STD150NH02L-1
STD150NH02L

N-channel 24V - 0.003Ω - 150A - ClipPAK™ - IPAK
STripFET™ III Power MOSFET

General features

Type	V_{DSSS}	$R_{DS(on)}$	I_D
STD150NH02L	24V	<0.0035Ω	150A
STD150NH02L-1	24V	<0.0035Ω	150A

- $R_{DS(on)}$ * Qg industry's benchmark
- Conduction losses reduced
- Switching losses reduced
- Low threshold device

ClipPAK™ IPAK

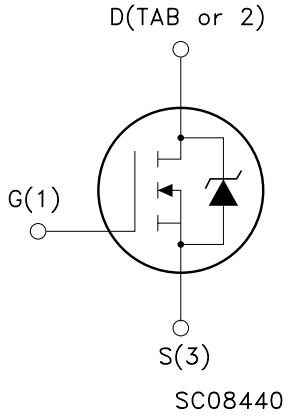
Description

The STD150NH02L utilizes the latest advanced design rules of ST's proprietary STripFET™ technology. This novel 0.6µ process utilizes also unique metallization techniques that couple to a "bondless" assembly technique result in outstanding performance with standard DPAK outline. It is therefore ideal in high performance DC-DC converter applications where efficiency it to be achieved at very high out currents.

Applications

- Switching application

Internal schematic diagram



Order codes

Part number	Marking	Package	Packaging
STD150NH02LT4	D150NH02L	ClipPAK™	Tape & reel
STD150NH02L-1	D150NH02L	IPAK	Tube

1 Electrical ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{spike} (1)	Drain-source voltage rating	30	V
V_{DS}	Drain-source voltage (V_{GS} = 0)	24	V
V_{DGR}	Drain-gate voltage (R_{GS} = 20KΩ)	24	V
V_{GS}	Drain-source voltage	± 20	V
I_D	Drain current (continuous) at T_C = 25°C	150	A
I_D	Drain current (continuous) at T_C=100°C	107	A
I_{DM} (2)	Drain current (pulsed)	600	A
P_{TOT}	Total dissipation at T_C = 25°C	125	W
	Derating factor	0.83	W/°C
E_{AS} (3)	Single pulse avalanche energy	500	mJ
T_{stg}	Storage temperature	-55 to 175	°C
T_J	Max. operating junction temperature		

1. Garanted when external Rg = 4.7 Ω and $t_f < t_{fmax}$.
2. Pulse width limited by safe operating area
3. Starting T_J = 25 °C, I_D = 75A, V_{DD} = 10V

Table 2. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Thermal resistance junction-case Max	1.2	°C/W
R_{thJA}	Thermal resistance junction-ambient Max	100	°C/W
T_l	Maximum lead temperature for soldering purpose	275	°C

2 Electrical characteristics

(T_{CASE}=25°C unless otherwise specified)

Table 3. On(1) /off states

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source breakdown voltage	I_D = 25mA, V_{GS} = 0	24			V
I_{DSS}	Zero gate voltage drain current (V_{GS} = 0)	V_{DS} = 20V V_{DS} = 20V, T_C = 125°C			1 10	µA µA
I_{GSS}	Gate body leakage current (V_{DS} = 0)	V_{GS} = ±20V			±100	nA
$V_{GS(th)}$	Gate threshold voltage	V_{DS}= V_{GS}, I_D = 250µA	1	1.8		V
$R_{DS(on)}$	Static drain-source on resistance	V_{GS} = 10V, I_D = 75A V_{GS} = 5V, I_D = 37.5A		0.003 0.004	0.0035 0.0065	Ω Ω

1. Pulsed: Pulse duration = 300 µs, duty cycle 1.5%

Table 4. Dynamic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
g_{fs} (1)	Forward transconductance	V_{DS} = 10 V, I_D = 75A		60		S
C_{iss} C_{oss} C_{rss}	Input capacitance Output capacitance Reverse transfer capacitance	V_{DS} = 15V, f = 1 MHz, V_{GS} = 0		4450 1126 141		pF pF pF
Q_g Q_{gs} Q_{gd}	Total gate charge Gate-source charge Gate-drain charge	V_{DD} = 16V, I_D = 150A V_{GS} = 10V		69 13 9	93	nC nC nC
Q_{oss}(2)	Output charge	V_{DS} = 16V, V_{GS} = 0V		27		nC
Q_{gls}(3)	Third-quadrant gate charge	V_{DS} < 0V, V_{GS} = 10V		64		nC
R_G	Gate input resistance	f = 1MHz gate DC Bias = 0 Test signal level = 20mV Open drain		1.6		Ω

1. Pulsed: pulse duration=300µs, duty cycle 1.5%
2. $Q_{oss} = C_{oss} * \Delta V_{in}$, $C_{oss} = C_{gd} + C_{ds}$. See Appendix A
3. Gate charge for synchronous operation

Table 5. Switching times

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$ t_r $t_{d(off)}$ t_f	Turn-on delay time Rise time Turn-off delay time Fall time	V_{DD} = 10V, I_D = 75A, R_G = 4.7Ω, V_{GS} = 10V		14 224 69 40	 54	ns ns ns ns

Table 6. Source drain diode

Symbol	Parameter	Test conditions	Min	Typ.	Max	Unit
I_{SD}	Source-drain current				150	A
I_{SDM}	Source-drain current (pulsed)				600	A
V_{SD}(1)	Forward on voltage	I_{SD} = 75A, V_{GS} = 0			1.15	V
t_{rr} Q_{rr} I_{RRM}	Reverse recovery time Reverse recovery charge Reverse recovery current	I_{SD} = 150A, di/dt = 100A/µs, V_{DD} = 15V, T_J = 150°C		47 58 2.5		ns µC A

1. Pulsed: pulse duration=300µs, duty cycle 1.5%

2.1 Electrical characteristics (curves)

Figure 1. Safe operating area

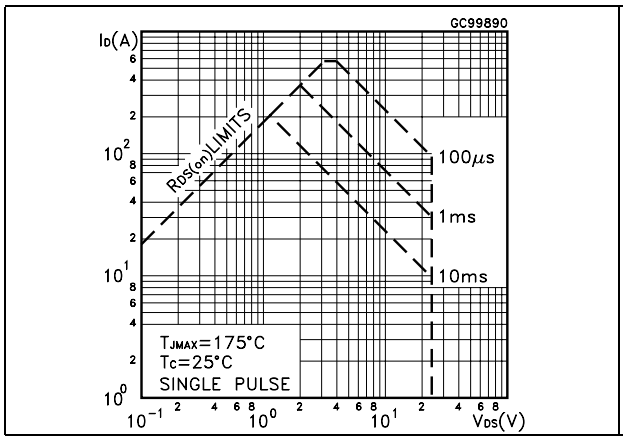


Figure 2. Thermal impedance

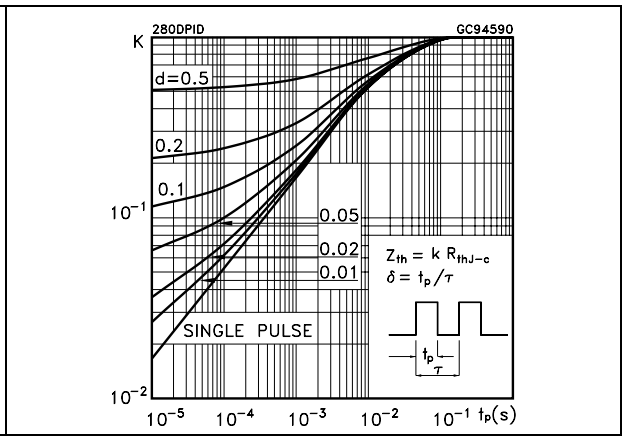


Figure 3. Output characterisics

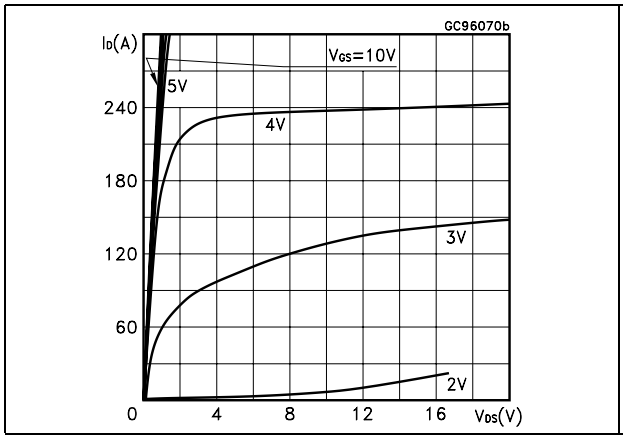


Figure 4. Transfer characteristics

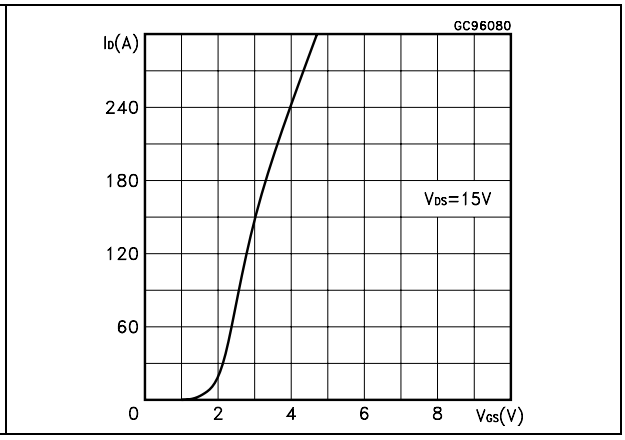


Figure 5. Transconductance

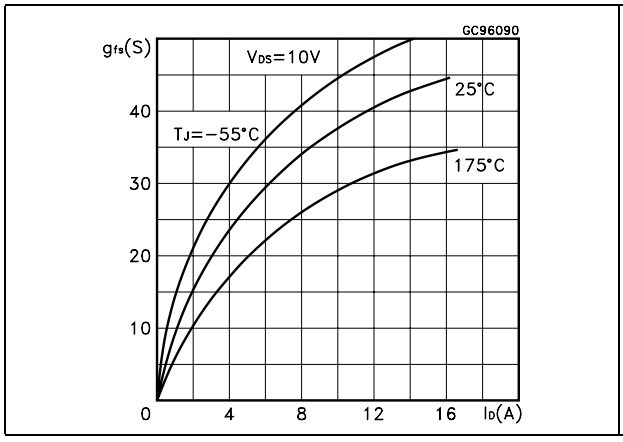


Figure 6. Static drain-source on resistance