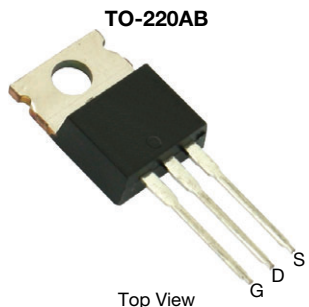


P-Channel 80 V (D-S) MOSFET



FEATURES

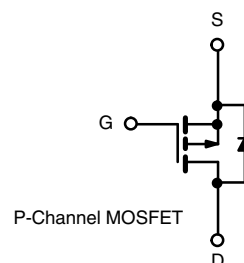
- TrenchFET® power MOSFET
- Package with low thermal resistance
- Maximum 175 °C junction temperature
- Low $R_{DS(on)}$ minimizes power loss from conduction
- Compatible with logic-level gate driving
- 100 % R_g and UIS tested
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Battery protection
- Motor drive control
- Load switch



PRODUCT SUMMARY

V_{DS} (V)	-80
$R_{DS(on)}$ max. (Ω) at $V_{GS} = -10$ V	0.0058
$R_{DS(on)}$ max. (Ω) at $V_{GS} = -4.5$ V	0.0081
Q_g typ. (nC)	145
I_D (A)	-150
Configuration	Single

ORDERING INFORMATION

Package	TO-220AB
Lead (Pb)-free and halogen-free	SUP60061EL-GE3

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

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-source voltage	V_{DS}	-80	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current ^d ($T_J = 175$ °C)	I_D	-150 ^d	A
		-150 ^d	A
Pulsed drain current (100 μ s)	I_{DM}	-250	A
Avalanche current	I_{AS}	-75	A
Single pulse avalanche energy ^a	E_{AS}	281	mJ
Power dissipation	P_D	375	W
		125	W
Operating junction and storage temperature range	T_J, T_{stg}	-55 to +175	°C

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-ambient	R_{thJA}	40	°C/W
Junction-to-case	R_{thJC}	0.4	°C/W

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 = -10 mA	-80	-	-	V
Gate threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250 μA	-1.5	-	-2.5	
Gate-body leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	-	-	± 100	nA
Zero gate voltage drain current	I _{DSS}	V _{DS} = -80 V, V _{GS} = 0 V	-	-	-10	μA
		V _{DS} = -64 V, V _{GS} = 0 V, T _J = 125 °C	-	-	-50	
		V _{DS} = -64 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	-30	-	-	A
Drain-source on-state resistance ^a	R _{DS(on)}	V _{GS} = -10 V, I _D = -20 A	-	0.0048	0.0058	Ω
		V _{GS} = -4.5 V, I _D = -15 A	-	0.0065	0.0081	
Forward transconductance ^a	g _{fs}	V _{DS} = -15 V, I _D = -15 A	-	80	-	S
Dynamic ^b						
Input capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = -40 V, f = 1 MHz	-	9600	-	pF
Output capacitance	C _{oss}		-	3300	-	
Reverse transfer capacitance	C _{rss}		-	110	-	
Total gate charge ^c	Q _g	V _{DS} = -40 V, V _{GS} = -10 V, I _D = -110 A	-	145	218	nC
Gate-source charge ^c	Q _{gs}		-	34	-	
Gate-drain charge ^c	Q _{gd}		-	16	-	
Gate resistance	R _g	f = 1 MHz	0.46	2.3	4.6	Ω
Turn-on delay time ^c	t _{d(on)}	V _{DD} = -40 V, R _L = 0.71 Ω I _D ≅ -20 A, V _{GEN} = -10 V, R _g = 1 Ω	-	25	35	ns
Rise time ^c	t _r		-	20	30	
Turn-off delay time ^c	t _{d(off)}		-	90	140	
Fall time ^c	t _f		-	20	30	
Drain-Source Body Diode Characteristics (T _C = 25 °C ^b)						
Continuous current	I _S		-	-	-150	A
Pulsed current	I _{SM}		-	-	-250	
Forward voltage ^a	V _{SD}	I _F = -10 A, V _{GS} = 0 V	-	-0.8	-1.5	V
Reverse recovery time	t _{rr}	I _F = -20 A, dI/dt = 100 A/μs	-	90	135	ns
Peak reverse recovery charge	I _{RM(REC)}		-	-2.8	-4.2	A
Reverse recovery charge	Q _{rr}		-	145	218	nC

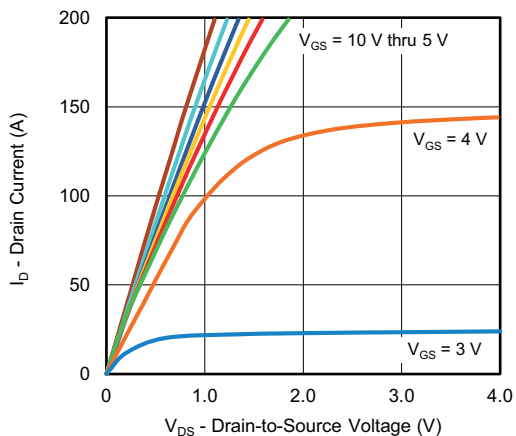
Notes

- 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

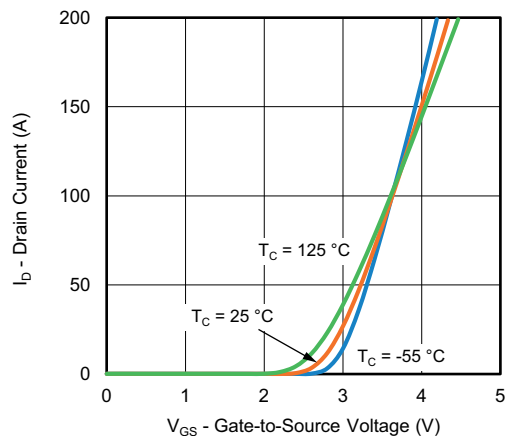
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



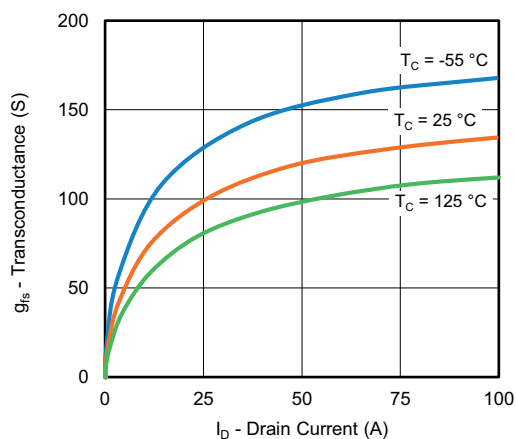
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)



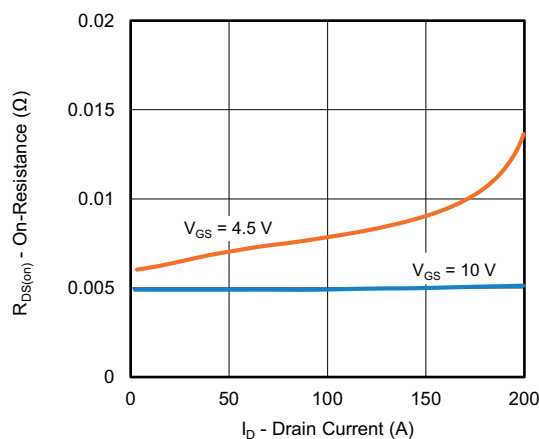
Output Characteristics



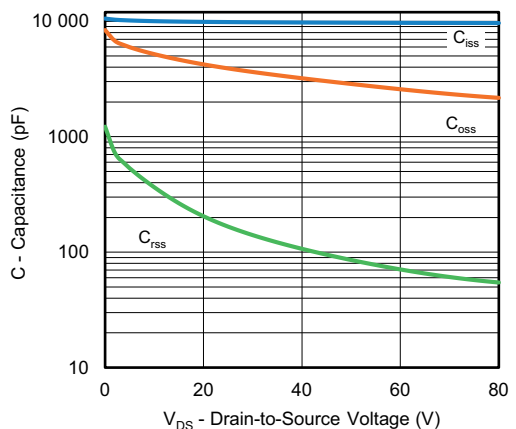
Transfer Characteristics



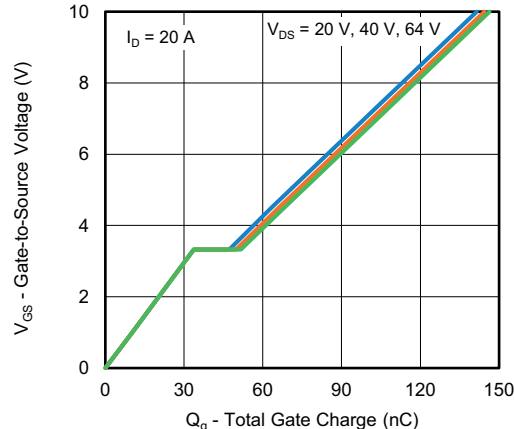
Transconductance



On-Resistance vs. Drain Current



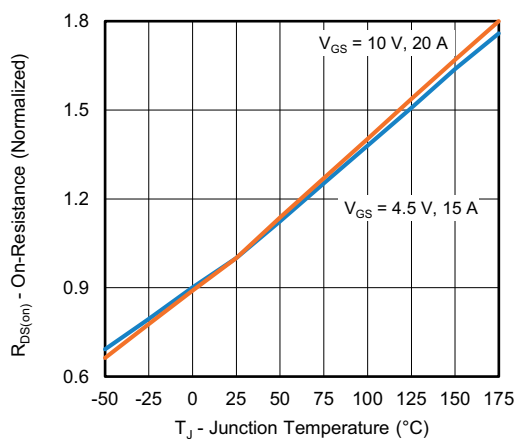
Capacitance



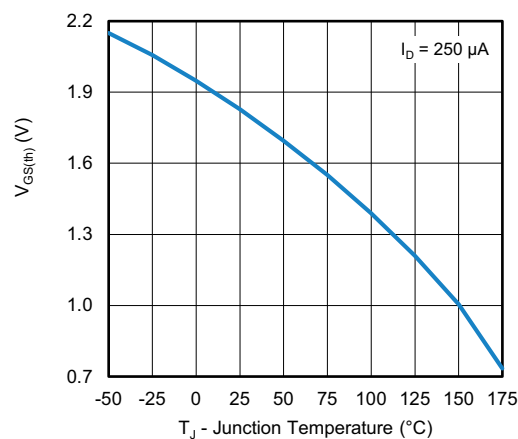
Gate Charge



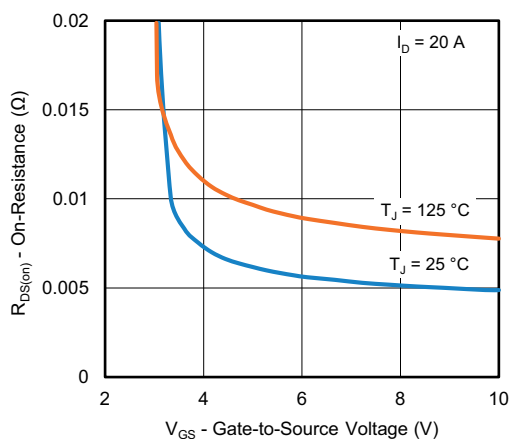
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)



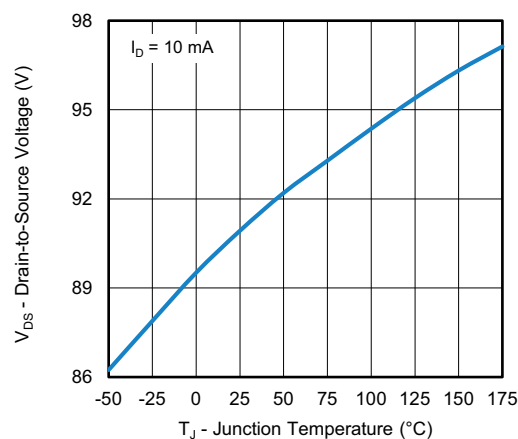
On-Resistance vs. Junction Temperature



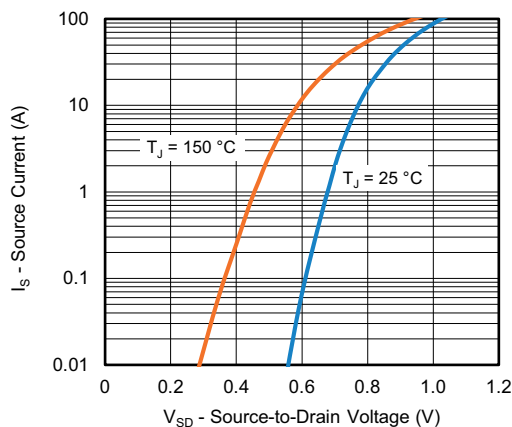
Threshold Voltage



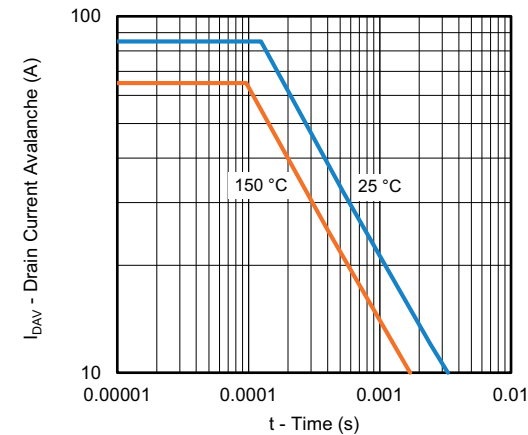
On-Resistance vs. Gate-to-Source Voltage



Drain Source Breakdown vs. Junction Temperature



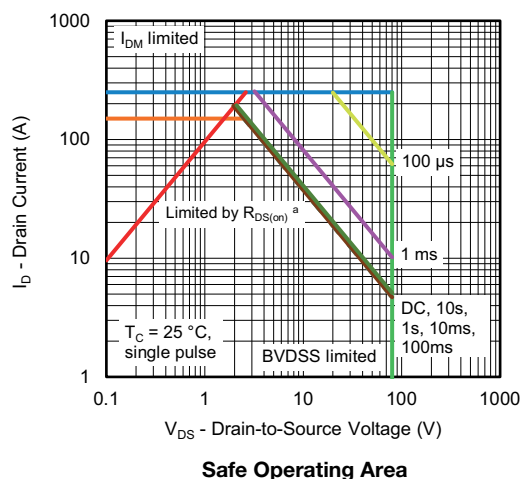
Source Drain Diode Forward Voltage



Avalanche Current vs. Time

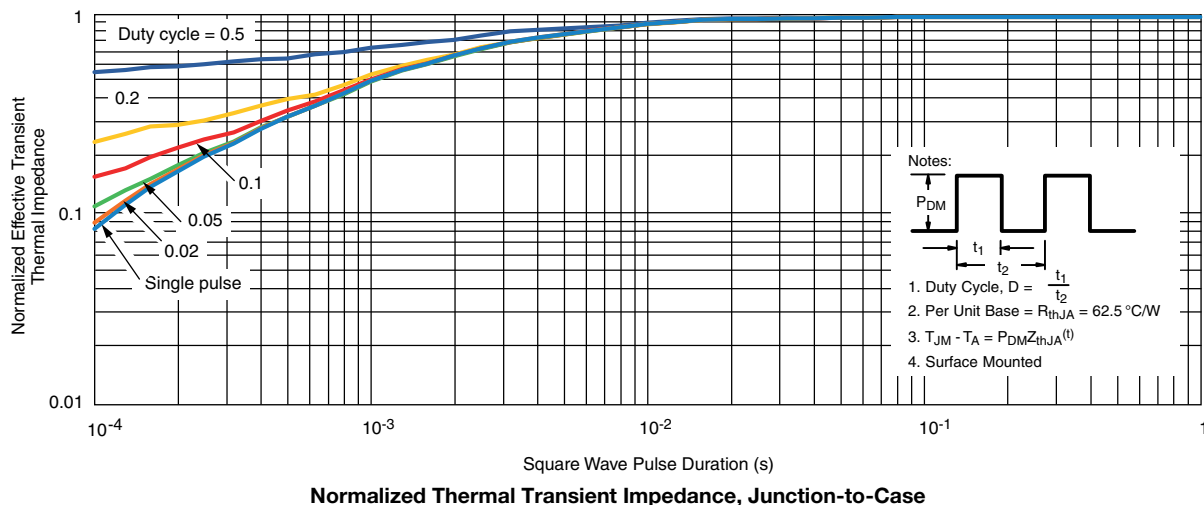


THERMAL RATINGS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)



Note

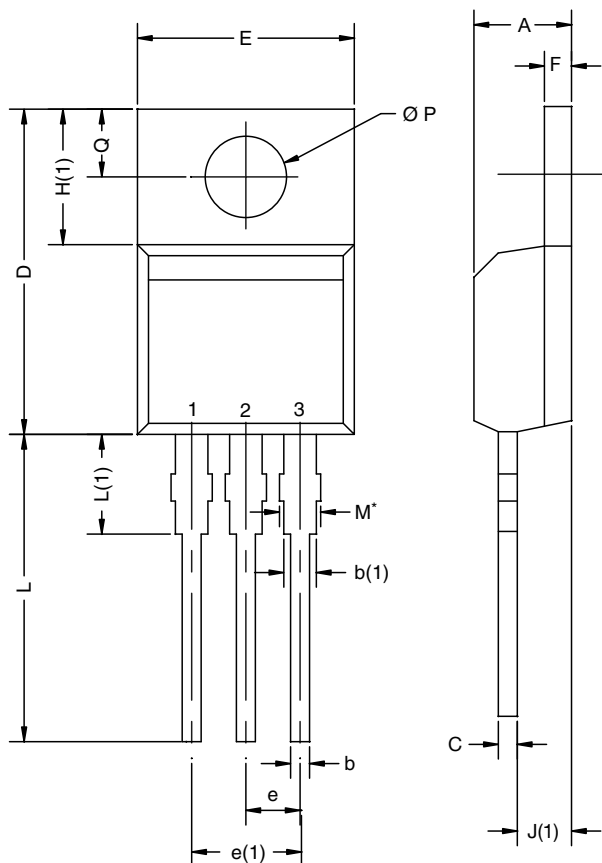
a. $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified



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TO-220AB

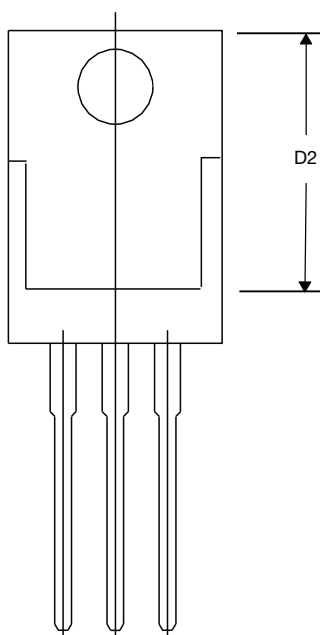


DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.25	4.65	0.167	0.183
b	0.69	1.01	0.027	0.040
b(1)	1.20	1.73	0.047	0.068
c	0.36	0.61	0.014	0.024
D	14.85	15.49	0.585	0.610
D2	12.19	12.70	0.480	0.500
E	10.04	10.51	0.395	0.414
e	2.41	2.67	0.095	0.105
e(1)	4.88	5.28	0.192	0.208
F	1.14	1.40	0.045	0.055
H(1)	6.09	6.48	0.240	0.255
J(1)	2.41	2.92	0.095	0.115
L	13.35	14.02	0.526	0.552
L(1)	3.32	3.82	0.131	0.150
Ø P	3.54	3.94	0.139	0.155
Q	2.60	3.00	0.102	0.118

ECN: T14-0413-Rev. P, 16-Jun-14
DWG: 5471

Note

* M = 1.32 mm to 1.62 mm (dimension including protrusion)
Heatsink hole for HVM





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