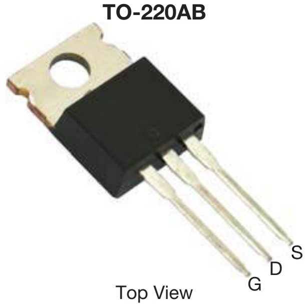
N-Channel 100 V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω) MAX.	I_D (A)	Q_g (TYP.)
100	0.0058 at V_{GS} = 10 V	131	53.5 nC
	0.0064 at V_{GS} = 7.5 V	129	

TO-220AB



Top View

Ordering Information:
SUP70060E-GE3 (lead (Pb)-free and halogen-free)

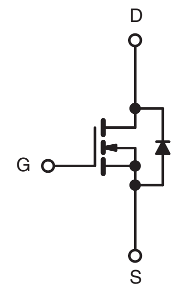
FEATURES

- ThunderFET® power MOSFET
- Maximum 175 °C junction temperature
- 100 % R_g and UIS tested
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT
HALOGEN FREE

APPLICATIONS

- Power supplies:
  - Uninterruptible power supplies
  - AC/DC switch-mode power supplies
  - Lighting
- Synchronous rectification
- DC/DC converter
- Motor drive switch
- DC/AC inverter



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 150 °C)	T_C = 25 °C	I_D	131	A
	T_C = 125 °C		75	
Pulsed Drain Current (t = 100 μs)		I_{DM}	240	
Avalanche Current	L = 0.1 mH	I_{AS}	50	
Single Avalanche Energy [a]		E_{AS}	125	mJ
Maximum Power Dissipation [a]	T_C = 25 °C	P_D	200 [b]	W
	T_C = 125 °C		66.6 [b]	
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) [c]	R_{thJA}	40	°C/W
Junction-to-Case (Drain)	R_{thJC}	0.75	

Notes
a. Duty cycle ≤ 1 %.
b. See SOA curve for voltage derating.
c. When mounted on 1" square PCB (FR4 material).

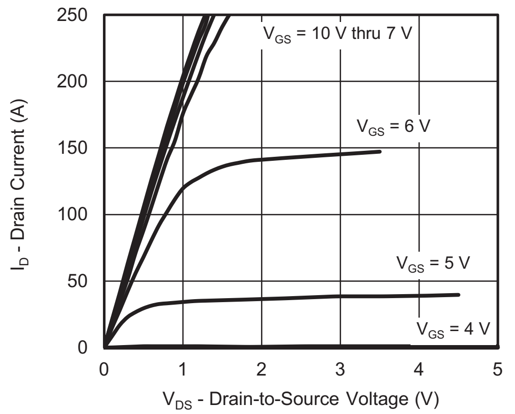
SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 μA	100	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 μA	2	-	4	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V	-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 100 V, V_{GS} = 0 V	-	-	1	μA
		V_{DS} = 100 V, V_{GS} = 0 V, T_J = 125 °C	-	-	100	
		V_{DS} = 100 V, V_{GS} = 0 V, T_J = 175 °C	-	-	2	mA
On-State Drain Current [a]	$I_{D(on)}$	V_{DS} ≥ 10 V, V_{GS} = 10 V	90	-	-	A
Drain-Source On-State Resistance [a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 30 A	-	0.0048	0.0058	Ω
		V_{GS} = 7.5 V, I_D = 30 A	-	0.0050	0.0064	
Forward Transconductance [a]	g_{fs}	V_{DS} = 15 V, I_D = 30 A	-	85	-	S
Dynamic [b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 50 V, f = 1 MHz	-	3330	-	pF
Output Capacitance	C_{oss}		-	1395	-	
Reverse Transfer Capacitance	C_{rss}		-	95	-	
Total Gate Charge [c]	Q_g	V_{DS} = 50 V, V_{GS} = 10 V, I_D = 30 A	-	53.5	81	nC
Gate-Source Charge [c]	Q_{gs}		-	14.5	-	
Gate-Drain Charge [c]	Q_{gd}		-	13.2	-	
Gate Resistance	R_g	f = 1 MHz	0.9	1.9	3.8	Ω
Turn-On Delay Time [c]	$t_{d(on)}$	V_{DD} = 50 V, R_L = 1.67 Ω I_D ≅ 30 A, V_{GEN} = 10 V, R_g = 1 Ω	-	13	26	ns
Rise Time [c]	t_r		-	22	44	
Turn-Off Delay Time [c]	$t_{d(off)}$		-	27	54	
Fall Time [c]	t_f		-	9	18	
Drain-Source Body Diode Ratings and Characteristics [b] (T_C = 25 °C)						
Pulsed Current (t = 100 μs)	I_{SM}		-	-	240	A
Forward Voltage [a]	V_{SD}	I_F = 30 A, V_{GS} = 0 V	-	0.86	1.4	V
Reverse Recovery Time	t_{rr}	I_F = 30 A, di/dt = 100 A/μs	-	88	176	ns
Peak Reverse Recovery Charge	$I_{RM(REC)}$		-	5	10	A
Reverse Recovery Charge	Q_{rr}		-	0.22	0.44	μC

Notes

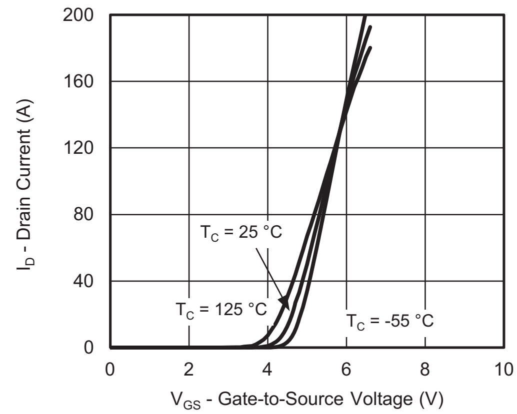
a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

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.

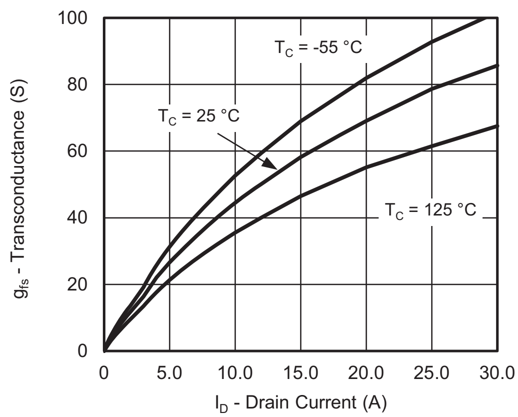
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



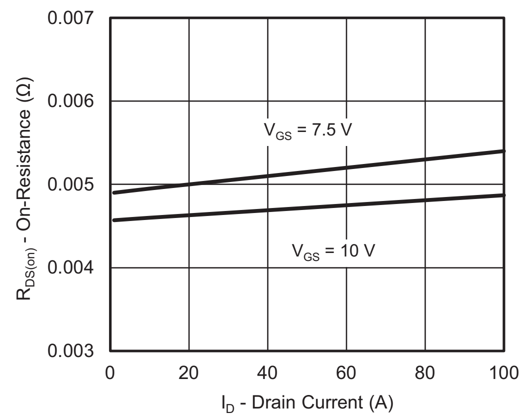
Output Characteristics



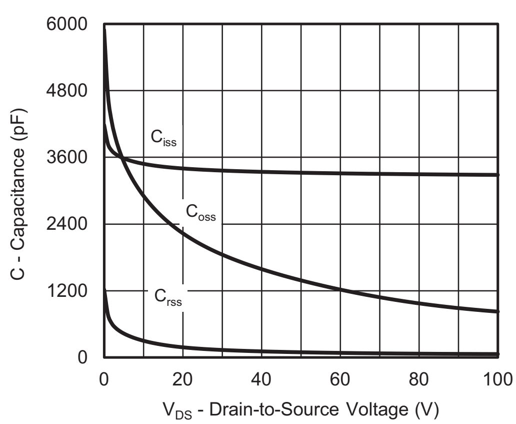
Transfer Characteristics



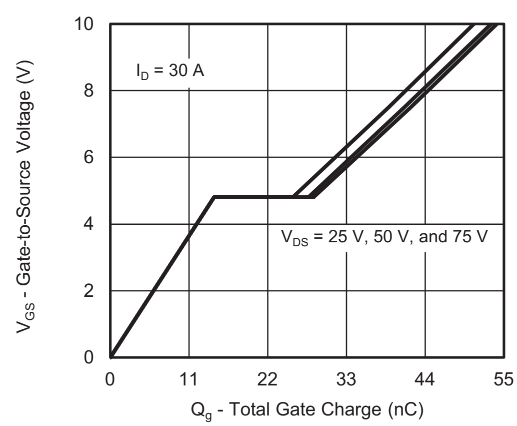
Transconductance



On-Resistance vs. Drain Current

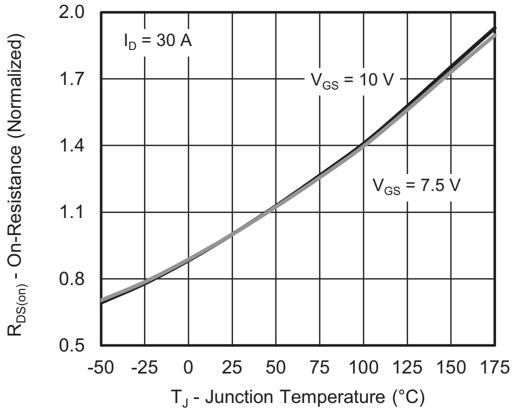


Capacitance

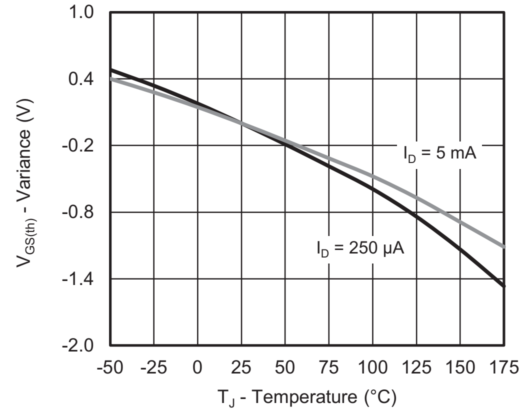


Gate Charge

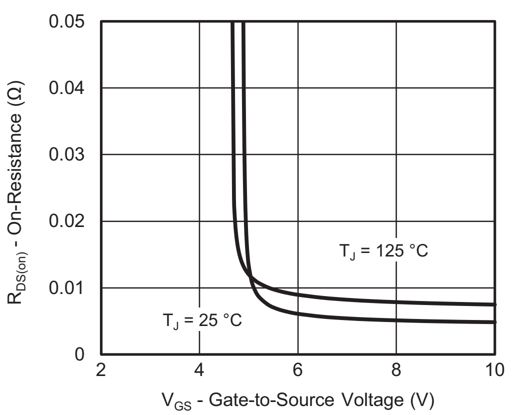
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



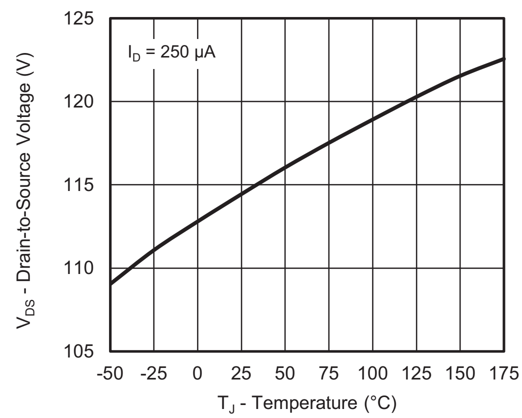
On-Resistance vs. Junction Temperature



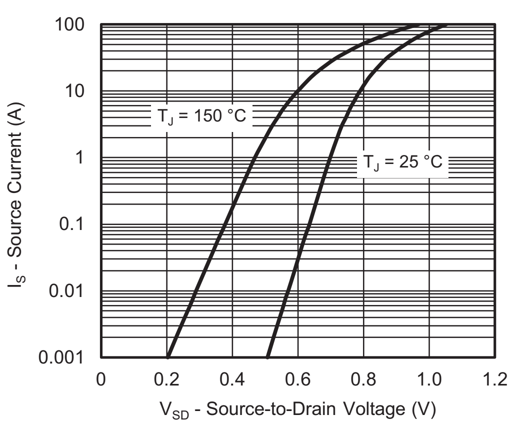
Threshold Voltage



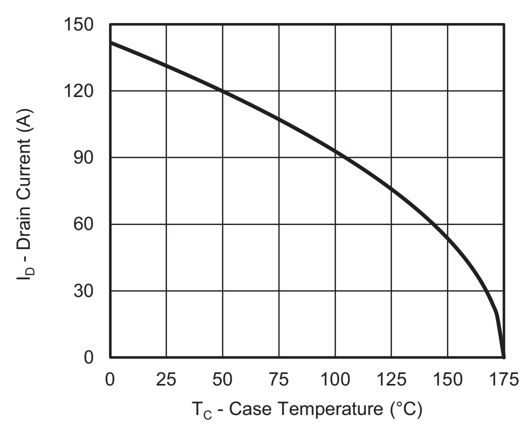
On-Resistance vs. Gate-to-Source Voltage



Drain Source Breakdown vs. Junction Temperature

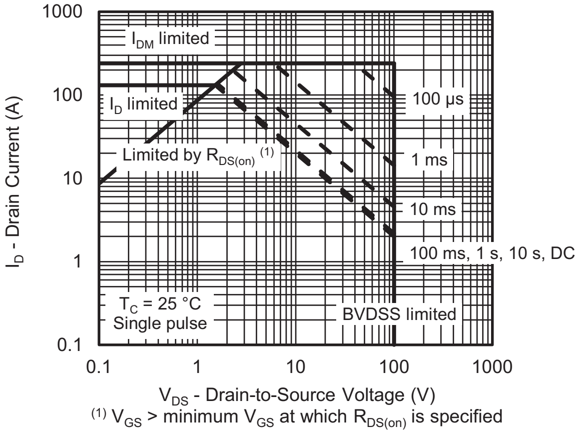


Source Drain Diode Forward Voltage

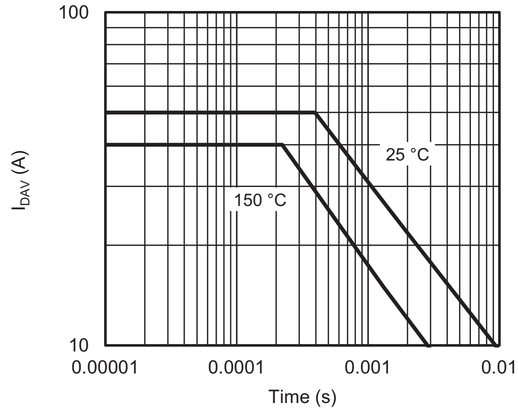


Current De-Rating

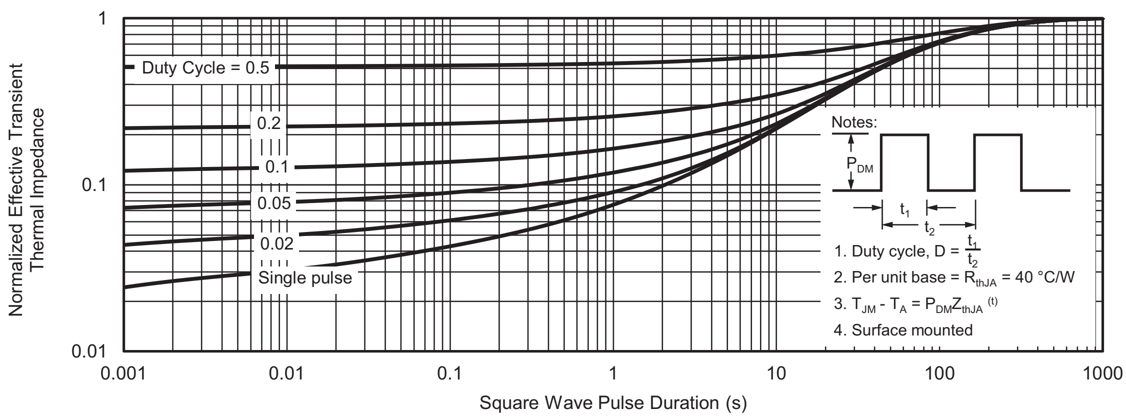
THERMAL RATINGS (T_A = 25 °C, unless otherwise noted)



Safe Operating Area

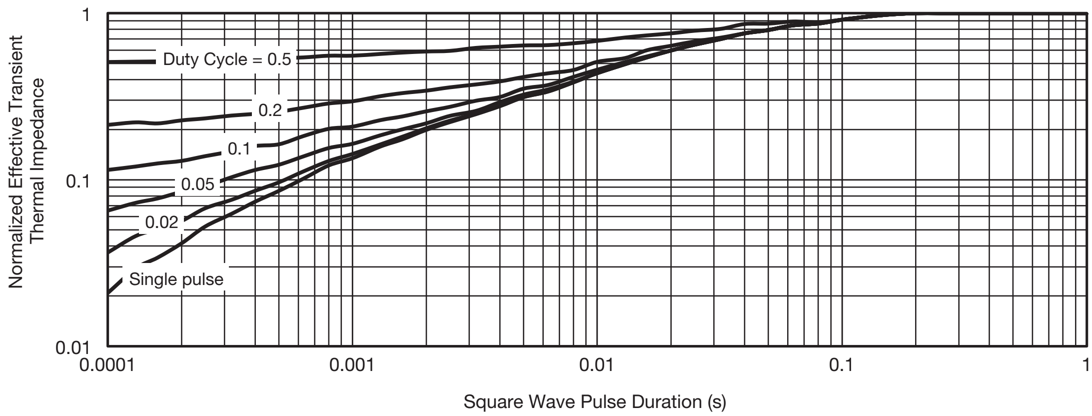


I_{DAV} vs. Time



Normalized Thermal Transient Impedance, Junction-to-Ambient

THERMAL RATINGS (T_A = 25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Case

Note

- The characteristics shown in the two graphs
  - Normalized Transient Thermal Impedance Junction to Ambient (25 °C)
  - Normalized Transient Thermal Impedance Junction to Case (25 °C)

  are given for general guidelines only to enable the user to get a “ball park” indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

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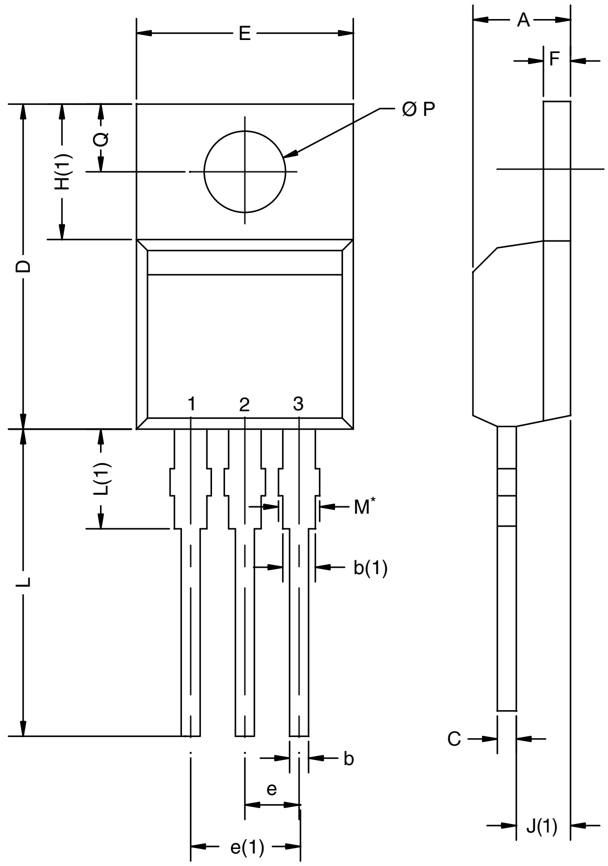
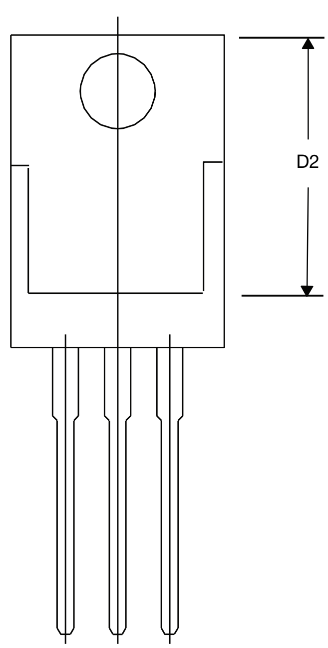


DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.25	4.65	0.167	0.183
b	0.69	1.01	0.027	0.040
b(1)	1.20	1.73	0.047	0.068
c	0.36	0.61	0.014	0.024
D	14.85	15.49	0.585	0.610
D2	12.19	12.70	0.480	0.500
E	10.04	10.51	0.395	0.414
e	2.41	2.67	0.095	0.105
e(1)	4.88	5.28	0.192	0.208
F	1.14	1.40	0.045	0.055
H(1)	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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