

HIGH-TEMPERATURE, 1200V, 80MΩ, DEPLETION-MODE JFET

FEATURES

- ▲ Low $R_{DS(on)}$: 80 mΩ @ 25°C, 290 mΩ @ 232°C
- ▲ Maximum $I_{D(DC)}$: 5A @ 232°C (450°F)
- ▲ Minimum $BV_{DSS} > 1200V$.
- ▲ Allowed V_{GS} range -15V to +2V.
- ▲ Operational beyond the -60°C to +240°C temperature range.
- ▲ Ruggedized 3-lead TO257

ADVANTAGES AND BENEFITS

- ▲ Low on resistance and leakage current.
- ▲ Suitable for high-frequency switching.
- ▲ Suitable for switching, linear and over-current applications.

DESCRIPTION

The KT12FN008 is a family of 80mΩ depletion SiC JFETs with maximum operation voltages up to 1200V. The KTxFN series is suitable for operation from -60°C to +232°C, with junction temperature able to reach +250°C.

CALY technologies offer high performance, high temperature Silicon Carbide (SiC) JFETs. The low resistance, reduced leakage current and surge capabilities of KT12FN008 parts make them ideal for protection, linear as well as for switching applications. Also available as bare die, the devices are proposed in ruggedized 3-lead TO257 package. Other packages for lower voltage applications are possible upon request.

APPLICATIONS

- ▲ Protection circuit (Voltage and/or Current Clamping), power switching, motor control, power inverters.
- ▲ Reliability-critical, Automotive, Aeronautics & Aerospace, Down-hole.

ABSOLUTE MAXIMUM RATINGS

Unless otherwise stated, specification applies for $T_C=25^\circ\text{C}$.

Parameter	Symbol	Values			Unit	Note/Test Condition
		Min	Typ	Max		
Drain-Source Breakdown Voltage	BV_{DS}	1200			V	$V_{GS}=-20V, I_D=1mA$
Continuous Drain Current			5		A	$V_{GS}=0V, T_C=232^\circ\text{C}$
Drain-Source On-Resistance			290		mΩ	$V_{GS}=0V, I_F=5A, T_J=232^\circ\text{C}$

DC ELECTRICAL CHARACTERISTICS

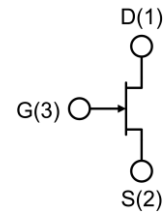
Unless otherwise stated, specification applies for $-60^\circ\text{C} < T_J < 232^\circ\text{C}$.

Parameter	Symbol	Values			Unit	Note/Test Condition
		Min	Typ	Max		
Drain-Source Breakdown Voltage	BV_{DS}	1200			V	$V_{GS}=-20V, I_D=1mA$
Continuous Drain Current	$I_{D(DC)}$		15		A	$V_{GS}=0V, T_C=125^\circ\text{C}$
Pulsed Drain Current	I_{DM}		5		A	$V_{GS}=0V, T_C=232^\circ\text{C}$
Total Drain Leakage Current	I_D		30		A	$V_{GS}=0V, T_C=175^\circ\text{C}$
Total Gate Leakage Current	I_G		40	250	μA	$V_{DS}=1200V, V_{GS}=-20V, T_J=25^\circ\text{C}$
			120	750		$V_{DS}=1200V, V_{GS}=-20V, T_J=175^\circ\text{C}$
Drain-Source On-Resistance	$R_{DS(on)}$		0.3	125	mΩ	$V_{GS}=-20V, T_J=25^\circ\text{C}$
			3			$V_{GS}=-20V, T_J=175^\circ\text{C}$
			77	95		$V_{GS}=0V, I_F=5A, T_J=25^\circ\text{C}$
Gate Threshold Voltage	$V_{G(th)}$		230	285	V	$V_{GS}=0V, I_F=5A, T_J=175^\circ\text{C}$
			290	360		$V_{GS}=0V, I_F=5A, T_J=232^\circ\text{C}$
Gate Resistance	R_G	-10	-7	-4	Ω	$V_{DS}=5V, I_D=70mA$
			6			$V_{GS}=0V, f=1MHz$

KEY PERFORMANCE

Parameter	Value
Drain-Source Breakdown Voltage BV_{DS}	1200V
Drain-Source On-Resistance $R_{DS(on)}$	80mΩ

PACKAGING



QUICK ORDERING INFORMATION

Part Number	Package	Marking
KT12FN008B	Bare die	
KT12FN008T	TO257	KT12FN008

Other packages and packaging configurations possible upon request. MOQ may apply.

AC ELECTRICAL CHARACTERISTICS

Unless otherwise stated, specification applies for $-60^{\circ}\text{C} < T_j < 232^{\circ}\text{C}$.

Parameter	Symbol	Values			Unit	Note/Test Condition
		Min	Typ	Max		
Input Capacitance	C_{iss}		500		pF	$V_{DS} = 100\text{V}, V_{GS} = -15\text{V}, f = 100\text{kHz}$
Output Capacitance	C_{oss}		95		pF	
Transfer Capacitance	C_{rss}		95		pF	

SWITCHING ELECTRICAL CHARACTERISTICS

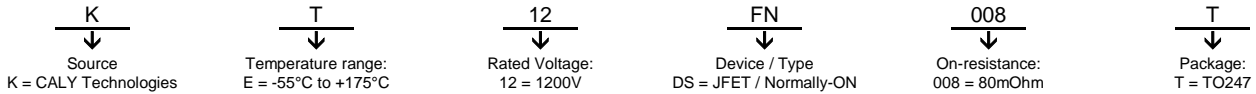
Unless otherwise stated, specification applies for $-60^{\circ}\text{C} < T_j < 232^{\circ}\text{C}$.

Parameter	Symbol	Values			Unit	Note/Test Condition
		Min	Typ	Max		
Total Gate Charge	Qg		70		nC	$V_{DS} = 600\text{V}, V_{GS\text{ sweep}} = -15\text{V to } +2\text{V}$
Turn-on Delay Time	$t_{d(on)}$		14		ns	$V_{DS} = 600\text{V}, R_{G\text{-EXT}} = 2.5\Omega$ Inductive load $T_j = 175^{\circ}\text{C}$
Rise time	t_r		32		ns	
Turn-off Delay Time	$t_{d(off)}$		26		ns	
Fall time	t_f		28		ns	
Turn-on Energy	E_{ON}		225		μJ	
Turn-off Energy	E_{OFF}		178		μJ	

THERMAL CHARACTERISTICS

Parameter	Symbol	Values			Unit	Note/Test Condition
		Min	Typ	Max		
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$		2		$^{\circ}\text{C/W}$	

DETAILED ORDERING INFORMATION

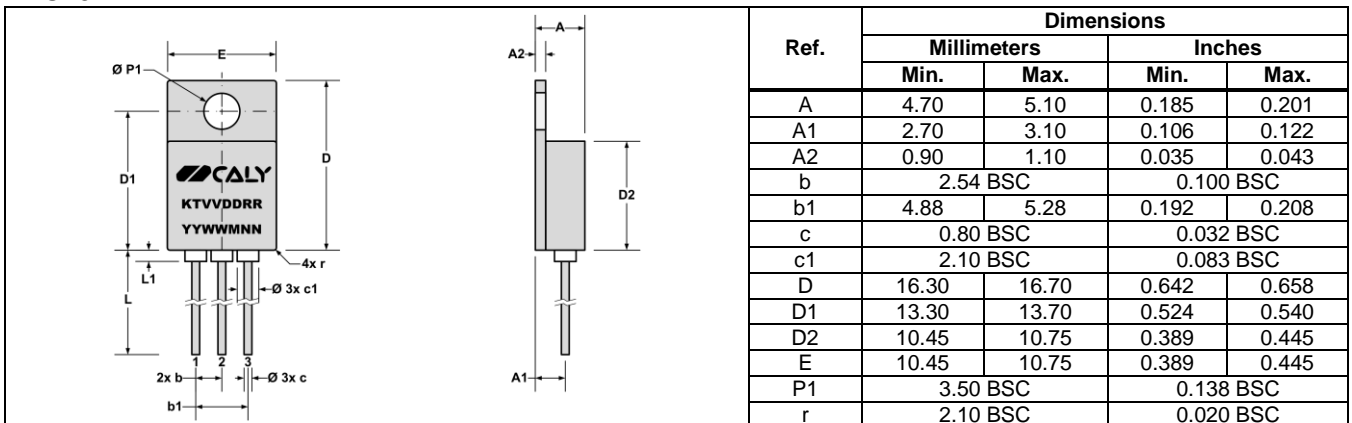


Part Number	Temperature Range	Package	Pin Count	Marking
KT12FN008B	-55°C to $+232^{\circ}\text{C}$	Bare die		
KT12FN008T	-55°C to $+232^{\circ}\text{C}$	TO257	3	KT12FN008

Other packages, packaging configurations and finishing materials possible upon request. MOQ may apply.

PACKAGE OUTLINES

TO257



Unique Lot Assembly Code

YY	Last two digits of assembly year (e.g. 16 = 2016).
WW	Assembly week (01 to 52).
A	Assembly location code.
NN	Assembly lot code (01 to 99).

REVISION HISTORY

Revision	Date	Description
1A	2016-Oct-05	First issue
1B	2017-Feb-22	Amended Gate current unit (from $\mu\Omega$ to μA). Added DC current at 232°C

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