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November 2013

ISL9K460P3 —

STEALTH<sup>™</sup> Dual Diode

# SEMICONDUCTOR® ISL9K460P3 8 A, 600 V, STEALTH™ II Diode

## Features

- Stealth Recovery  $t_{rr}$  = 17 ns (@ I<sub>F</sub> = 4 A)
- Max Forward Voltage, V<sub>F</sub> = 2.4 V (@ T<sub>C</sub> = 25°C)
- 600 V Reverse Voltage and High Reliability
- Avalanche Energy Rated

FAIRCHILD

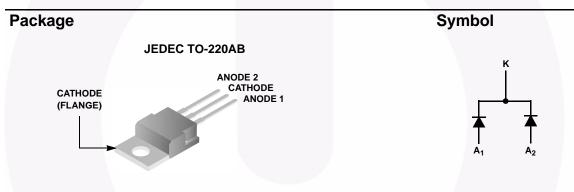
RoHS Compliant

## Applications

- SMPS FWD
- Hard Switched PFC Boost Diode
- UPS Free Wheeling Diode
- Motor Drive FWD
- Snubber Diode

## Description

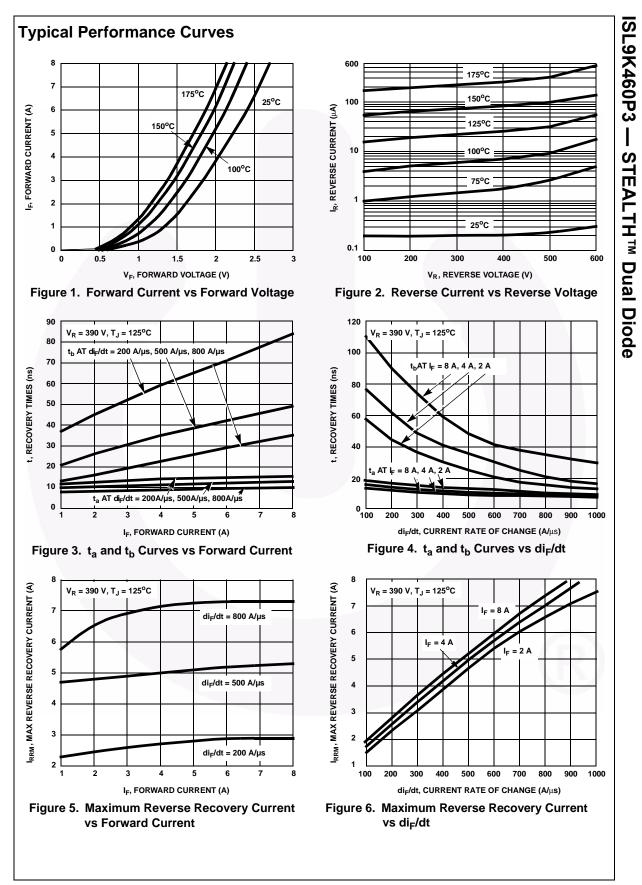
The ISL9K460P3 is a STEALTH<sup>™</sup> dual diode optimized for low loss performance in high frequency hard switched applications. The STEALTH<sup>™</sup> family exhibits low reverse recovery current (I<sub>rr</sub>) and exceptionally soft recovery under typical operating conditions. This device is intended for use as a free wheeling or boost diode in power supplies and other power switching applications. The low I<sub>rr</sub> and short ta phase reduce loss in switching transistors. The soft recovery minimizes ringing, expanding the range of conditions under which the diode may be operated without the use of additional snubber circuitry. Consider using the STEALTH<sup>™</sup> diode with an SMPS IGBT to provide the most efficient and highest power density design at lower cost.



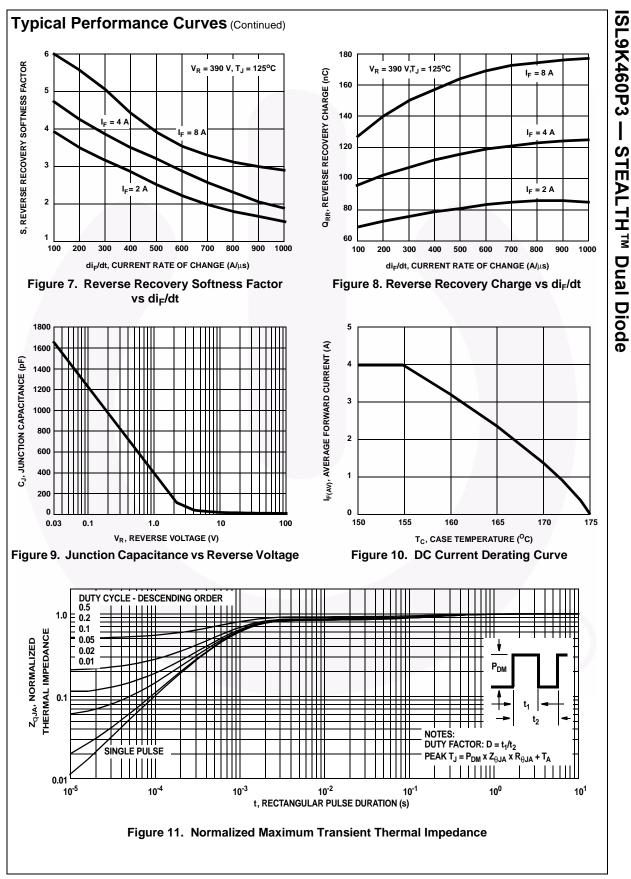
# Device Maximum Ratings (per leg) T<sub>C</sub>= 25°C unless otherwise noted

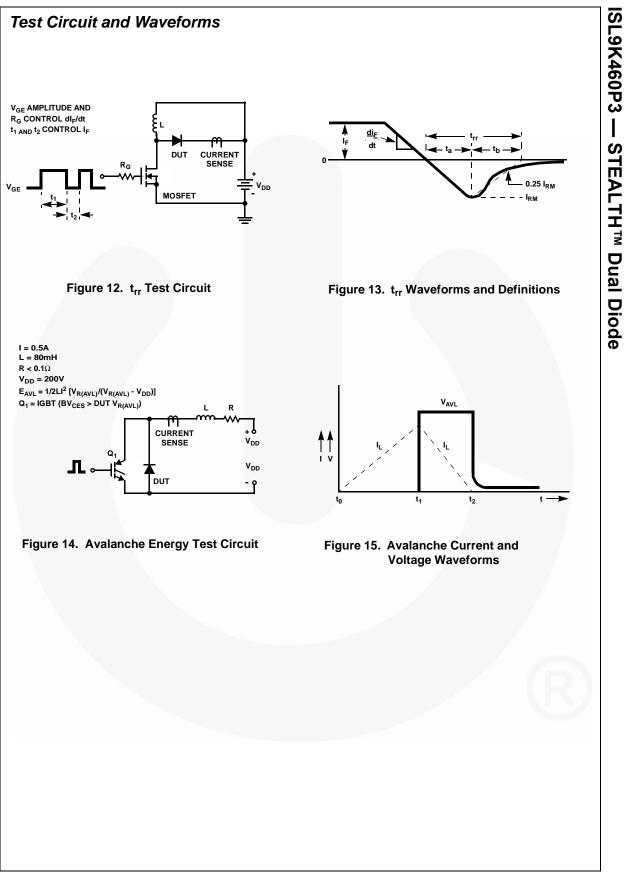
Symbol	Parameter	Rating	Unit V	
V <sub>RRM</sub>	Peak Repetitive Reverse Voltage	600		
V <sub>RWM</sub>	Working Peak Reverse Voltage	600	V	
V <sub>R</sub>	DC Blocking Voltage	600	V	
I <sub>F(AV)</sub>	Average Rectified Forward Current (T <sub>C</sub> = 155°C)	4	Α	
	Total Device Current (Both Legs)	8	A	
I <sub>FRM</sub>	Repetitive Peak Surge Current (20kHz Square Wave)	8	A	
I <sub>FSM</sub>	Nonrepetitive Peak Surge Current (Halfwave 1 Phase 60Hz)	50	A	
PD	Power Dissipation	58	W	
E <sub>AVL</sub>	Avalanche Energy (0.5A, 80mH)		mJ	
Г <sub>Ј</sub> , Т <sub>STG</sub>	Operating and Storage Temperature Range	-55 to 175	°C	
T <sub>L</sub> Maximum Temperature for Soldering		300	°C	
T <sub>PKG</sub>	Leads at 0.063in (1.6mm) from Case for 10s	260	°C	
	Package Body for 10s, See Techbrief TB334			

art Num	ber	Top Mark	Package	Packing Method	Reel Size	Таре	Width	Qu	antity
ISL9K460P3		ISL9K460P3	TO-220	Tube	N/A	N/A		50	
Electric	al C	Characteris	stics (per leg)	T <sub>C</sub> = 25°C unless oth	nerwise noted				
Symbol Parameter		neter	Test Conditions		Min	Тур	Max	Unit	
Off State	Cha	aracteristics							
I <sub>R</sub>	Instantaneous Reverse Current		V <sub>R</sub> = 600 V	T <sub>C</sub> = 25°C	-	-	100	μA	
				T <sub>C</sub> = 125°C	-	-	1.0	mA	
)n State	Cha	racteristics							
		nstantaneous Forward Voltage		$I_F = 4 A$	T <sub>C</sub> = 25°C	-	2.0	2.4	V
				·F ···	T <sub>C</sub> = 125°C	-	1.6	2.0	V
)vnamic	Cha	aracteristics							
CJ		tion Capacitance	)	V <sub>R</sub> = 10 V, I <sub>F</sub> = 0 A	_	-	19	-	pF
		aracteristics					11		
	-					-	17	20	
۲rr	t <sub>rr</sub> Reverse Recovery Time		me	$I_F = 1 \text{ A}, \text{ di}_F/\text{dt} = 100$ $I_F = 4 \text{ A}, \text{ di}_F/\text{dt} = 100$			17	20 22	ns
+	Pov		mo	$I_F = 4 \text{ A}, \ \text{al}_{F}/\text{al} = 100$	$0 \text{ A/}\mu\text{s}, \text{ v}_{\text{R}} = 30 \text{ v}$	-	19	-	ns ns
t <sub>rr</sub>		Reverse Recovery Time Reverse Recovery Current Reverse Recovery Charge		$d_{F} = 4.5$ , $d_{F}/dt = 200 \text{ A/}\mu\text{s}$ , $V_{R} = 390 \text{ V}$ , $T_{C} = 25^{\circ}\text{C}$		_	2.6	-	A
I <sub>rr</sub>						-	2.0		nC
Q <sub>rr</sub>		,	8	$I_{\rm E} = 4$ A,		-	77	-	
t <sub>rr</sub> S		Reverse Recovery Time Softness Factor (t <sub>b</sub> /t <sub>a</sub> ) Reverse Recovery Current		di <sub>F</sub> /dt = 200 A/μs, V <sub>R</sub> = 390 V,		-	4.2	-	ns
-						-	4.2 2.8	-	Α
I <sub>rr</sub>		,		$T_{C} = 125^{\circ}C$				-	
Q <sub>rr</sub>		erse Recovery Cl		$I_{\rm F} = 4  {\rm A},$		-	100	-	nC
t <sub>rr</sub> S		erse Recovery Ti		l <sub>F</sub> = 4 A, di <sub>F</sub> /dt = 400 A/μs,		-	54	-	ns
-		ness Factor (t <sub>b</sub> /t <sub>a</sub> erse Recovery Ci		$V_{\rm R} = 390  \rm V,$		-	3.5 4.3	-	A
I <sub>rr</sub>		erse Recovery Cl		– T <sub>C</sub> = 125°C		-	4.3	-	nC
Q <sub>rr</sub> dI <sub>M</sub> /dt		mum di/dt during	-		-			-	A/µs
			Ъ				500		77μ3
_		racteristics	Junction to Case					2.6	°C/W
R <sub>0JC</sub>				t TO-220		-	-	2.0 62	°C/W
$R_{ extsf{ heta}JA}$	Ther	Thermal Resistance Junction to Ambie		10-220		-	-	02	°C/W



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# **Mechanical Dimensions** ø<sup>4.09</sup> 3.50∆ ⊕ 0,36 M B AM в 4.83 3.56 А 10.67 9.65 8.89 6.86 3.43 2.54 6.86 7° 3' △13.40 12.19 16.51 14,22 △9.40 8.38 3 2 1 C 5° 6.35 MAX 5° 14.73 12.70 (1.91) -1,78 1,14 0,61 △0,33 1.02 0.38 2.92 ⊕ 0.36 M B AM 2.54 NOTES: UNLESS OTHERWISE SPECIFIED A) REFERENCE JEDEC, TO-220, ISSUE K, VARIATION AB, DATED APRIL, 2002. B) ALL DIMENSIONS ARE IN MILLIMETERS. 5.08 B) ALL DIMENSIONS ARE IN MILLIME TERS. C) DIMENSIONING AND TOLERANCING PER ANSI Y14.5 - 1973 D) LOCATION OF THE PIN HOLE MAY VARY (LOWER LEFT CORNER, LOWER CENTER AND CENTER OF THE PACKAGE) COMPLY JEDEC STANDARD VALUE, DIMENSION DEPERCENT IN SOLUTION "A1" DIMENSIONS REPRESENT LIKE BELOW: SINGLE GAUGE = 0.51 - 0.61 DUAL GAUGE = 1,14 - 1,40 щ щ G) DRAWING FILE NAME: TO220B03REV6 Figure 16. TO-220 3L - TO-220, MOLDED, 3LEAD, JEDEC VARIATION AB

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