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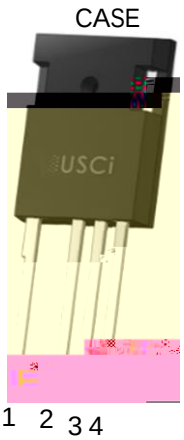
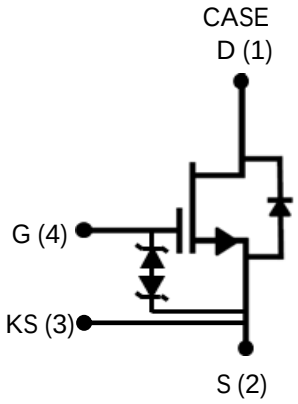
DATASHEET

UF3C065080K4S





Part Number	Package	Marking
UF3C065080K4S	TO-247-4L	UF3C065080K4S

Maximum Ratings

Parameter	Symbol	Test Conditions	Value	Units
Drain-source voltage	V_{DS}		650	V
Gate-source voltage	V_{GS}	DC	-25 to +25	V
Continuous drain current [1]	I_D	T_C = 25°C	31	A
		T_C = 100°C	23	A
Pulsed drain current [2]	I_{DM}	T_C = 25°C	65	A
Single pulsed avalanche energy [3]	E_{AS}	L=15mH, I_{AS} =2.1A	33	mJ
Power dissipation	P_{tot}	T_C = 25°C	190	W
Maximum junction temperature	$T_{J,max}$		175	°C
Operating and storage temperature	T_J, T_{STG}		-55 to 175	°C
Max. lead temperature for soldering, 1/8” from case for 5 seconds	T_L		250	°C

1. Limited by $T_{J,max}$
2. Pulse width t_p limited by $T_{J,max}$
3. Starting T_J = 25°C

Thermal Characteristics

Parameter	Symbol	Test Conditions	Value			Units
			Min	Typ	Max	
Thermal resistance, junction-to-case	R_q			0.61	0.79	°C/W

Electrical Characteristics

Typical Performance - Static

		Min	Typ	Max	
	BV_{DS}	650			V
			6	100	
			40		
	I_{GSS}		6		

Typical Performance - Dynamic

			Min	Typ	Max	
	C_{iss}			1500		
	C_{oss}			104		
	C_{rss}			2.6		
	$C_{oss(er)}$			77		pF
	$C_{oss(tr)}$			176		pF
	E_{oss}			6.2		mJ
Total gate charge	Q_G	V_{DS}=400V, I_D=20A, V_{GS} = -5V to 12V		43		nC
Gate-drain charge	Q_{GD}			11		
Gate-source charge	Q_{GS}			19		
	$t_{d(on)}$			21		
	t_r			20		
	$t_{d(off)}$			37		
	t_f			8		
	E_{ON}			121		
	E_{OFF}			41		
Total switching energy	E_{TOTAL}			162		
Turn-on delay time	$t_{d(on)}$	V_{DS}=400V, I_D=20A, Gate Driver =-5V to +12V, Turn-on $R_{G,EXT}$=8.5W, Turn-off $R_{G,EXT}$=20W Inductive Load, FWD: same device with V_{GS} = -5V, R_G = 10W		17		
	t_r			18		
	$t_{d(off)}$			36		
	t_f			7		
	E_{ON}			107		
	E_{OFF}			31		
	E_{TOTAL}			138		

Tu.86 0.086 rg /GS0 gs /TT908.04 511.15 Td (nC)Ti EMC ET O g 26.16 529.12 329.02 Td (nsre W* n BT /P <</MCID 33.04DC 0.071 0.

Typical Performance Diagrams

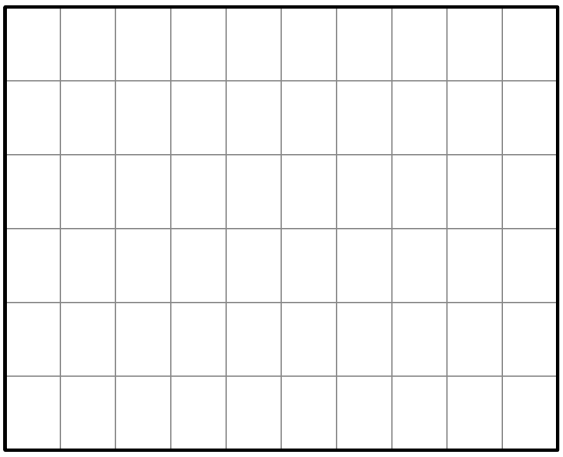


Figure 1. Typical output characteristics at T_J = -55°C, tp < 250ms

Figure 2. Typical output characteristics at T_J = 25°C, tp < 250ms

Figure 3. Typical output characteristics at T_J = 175°C, tp < 250ms

Figure 4. Normalized on-resistance vs. temperature at V_{GS} = 12V and I_D = 20A

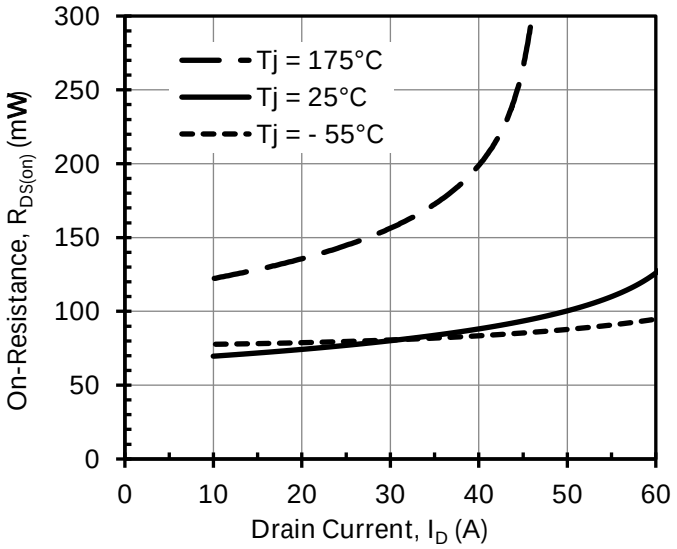


Figure 5. Typical drain-source on-resistances at V_{GS} = 12V

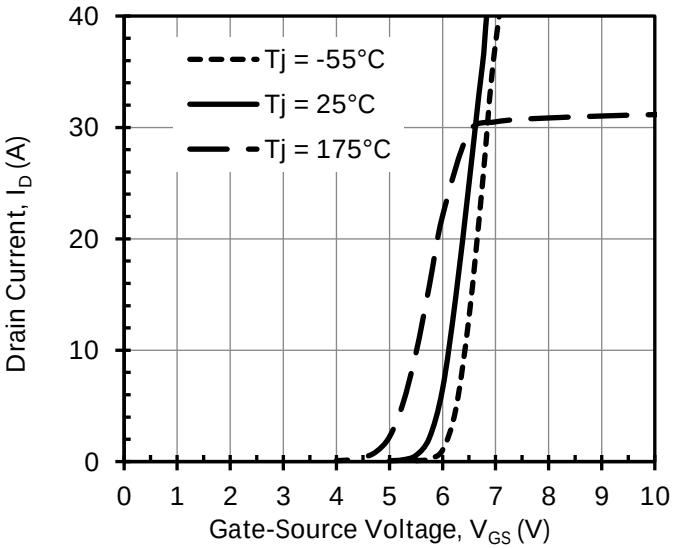


Figure 6. Typical transfer characteristics at V_{DS} = 5V

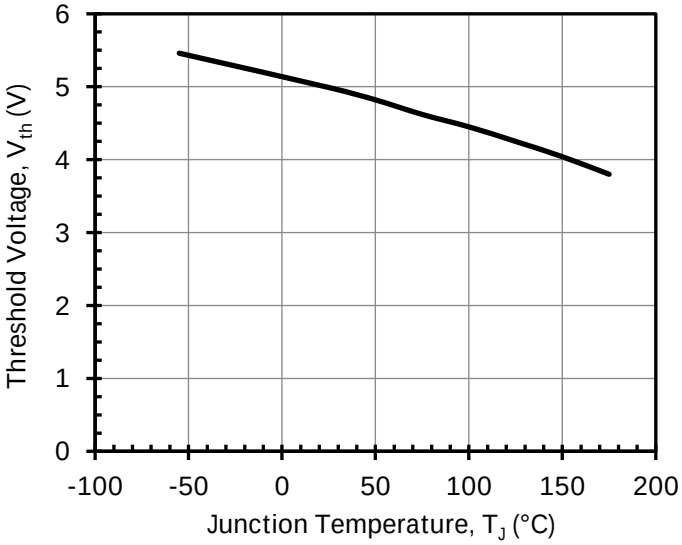


Figure 7. Threshold voltage vs. junction temperature at V_{DS} = 5V and I_D = 10mA

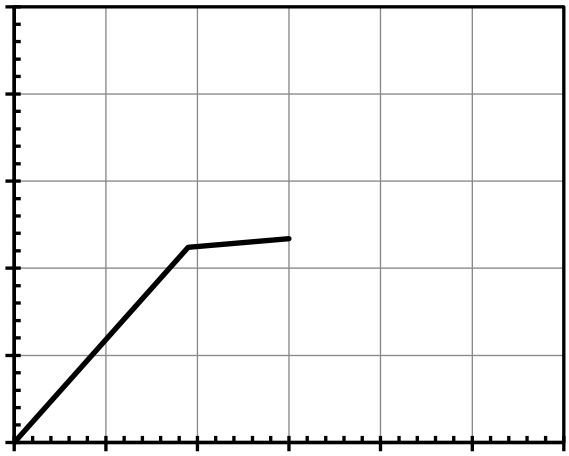


Figure 8. Typical gate charge at V_{DS} = 400V and I_D = 20A

Figure 9. 3rd quadrant characteristics at T_J = -55°C

Figure 10. 3rd quadrant characteristics at T_J = 25°C

Figure 11. 3rd quadrant characteristics at T_J = 175°C

Figure 12. Typical stored energy in C_{OSS} at V_{GS} = 0V

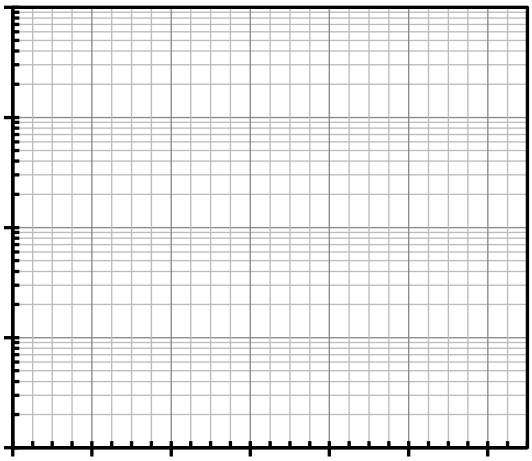


Figure 13. Typical capacitances at f = 100kHz and V_{GS} = 0V

Figure 14. DC drain current derating

Figure 15. Total power dissipation

Figure 16. Maximum transient thermal impedance

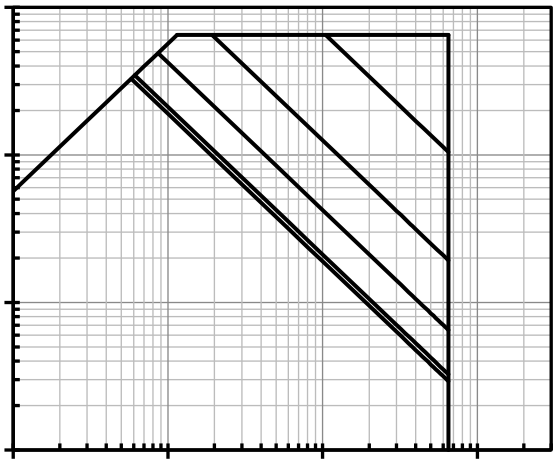


Figure 17. Safe operation area at T_C = 25°C, D = 0, Parameter t_p

Figure 18. Clamped inductive switching energy vs. drain current at T_J = 25°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}

Figure 21. Clamped inductive switching energy vs. junction temperature at V_{DS} = 400V and I_D = 20A

Figure 22. Reverse recovery charge Qrr vs. junction temperature

Applications Information

SiC cascodes are enhancement-mode power switches formed by a high-voltage SiC depletion-mode JFET and a low-voltage silicon MOSFET connected in series. The silicon MOSFET serves as the

Like other high performance power switches, proper PCB layout design to minimize circuit parasitics is strongly recommended due to the high dv/dt and di/dt rates. An external gate resistor is recommended when the cascode is working in the diode mode in order to achieve the optimum reverse recovery performance. For more information on cascode operation, see www.unitedsic.com.

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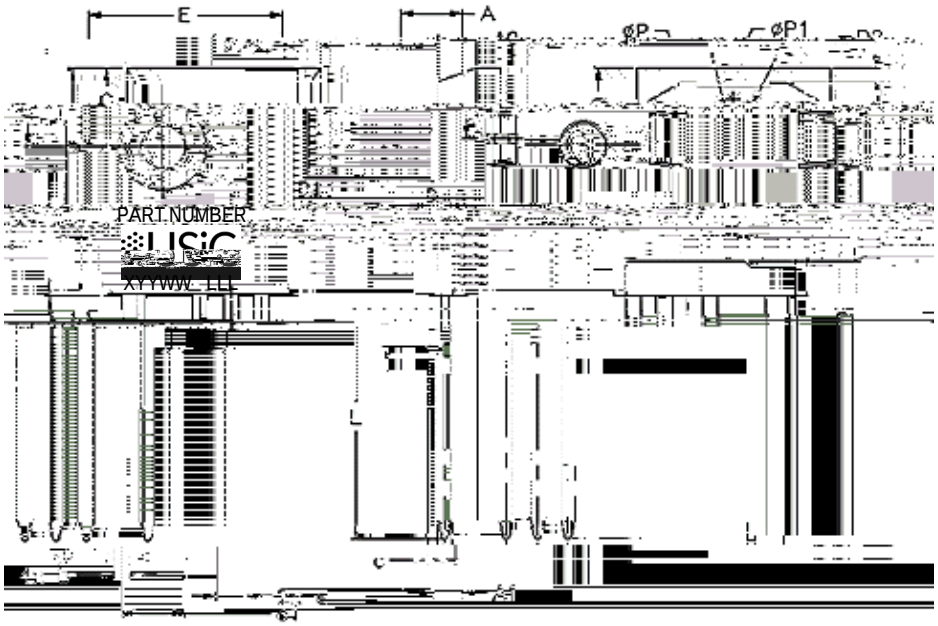
TO-247-4L PACKAGE OUTLINE, PART MARKING AND TUBE SPECIFICATIONS

PACKAGE OUTLINE



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
ΦP				
ΦP1				

TO-247-4L PACKAGE OUTLINE, PART MARKING AND TUBE SPECIFICATIONS

PART MARKING

PACKING TYPE