HIGH-TEMPERATURE, 80V N-CHANNEL POWER MOSFET FAMILY

FEATURES

- ▲ Minimum BV_{DSS} = 100V.
- ▲ Allowed V_{GS} range –5.5V to +5.5V.
- ▲ Operational beyond the -60℃ to +230℃ temperature range.
- ▲ Low $R_{DS(on)}$
  - ○ XTR2N0825: 1.8 Ω @ 230°C
  - ○ XTR2N0850: 0.79 Ω @ 230°C
- ▲ Maximum I_D:
  - ○ XTR2N0825: 5A @ 230℃
  - ○ XTR2N0850: 11.5A @ 230℃
- ▲ On-time ($t_{d(on)}$+t_r):
  - ○ XTR2N0825: 80nsec @ 230℃
  - ○ XTR2N0850: 95nsec @ 230℃
- ▲ Off-time ($t_{d(off)}$+t_f):
  - ○ XTR2N0825: 75nsec @ 230℃
  - ○ XTR2N0850: 75nsec @ 230℃
- ▲ Ruggedized 3-lead TO257 and SMD packages.
- ▲ Also available as bare die.

APPLICATIONS

- ▲ Reliability-critical, Automotive, Aeronautics & Aerospace, Down-hole.
- ▲ DC/DC converters, power switching, motor control, power inverters, power linear regulators, power supply.

DESCRIPTION

XTR2N0800 is a family of N-channel power MOSFETs designed to reliably operate over a wide range of temperatures. Full functionality is guaranteed from -60℃ to +230℃, though operation well below and above this temperature range is achieved.

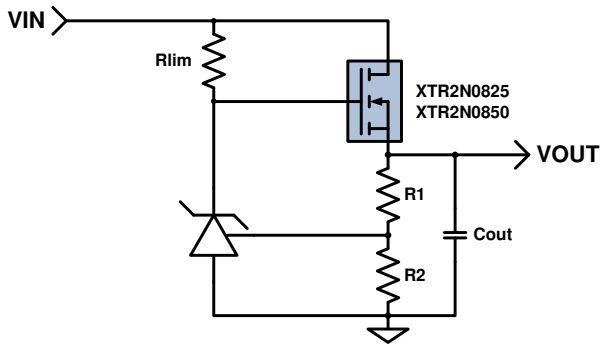
Fabricated on a Silicon-on-Insulator (SOI) process, XTR2N0800 family parts offer reduced leakage currents while providing high drain currents and low $R_{DS(on)}$. These features allow XTR2N0800 parts to be ideally suited for switching applications.

XTR2N0800 family parts have been designed to reduce system cost and ease adoption by reducing the learning curve and providing smart and easy to use features.

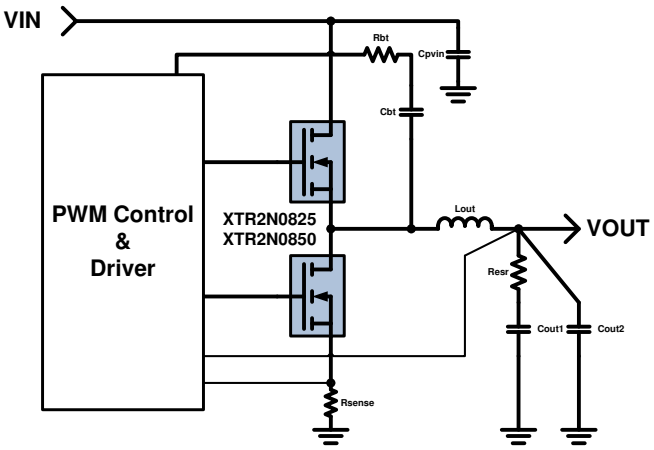
Parts from the XTR2N0800 family are available in ruggedized 3-lead TO257 and SMD power packages. Parts are also available as bare dies.

PRODUCT HIGHLIGHT

Power Series Regulator



Step-down DC-DC Converter



ORDERING INFORMATION

X	TR	2N	08xx
Source: X = X-REL Semi	Process: TR = HiTemp, HiRel R = HiRel	Part family	Part number

Product Reference	Temperature Range	Package	Pin Count	Marking
XTR2N0825-BD	-60℃ to +230℃	Bare die		XTR2N0825
XTR2N0850-BD	-60℃ to +230℃	Bare die		XTR2N0850
XTR2N0825-D	-60℃ to +230℃	Ceramic side Braze DIP	8	XTR2N0825
XTR2N0825-T	-60℃ to +230℃	TO-257AA	3	XTR2N0825
XTR2N0850-T	-60℃ to +230℃	TO-257AA	3	XTR2N0850
XTR2N0825-M	-60℃ to +230℃	SMD-0.5	3	XTR2N0825
XTR2N0850-M	-60℃ to +230℃	SMD-1	3	XTR2N0850

Other packages and packaging configurations possible upon request.

ABSOLUTE MAXIMUM RATINGS

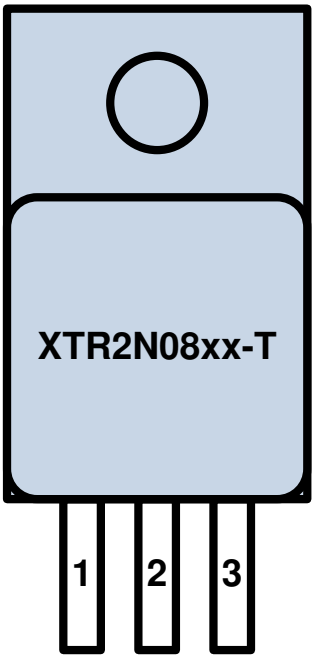
Drain-source voltage	-2V to +100V
Gate-source voltage	±6.0V
Storage temperature range	-70℃ to +230℃
Operating junction temperature range	-70℃ to +300℃
ESD classification	1kV HBM MIL-STD-883

Caution: *Stresses beyond those listed in "*ABSOLUTE MAXIMUM RATINGS*" may cause permanent damage to the device. These are* stress ratings only and functionality of the device at these or any other condition beyond those indicated in the operational sections of *the specifications is not implied. Exposure to "*ABSOLUTE MAXIMUM RATINGS*" conditions for extended periods may permanently* affect device reliability.

PRODUCT VARIANTS

TO-257

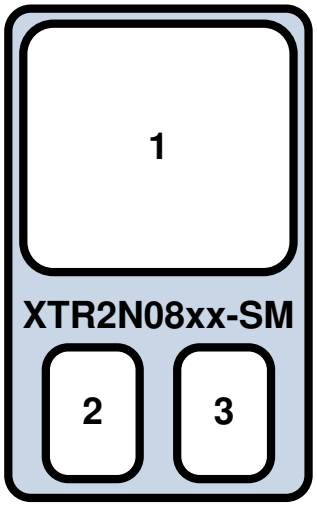
Front view



1	DRAIN
2	SOURCE
3	GATE

SMD-0.5 / SMD-1

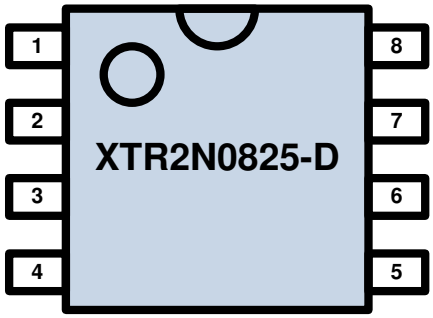
Bottom view



1	SOURCE
2	GATE
3	DRAIN

DIP8

Top view



1, 2, 3	SOURCE
4	GATE
5, 6, 7, 8	DRAIN

RECOMMENDED OPERATING CONDITIONS

Parameter	Min	Typ	Max	Units
Drain-source voltage V_{DS}	-1.5		80	V
Gate-source voltage V_{GS}	-5.5		+5.5	V
Junction Temperature[1] T_j	-60		230	℃

[1] Operation beyond the specified temperature range is achieved.

XTR2N0825 SPECIFICATIONS

Unless otherwise stated, specification applies for -60℃<T_j<230℃.

Parameter	Condition	Min	Typ	Max	Units
DC Characteristics					
Drain-source breakdown voltage BV_{DSS}	V_{GS}=0V, I_{DS}=100μA, T_j=25℃	100			V
Static drain-source on-state resistance $R_{DS(on)}$	V_{GS}=+5V, I_{DS}=100mA T_j=-60℃ T_j=25℃ T_j=230℃		0.65 0.75 1.50		Ω
Gate threshold voltage $V_{GS(th)}$	V_{DS}=V_{GS}, T_j=25℃, I_{DS}=100μA	1.4	1.6	1.8	V
Temperature drift of gate threshold voltage $\Delta V_{GS(TH)}/\Delta T_j$	V_{DS}=V_{GS}, I_{DS}=100μA		-3.5		mV/℃
Off-state drain current I_{DSS}	V_{DS}=80V, V_{GS}=0V T_j=25℃ T_j=230℃		0.0009 12		μA
Off-state gate current I_{GSS}	V_{GS}=±5V, V_{DS}=0V T_j=25℃ T_j=230℃		±0.2 ±80		nA
AC Characteristics					
Input capacitance C_{iss}	V_{DS}=80V, V_{GS}=0V, f=1MHz		310		pF
Output capacitance C_{oss}			75		pF
Reverse transfer capacitance C_{rss}			30		pF
Switching Characteristics					
Pulsed drain current I_{DM}	V_{DS}=80V, $V_{GS\ sweep}$=0 to +5V, d=0.2%, τ=1ms T_j=-60℃ T_j=25℃ T_j=230℃		5 4 2.5		A
Total gate charge Q_g	V_{DS}=80V, $V_{GS\ sweep}$=0 to +5V		3		nC
Turn-on delay time $t_{d(on)}$	V_{DS}=20V, $V_{GS\ sweep}$=0 to +5V, d=0.2%, τ=1ms		30		ns
Rise time t_r	V_{DS}=20V, $V_{GS\ sweep}$=0 to +5V, d=0.2%, τ=1ms		50		
Turn-off delay time $t_{d(off)}$	V_{DS}=20V, $V_{GS\ sweep}$=+5 to 0V, d=0.2%, τ=1ms		50		
Fall time t_f	V_{DS}=20V, $V_{GS\ sweep}$=+5 to 0V, d=0.2%, τ=1ms		25		
Thermal Characteristics					
Junction-case thermal resistance $\Theta_{j\text{-}c}$	TO-257 SMD-0.5		TBD		℃/W
Junction-ambient thermal resistance $\Theta_{j\text{-}a}$	TO-257 SMD-0.5		TBD		℃/W

XTR2N0850 SPECIFICATIONS

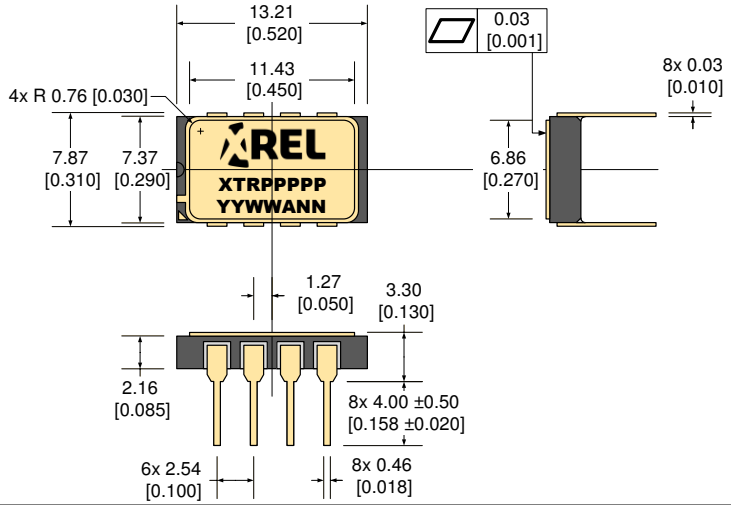
Unless otherwise stated, specification applies for -60℃<T_j<230℃.

Parameter	Condition	Min	Typ	Max	Units
DC Characteristics					
Drain-source breakdown voltage **BV_{DSS}**	V_{GS}=0V, I_{DS}=100μA	100			V
Static drain-source on-state resistance **$R_{DS(on)}$**	V_{GS}=+5V, I_{DS}=100mA T_j=-60℃ T_j=25℃ T_j=230℃		0.33 0.40 0.79		Ω
Gate threshold voltage **$V_{GS(th)}$**	V_{DS}=V_{GS}, T_j=25℃, I_{DS}=100μA	1.4	1.6	1.8	V
Temperature drift of gate threshold voltage **$\Delta V_{GS(TH)}/\Delta T_j$**	V_{DS}=V_{GS}, I_{DS}=100μA		-3.5		mV/℃
Off-state drain current **I_{DSS}**	V_{DS}=80V, V_{GS}=0V T_j=25℃ T_j=230℃		0.0025 29		μA
Off-state drain current **I_{GSS}**	V_{GS}=±5V, V_{DS}=0V T_j=25℃ T_j=230℃		±0.2 ±80		nA
AC Characteristics					
Input capacitance **C_{iss}**	V_{DS}=80V, V_{GS}=0V, f=1MHz		750		pF
Output capacitance **C_{oss}**			180		pF
Reverse transfer capacitance **C_{rss}**			75		pF
Switching Characteristics					
Pulsed drain current **I_{DM}**	V_{DS}=80V, $V_{GS\ sweep}$=0 to +5V, d=0.2%, τ=1ms T_j=-60℃ T_j=25℃ T_j=230℃		11.5 9.5 5.8		A
Total gate charge **Q_g**	V_{DS}=80V, $V_{GS\ sweep}$=0 to +5V		7		nC
Turn-on delay time **$t_{d(on)}$**	V_{DS}=20V, $V_{GS\ sweep}$=0 to +5V, d=0.2%, τ=1ms		40		ns
Rise time **t_r**	V_{DS}=20V, $V_{GS\ sweep}$=0 to +5V, d=0.2%, τ=1ms		55		
Turn-off delay time **$t_{d(off)}$**	V_{DS}=20V, $V_{GS\ sweep}$=+5 to 0V, d=0.2%, τ=1ms		55		
Fall time **t_f**	V_{DS}=20V, $V_{GS\ sweep}$=+5 to 0V, d=0.2%, τ=1ms		30		
Thermal Characteristics					
Junction-case thermal resistance **$\Theta_{j\text{-}c}$**	TO-257 SMD-1		TBD		℃/W
Junction-ambient thermal resistance **$\Theta_{j\text{-}a}$**	TO-257 SMD-1		TBD		℃/W

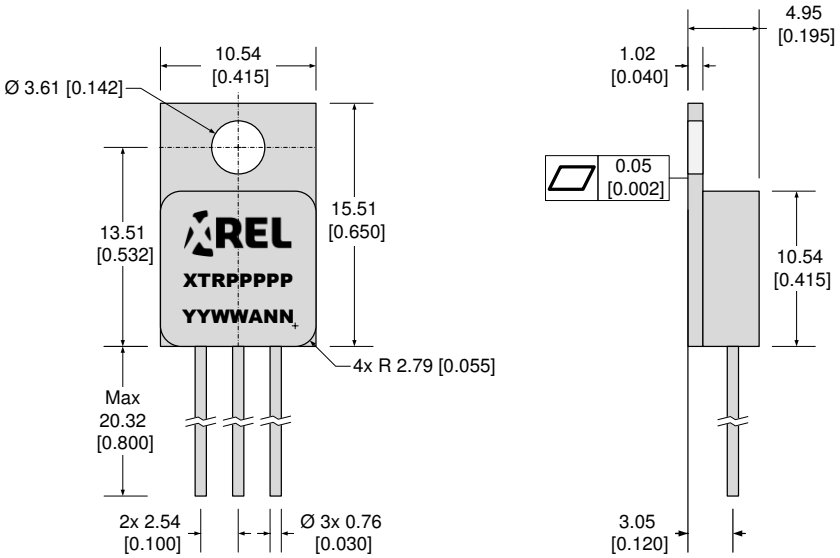
PACKAGE OUTLINES

Dimensions shown in mm [inches].

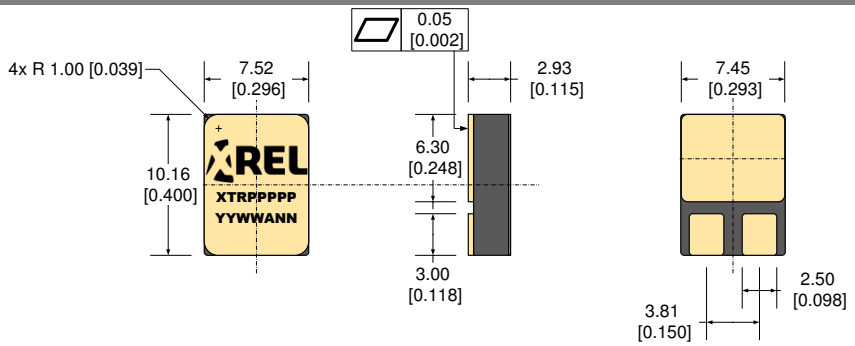
Ceramic Side Braze Dual In-line DIP8



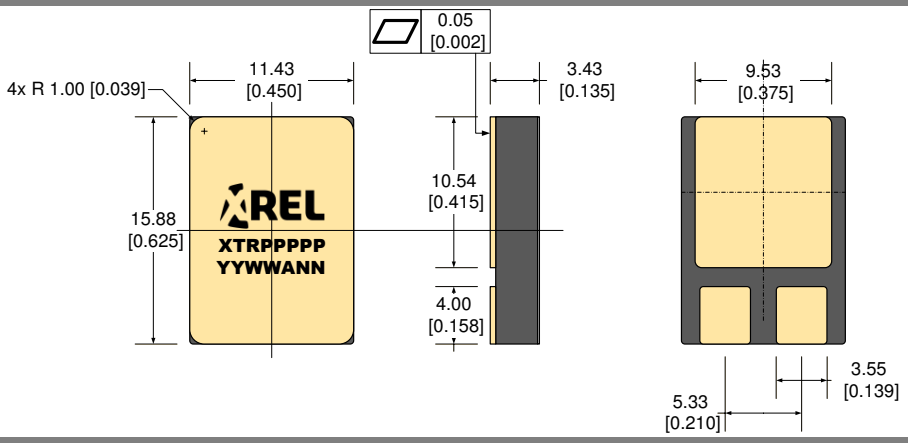
TO-257AA (TO-220M)



SMD-0.5 (TO-276AA)



SMD-0.5 (TO-276AB)



Part Marking Convention	
Part Reference: XTRPPPPPP	
XTR	X-REL Semiconductor, high-temperature, high-reliability product (XTRM Series).
PPPPP	Part number (0-9, A-Z).
Unique Lot Assembly Code: YYWWANN	
YY	Two last digits of assembly year (e.g. 11 = 2011).
WW	Assembly week (01 to 52).
A	Assembly location code.
NN	Assembly lot code (01 to 99).

IMPORTANT NOTICE & DISCLAIMER

CONTACT US

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