15-GE3 SUD50P06-15-T4-GE3

ABSOLUTE MAXIMUM RATINGS ($T_A = 25$ °C, unless otherwise noted)

PARAMETER		SYMBOL	LIMIT	UNIT
Drain-source voltage		V_{DS}	-60	V
Gate-source voltage		V_{GS}	± 20	
Continuous drain current ($T_J = 175$ °C)	$T_C = 25$ °C	I_D	-50 ^d	A
	$T_C = 125$ °C		-27.5	
Pulsed drain current		I_{DM}	-80	
Avalanche current		I_{AS}	-50	
Single pulse avalanche energy ^a	$L = 0.1$ mH	E_{AS}	125	mJ
Power dissipation	$T_C = 25$ °C	P_D	113 ^c	W
	$T_A = 25$ °C		2.5 ^{b, c}	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to +150	°C

THERMAL RESISTANCE RATINGS

PARAMETER		SYMBOL	TYPICAL	MAXIMUM	UNIT
Junction-to-ambient ^b	$t \leq 10$ s	R_{thJA}	15	18	°C/W
	Steady state		40	50	
Junction-to-case		R_{thJC}	0.82	1.1	

Notes

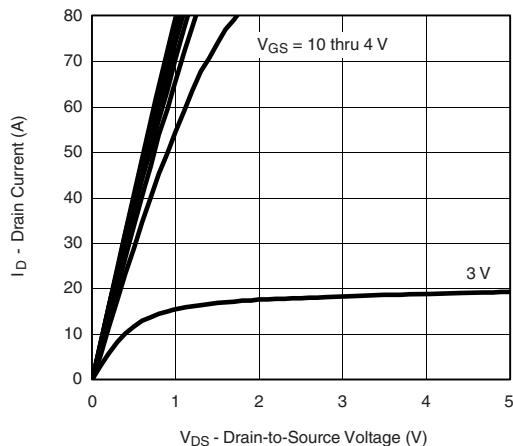
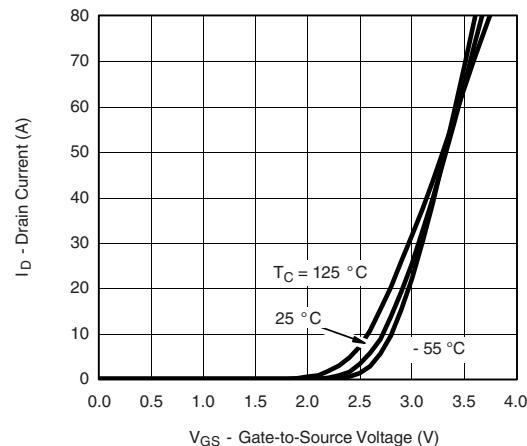
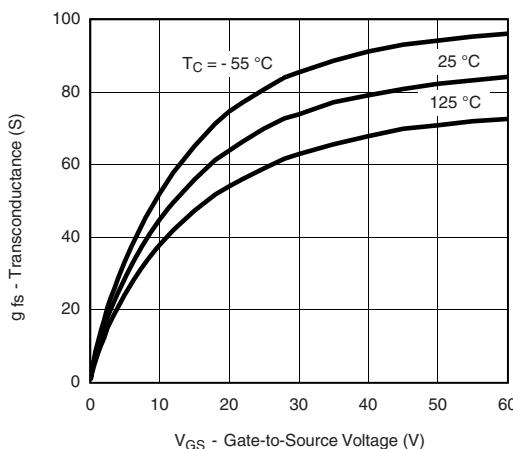
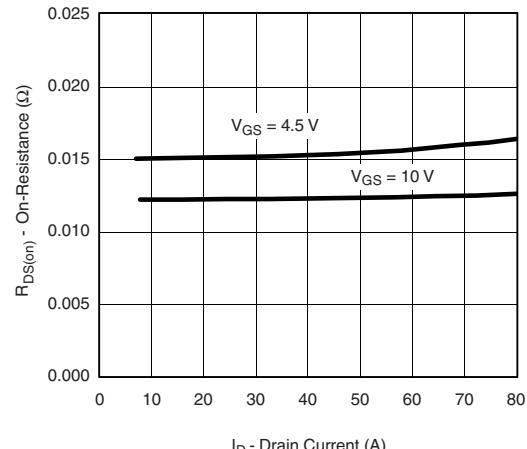
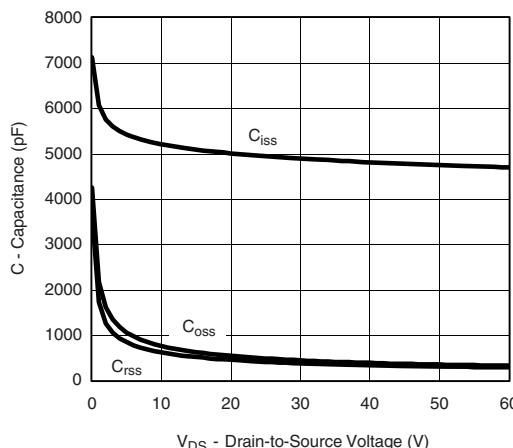
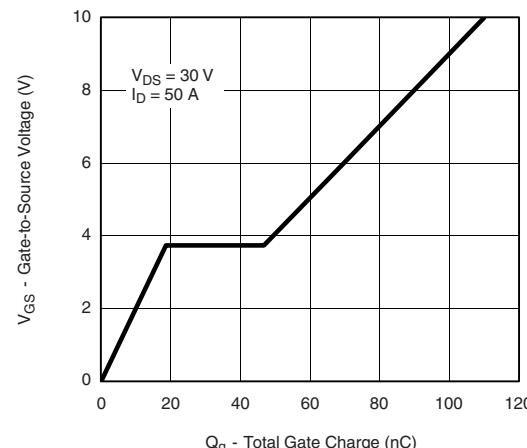
- Duty cycle $\leq 1\%$
- When mounted on 1" square PCB (FR4 material)
- See SOA curve for voltage derating
- Package limited

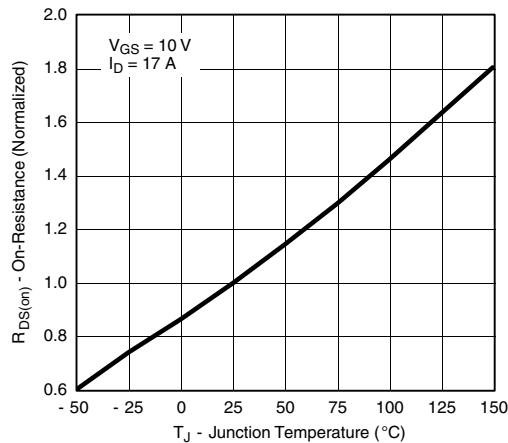
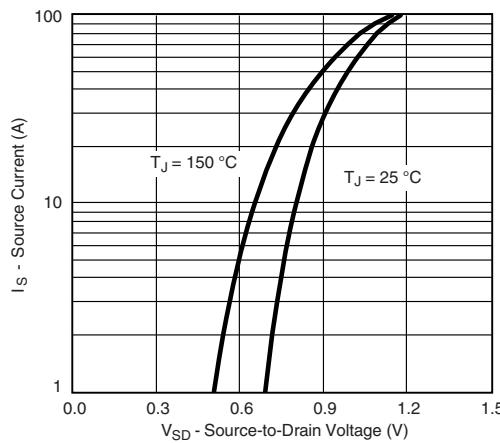
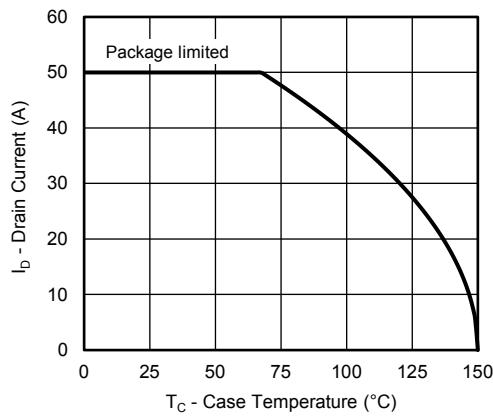
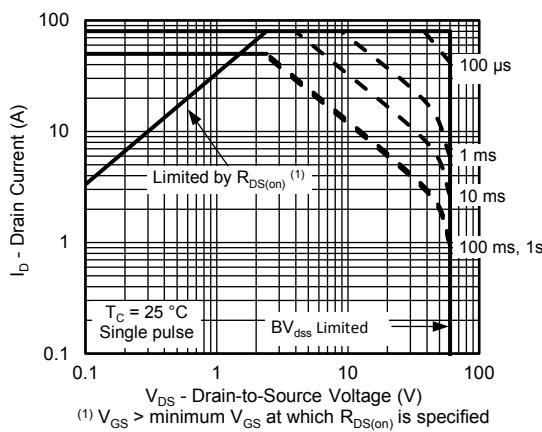
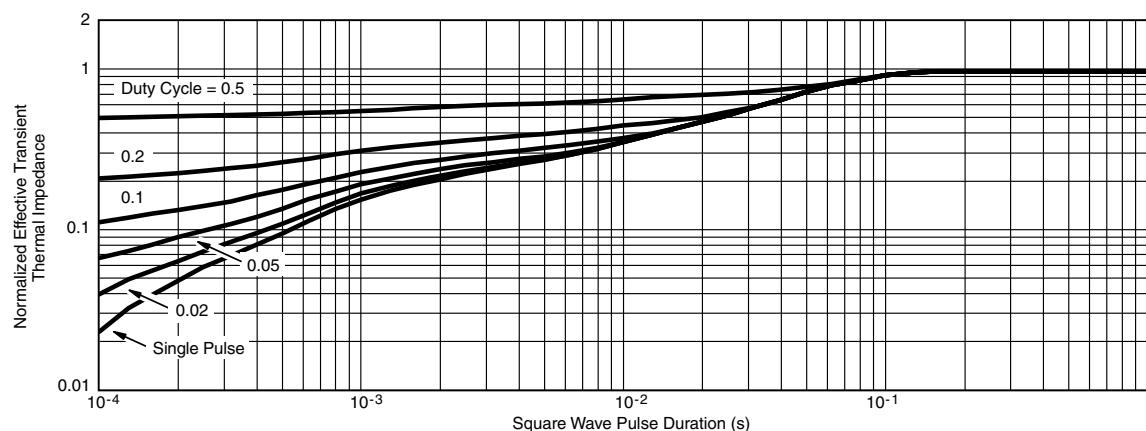
SPECIFICATIONS ($T_J = 25^\circ\text{C}$, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-source breakdown voltage	V_{DS}	$V_{GS} = 0 \text{ V}$, $I_D = -250 \mu\text{A}$	-60	-	-	V
Gate threshold voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = -250 \mu\text{A}$	-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	
		$V_{DS} = -60 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 125^\circ\text{C}$	-	-	-50	
		$V_{DS} = -60 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 150^\circ\text{C}$	-	-	-100	
On-state drain current ^a	$I_{D(\text{on})}$	$V_{DS} = -5 \text{ V}$, $V_{GS} = -10 \text{ V}$	-50	-	-	A
Drain-source on-state resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = -10 \text{ V}$, $I_D = -17 \text{ A}$	-	0.012	0.015	
		$V_{GS} = -10 \text{ V}$, $I_D = -50 \text{ A}$, $T_J = 125^\circ\text{C}$	-	-	0.025	
		$V_{GS} = -10 \text{ V}$, $I_D = -50 \text{ A}$, $T_J = 150^\circ\text{C}$	-	-	0.028	
		$V_{GS} = -4.5 \text{ V}$, $I_D = -14 \text{ A}$	-	-	0.020	
Forward transconductance ^a	g_{fs}	$V_{DS} = -15 \text{ V}$, $I_D = -17 \text{ A}$	-	61	-	S
Dynamic^b						
Input capacitance	C_{iss}	$V_{GS} = 0 \text{ V}$, $V_{DS} = -25 \text{ V}$, $f = 1 \text{ MHz}$	-	4950	-	
Output capacitance	C_{oss}		-	480	-	
Reverse transfer capacitance	C_{rss}		-	405	-	
Total gate charge ^c	Q_g	$V_{DS} = -30 \text{ V}$, $V_{GS} = -10 \text{ V}$, $I_D = -50 \text{ A}$	-	110	165	
Gate-source charge ^c	Q_{gs}		-	19	-	
Gate-drain charge ^c	Q_{gd}		-	28	-	
Turn-on delay time ^c	$t_{d(on)}$		-	15	23	
Rise time ^c	t_r	$V_{DD} = -30 \text{ V}$, $R_L = 0.6 \Omega$ $I_D \approx -50 \text{ A}$, $V_{GEN} = -10 \text{ V}$, $R_G = 6 \Omega$	-	70	105	
Turn-off delay time ^c	$t_{d(off)}$		-	175	260	
Fall time ^c	t_f		-	175	260	
Source-Drain Diode Ratings and Characteristics $T_C = 25^\circ\text{C}$ ^b						
Continuous current	I_S		-	-	-50	
Pulsed current	I_{SM}		-	-	-80	
Forward voltage ^a	V_{SD}	$I_F = -50 \text{ A}$, $V_{GS} = 0 \text{ V}$	-	-1	-1.6	V
Reverse recovery time	t_{rr}	$I_F = -50 \text{ A}$, $di/dt = 100 \text{ A}/\mu\text{s}$	-	45	70	ns

Notes

- a. Pulse test; pulse width $\leq 300 \mu\text{s}$, 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.

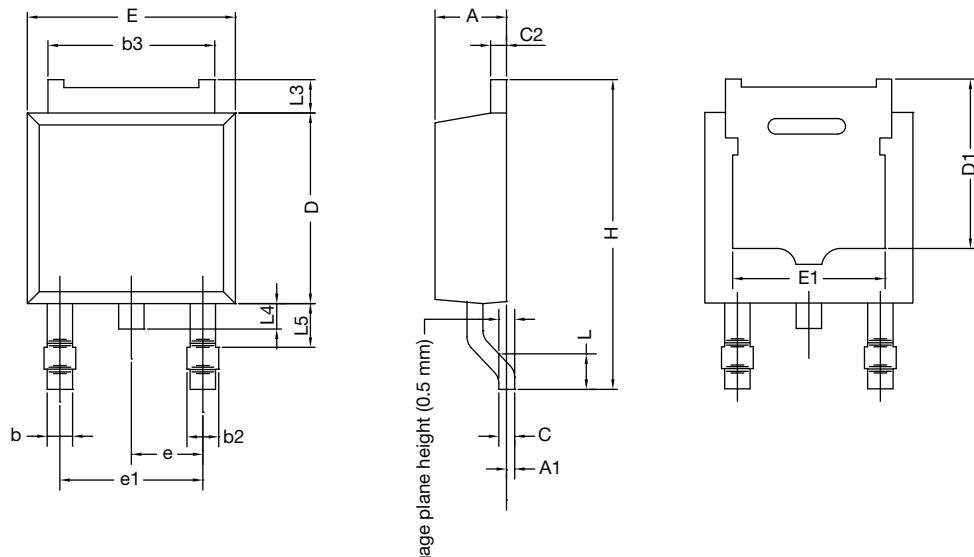
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

Output Characteristics

Transfer Characteristics

Transconductance

On-Resistance vs. Drain Current

Capacitance

Gate Charge

TYPICAL CHARACTERISTICS

On-Resistance vs. Junction Temperature

Source-Drain Diode Forward Voltage
THERMAL RATINGS (25 °C, unless otherwise noted)

Drain Current vs. Case Temperature

Safe Operating Area

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 www.vishay.com/ppg?68940.

TO-252AA Case Outline

VERSION 1: FACILITY CODE = Y

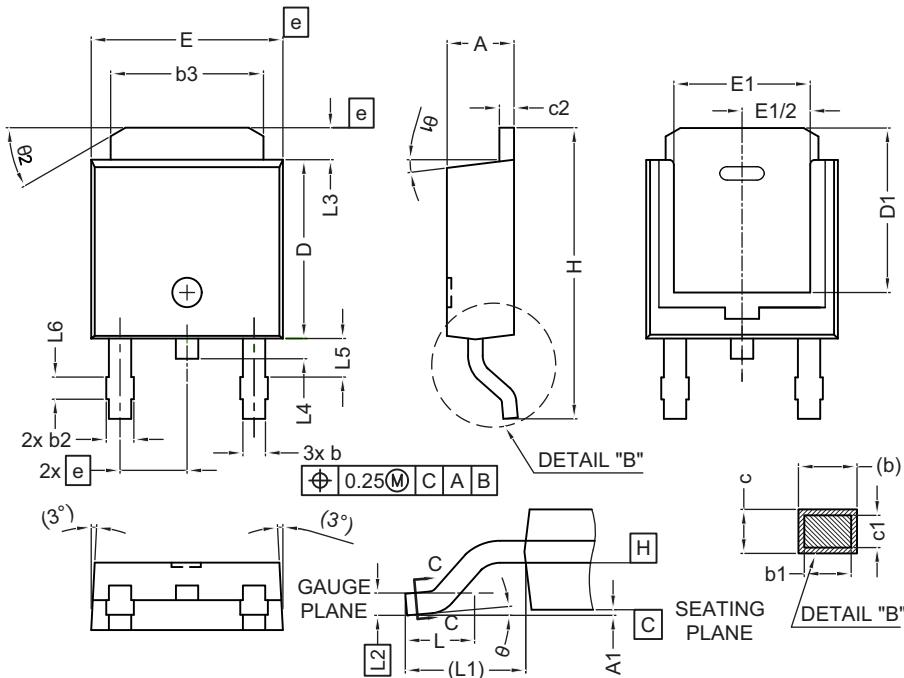


MILLIMETERS		
DIM.	MIN.	MAX.
A	2.18	2.38
A1	-	0.127
b	0.64	0.88
b2	0.76	1.14
b3	4.95	5.46
C	0.46	0.61
C2	0.46	0.89
D	5.97	6.22
D1	4.10	-
E	6.35	6.73
E1	4.32	-
H	9.40	10.41
e	2.28 BSC	
e1	4.56 BSC	
L	1.40	1.78
L3	0.89	1.27
L4	-	1.02
L5	1.01	1.52

Note

- Dimension L3 is for reference only

VERSION 2: FACILITY CODE = N



MILLIMETERS		
DIM.	MIN.	MAX.
A	2.18	2.39
A1	-	0.13
b	0.65	0.89
b1	0.64	0.79
b2	0.76	1.13
b3	4.95	5.46
c	0.46	0.61
c1	0.41	0.56
c2	0.46	0.60
D	5.97	6.22
D1	5.21	-
E	6.35	6.73
E1	4.32	-
e	2.29 BSC	
H	9.94	10.34

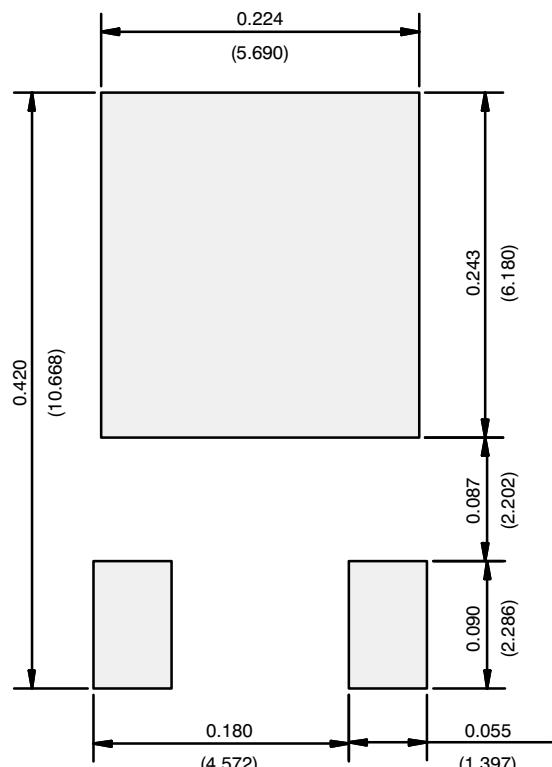
 MILLIMETERS		
DIM.	MIN.	MAX.
L	1.50	1.78
L1	2.74 ref.	
L2	0.51 BSC	
L3	0.89	1.27
L4	-	1.02
L5	1.14	1.49
L6	0.65	0.85
θ	0°	10°
01	0°	15°
02	25°	35°

Notes

- Dimensioning and tolerance confirm to ASME Y14.5M-1994
- All dimensions are in millimeters. Angles are in degrees
- Heat sink side flash is max. 0.8 mm
- Radius on terminal is optional

ECN: E19-0649-Rev. Q, 16-Dec-2019
DWG: 5347

RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)



**Recommended Minimum Pads
Dimensions in Inches/(mm)**

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