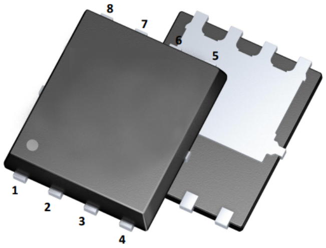
NEOTON
Optronics Corporation

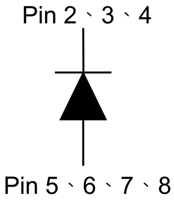
Soft Recovery GaN Schottky Diode

NT1D10565S
650V,5A

Description

The Schottky diodes employ a wide bandgap Gallium Nitride (GaN) material that ensures a 650 V rating. The diodes show no recovery at turn-off with negligible ringing patterns. Their minimal capacitive turn-off behavior is independent of temperature. The superior switching performance of GaN Schottky diodes improves system efficiency as compared to Silicon diodes.





Features and benefits

- Reduces conduction losses by lower V_F during extreme light load conditions
- Reduces switching losses in commutation between diodes and associated MOSFETs
- Lower EMI than FRD & SiC due to the higher softness factor(T_S) known as a soft-recovery
- Extremely fast switching, temperature independent, no thermal runaway issue, better thermal conductivity due to lower $R_{\theta JC}$
- Positive temperature coefficient on V_F, suitable for parallel commutation configuration in high power
- System cost and size savings due to the reduced cooling and EMI requirements

Part Number	Package	Marking
NT1D10565S	PDFN 5×6 8L	1D10565

Applications

- Power factor correction modules
- Secondary side rectification
- Anti-Parallel Diode (Switchmode Power Supply, Inverters)
- Free Wheeling Diode (Motor Controllers, Converters, Inverters)
- Snubber Diode

Maximum Ratings (T_J = 25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Value	Units
DC Peak reverse voltage	V_R		650	V
Repetitive peak reverse voltage	V_{RRM}		650	V
Surge peak reverse voltage	V_{RSM}		650	V
Continuous forward current	I_F	T_C = 125°C	5	A
Non-repetitive forward surge current sine halfwave	I_{FSM}	T_C = 25°C, t_p = 10ms	20	A
		T_C = 125°C, t_p =10ms	15	
Power dissipation	P_{Tot}	T_C = 25°C	62	W
		T_C = 125°C	12	
Maximum junction temperature	$T_{J,max}$		150	°C
Operating and storage temperature	T_J, T_{STG}		-55 to 150	°C
Soldering temperatures, wavesoldering only allowed at leads	T_{sold}	1.6mm from case for 10s	260	°C

Electrical Characteristics (T$_J$ = 25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Value			Units
			Min	Typ	Max	
Forward voltage	V_F	I_F=100mA, T_J=25°C		0.55		V
		I_F=5A, T_J=25°C		1.55	1.75	
		I_F=5A, T_J=150°C		2.15	2.35	
Reverse current	I_R	V_R=650V, T_J=25°C		5		µA
		V_R=650V, T_J=150°C		100		
Total capacitive charge (1)	Q_C	V_R=400V di/dt=300A/us		21		nC
Total capacitance	C	V_R=1V, f=1MHz		450		pF
		V_R=300V, f=1MHz		45		
		V_R=600V, f=1MHz		30		
Softness Factor (tb/ta)	T_S	V_R=400V di/dt=300A/us		7.0		

(1) Q_c is independent on T_J, di_F/dt, and I_F as shown in the application note

Thermal characteristics

Parameter	Symbol	Test Conditions	Value			Units
			Min	Typ	Max	
Thermal resistance, junction - case	$R_{\theta JC}$			2.0		°C/W

Typical Performance

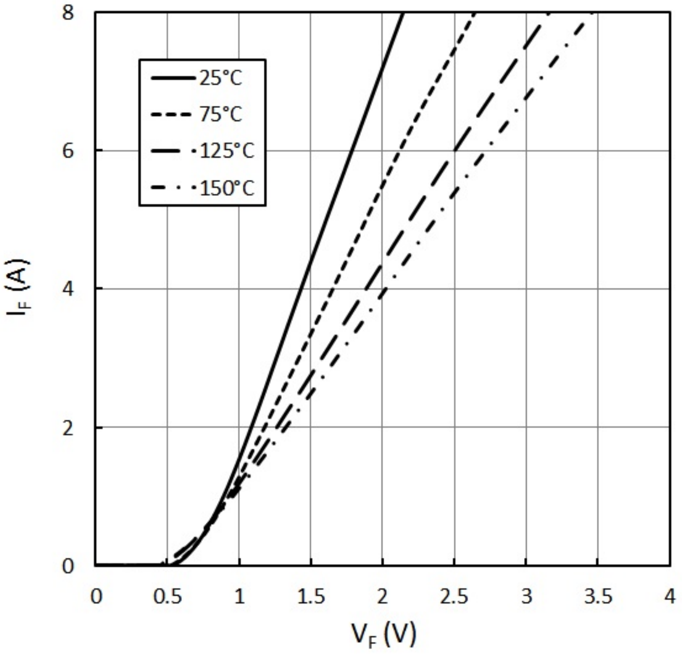


Figure 1 Typical forward characteristics

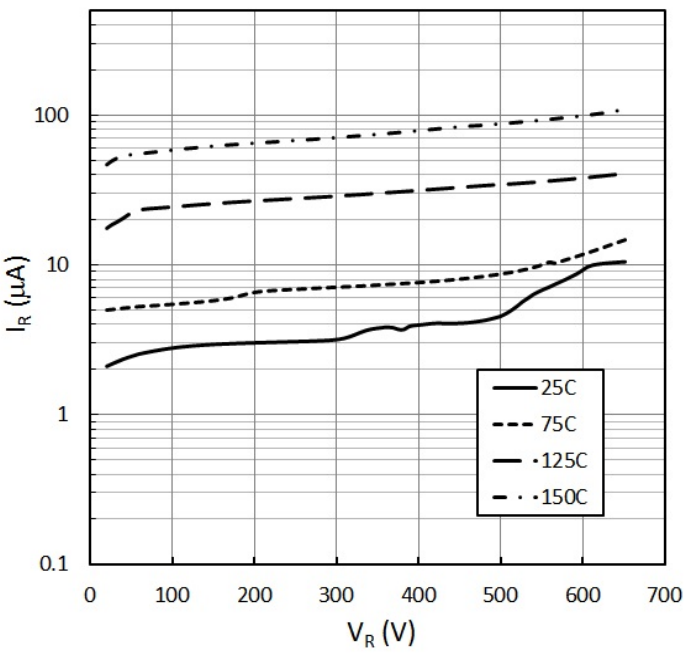


Figure 2 Typical reverse characteristics

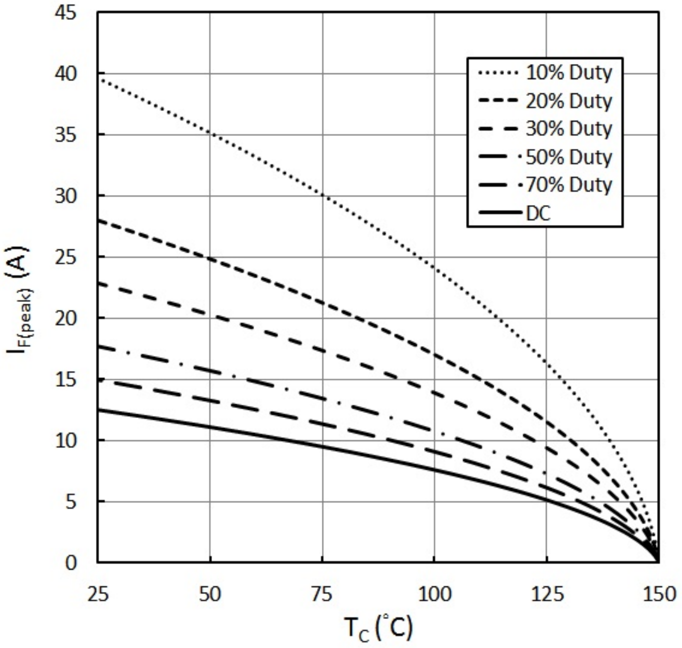


Figure 3 Current Derating

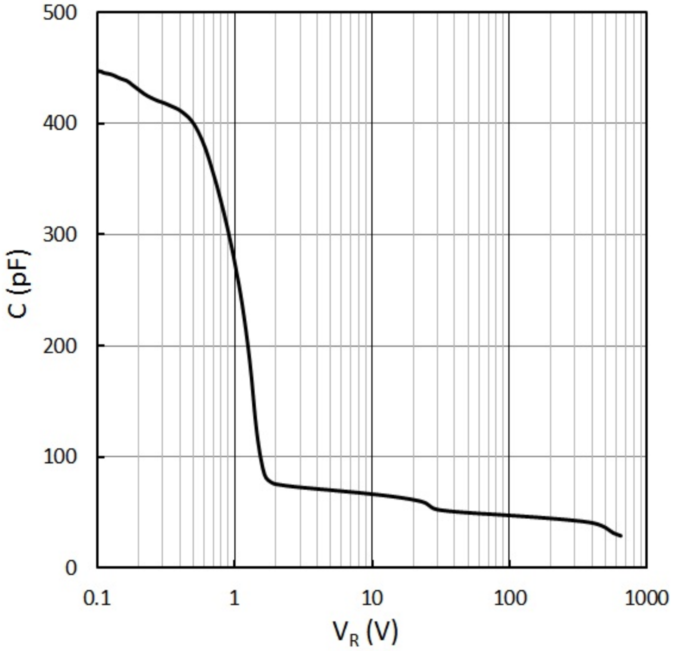
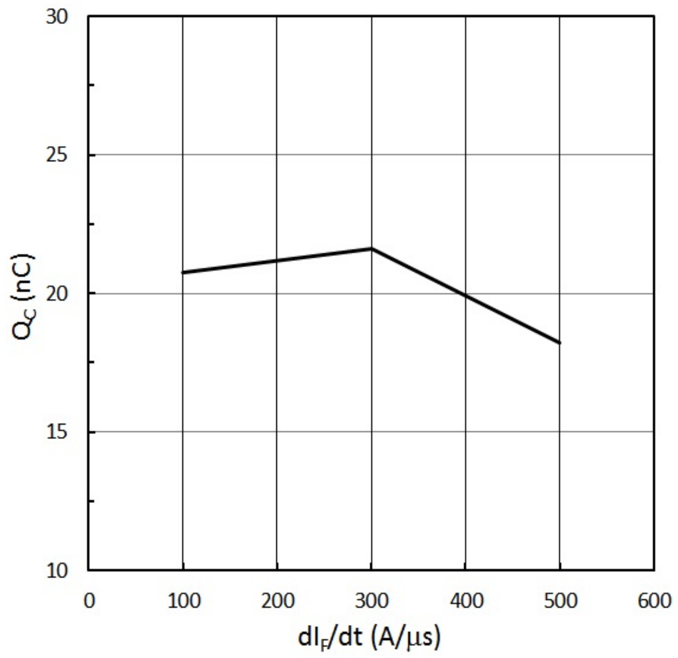


Figure 4 Capacitance vs. reverse voltage at 1MHz



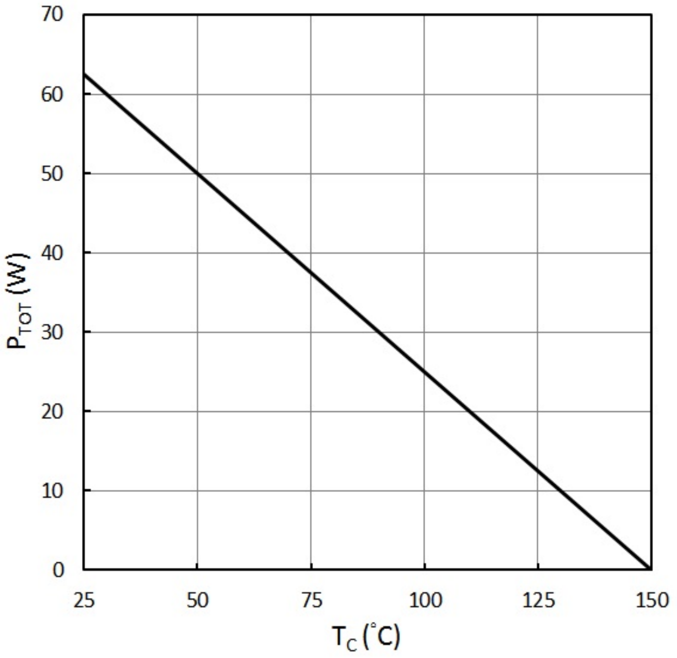


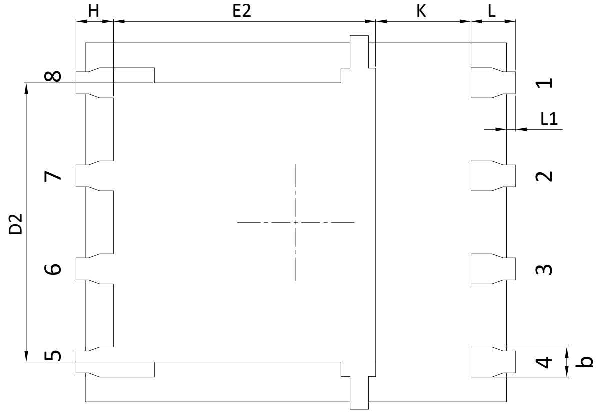
Figure 5 Capacitance charge vs. current slope

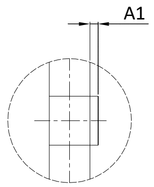
Figure 6 Power dissipation

Package information

TO-220-2L dimensions in mm

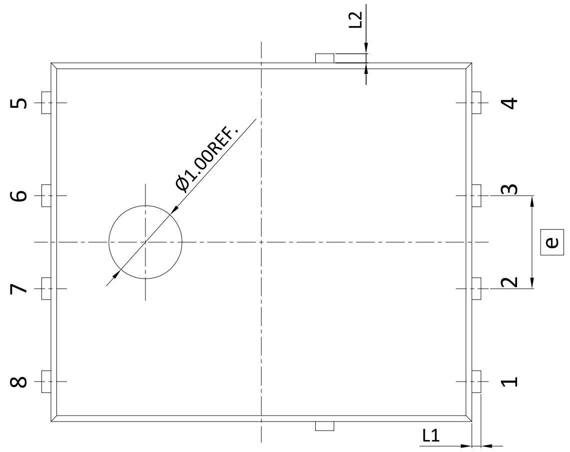
Bottom view

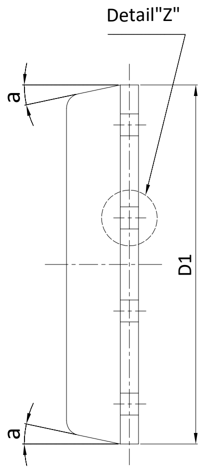




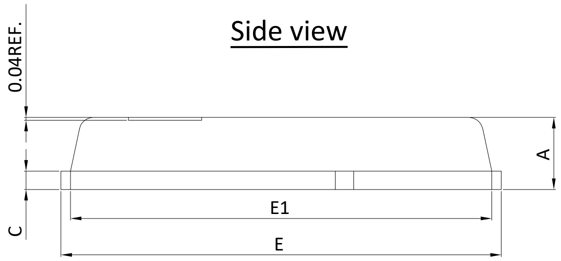
Detail"Z"

Top view





Side view



DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.90	1.00	1.10
A1	0	-	0.05
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
e	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	3.58	3.78
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
L2	-	-	0.125
a	0°	-	12°