

Cr % f

onsemi™



f5 f5 w037 f5 5r 5r d ((-)-2D [(9(79037)35) 5 . [(9(79037)35) E9.5 ((-)-25.5



DATASHEET

UF3C170400K3S

Rev. , January 202 CE

Description

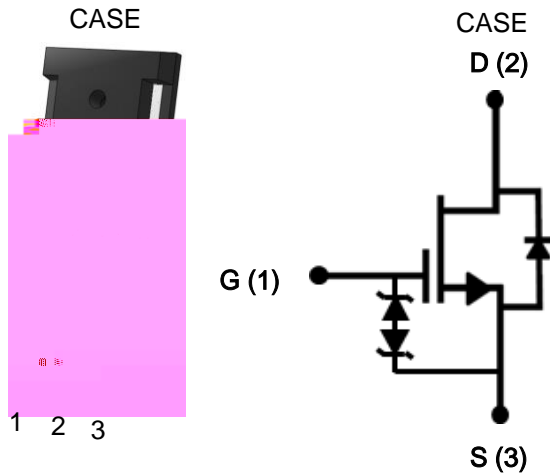
7 KLV 6 L &) (7 G H R L O X H Q I Y C H E D W B F L G H F X L W configuration , in which a normally-on SiC JFET is co-package with a Si (0 2 6) (7 W R S U D R B M P B O O \ R I I 6 L & K H 7 G M Y E H V V W C D U D S W H G U L Y H F K D U D F U M H W A G W V L S V L O O R Z U H S O D F H P H C W L W R V 6 L & 0 2 6) (0 6 L V X S H U M X Q F W L devices. Available in the TO-247-3L package this device exhibits ultra-low gate charge and exceptional reverse recovery characteristics, making it ideal for switching inductive loads , and any application requiring standard gate drive.

Features

- Typical on-resistance $R_{DS(on),typ}$ of 410m :
- Maximum operating temperature of 175°C
- Excellent reverse recovery
- Low gate charge
- Low intrinsic capacitance
- ESD protected, HBM class 2
- AECQ Qualified

Typical applications

- EV charging
- PV inverters
- Switch mode power supplies
- Power factor correction modules
- Motor drives
- Induction heating



Part Number	Package	Marking
UF3C170400K3S	TO-247-3L	UF3C170400K3S





Maximum Ratings

Parameter	Symbol	Test Conditions	Value	Units
Drain-source voltage	V_{DS}		1700	V
Gate-source voltage	V_{GS}	DC	-25 to +25	V
Continuous drain current ¹	I_D	$T_C = 25^\circ\text{C}$	7.6	A
		$T_C = 100^\circ\text{C}$	5.9	A
Pulsed drain current ²	I_{DM}	$T_C = 25^\circ\text{C}$	14	A
Single pulsed avalanche energy ³	E_{AS}	$L=15\text{mH}, I_{AS}=1.25\text{A}$	11.7	mJ
Power dissipation	P_{tot}	$T_C = 25^\circ\text{C}$	100	W
Maximum junction temperature	$T_{J,max}$		175	$^\circ\text{C}$
Operating and storage temperature	T_J, T_{STG}		-55 to 175	$^\circ\text{C}$
Max. lead temperature for soldering, see IURP FDVH IRU VHFRQG	T_L		250	$^\circ\text{C}$

1. Limited by $T_{J,max}$

2. Pulse width t_p limited by $T_{J,max}$

3. Starting $T_J = 25^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Test Conditions	Value			Units
			Min	Typ	Max	
Thermal resistance, junction-to-case	R_{JC}			1.2	1.5	$^\circ\text{C}/\text{W}$



Electrical Characteristics ($T_J = +25^\circ\text{C}$ unless otherwise specified)

Typical Performance - Static

	Min	Typ	Max	
BV_{DS}	1700			V
		1.5	60	
		5.5		
I_{GSS}		6	20	A
		410	515	
		1070		
$V_{G(th)}$	3	4.7	6	V
R_G		4.1		

Typical Performance - Reverse Diode

	Min	Typ	Max	
I_S			7.6	A
$I_{S,pulse}$			14	A
		1.5	1.75	
		2.4		
Q_{rr}		70		nC
t				



Typical Performance - Dynamic

	Min	Typ	Max
C_{iss}		740	
C_{oss}		27	
C_{rss}		2	
$C_{oss(er)}$		15.5	pF
$C_{oss(tr)}$		28	pF
E_{oss}		11.2	J
Q_G		27.5	
Q_{GD}		6.5	
Q_{GS}		10	
$t_{d(on)}$		17	
t_r		13	
$t_{d(off)}$		34	
t_f		27	
E_{ON}		189	



Typical Performance Diagrams

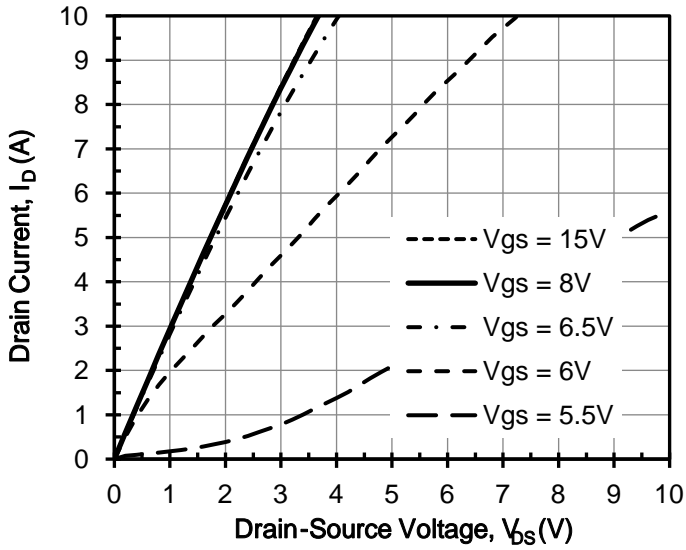


Figure 1. Typical output characteristics at $T_j = -55^\circ\text{C}$, $t_p < 250 \text{ ns}$

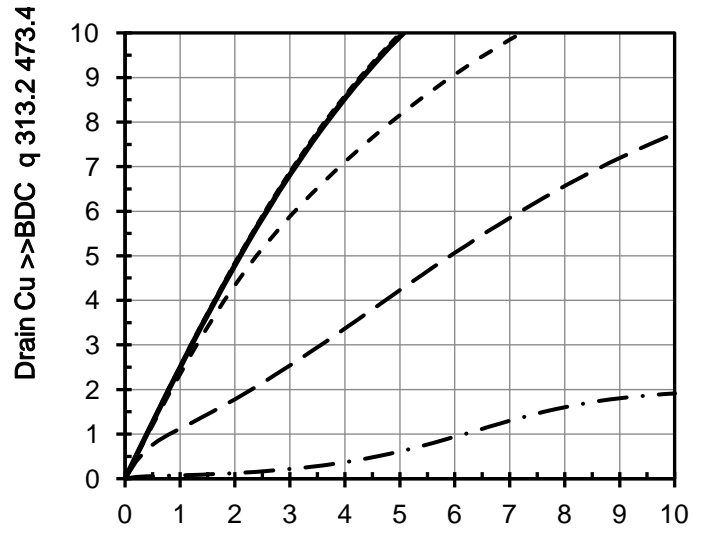


Figure 2. Typical output characteristics at $T_j = 25^\circ\text{C}$, $t_p < 250 \text{ ns}$

Figure 3. Typical output characteristics at $T_j = 175^\circ\text{C}$, $t_p < 250 \text{ ns}$

Figure 4. Normalized on-resistance vs. temperature at $V_{GS} = 12\text{V}$ and $I_D = 5\text{A}$

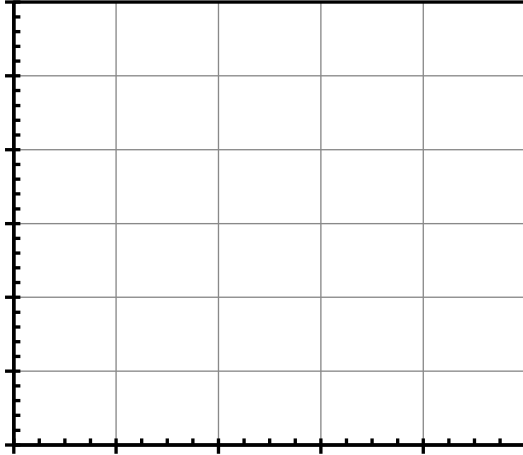


Figure 5. Typical drain-source on-resistances at $V_{GS} = 12V$

Figure 6. Typical transfer characteristics at $V_{DS} = 5V$

Figure 7. Threshold voltage vs. junction temperature at $V_{DS} = 5V$ and $I_D = 10mA$

Figure 8. Typical gate charge at $V_{GS} = 1200V$ and $I_D = 5A$

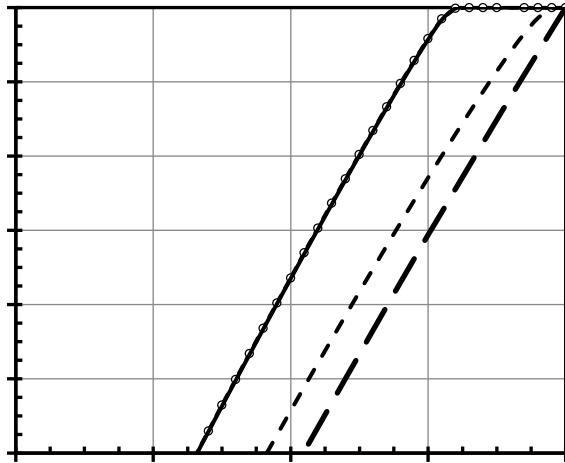


Figure 9. 3rd quadrant characteristics at $T_j = -55^\circ\text{C}$

Figure 10. 3rd quadrant characteristics at $T_j = 25^\circ\text{C}$

Figure 11. 3rd quadrant characteristics at $T_j = 175^\circ\text{C}$

Figure 12. Typical stored energy in C_{SS} at $V_{GS} = 0\text{V}$



Figure 13. Typical capacitances at $f = 100\text{kHz}$ and $V_{GS} = 0\text{V}$

Figure 14. DC drain current derating

Figure 15. Total power dissipation

Figure 16. Maximum transient thermal impedance

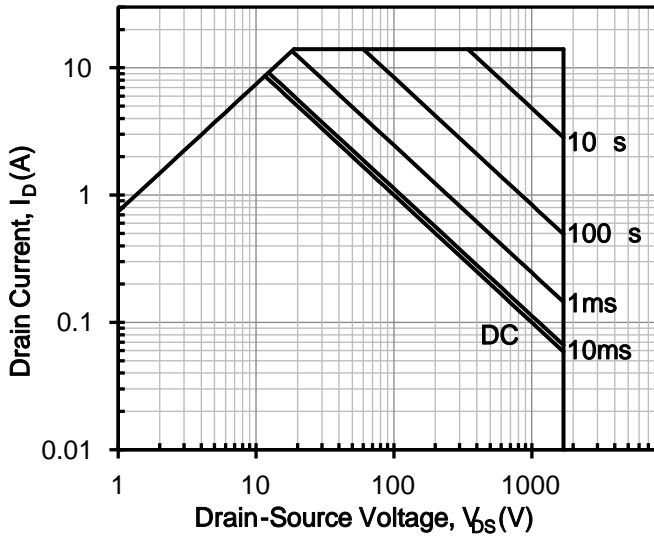


Figure 17. Safe operation area at $T_J = 25^\circ\text{C}$, $D = 0$, Parameter t_p

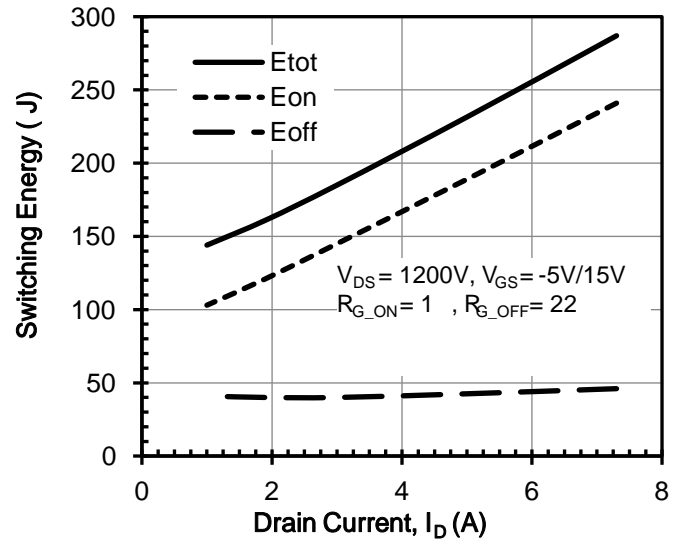


Figure 18. Clamped inductive switching energy vs. drain current at $T_J = 25^\circ\text{C}$

Figure 19. Clamped inductive switching turn-on energy vs. $R_{G_EXT_ON}$

Figure 20. Clamped inductive switching turn-off energy vs. $R_{G_EXT_OFF}$



Applications Information

SiC FETs are enhancement-mode power switches formed by a high-voltage SiC depletion-mode JFET and a low-voltage silicon MOSFET

Disclaimer


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TO-247-3L PACKA OUTLINE, PART MARK AND TUBE SPECIFICAT

PACKAGE OUTLINE

SYM	MIN	MAX	MIN	MAX
A	0.185	0.209	4.699	5.309
A1	0.087	0.102	2.21	2.61
A2	0.059	0.098	1.499	

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